IN THE MATTER OF	the Fast-track Approvals Act 2024 ("FTAA")
AND	
IN THE MATTER OF	an application for approvals by **NZ Transport Agency Waka Kotahi** to construct, operate and maintain the State Highway 1 Wellington Improvements project

STATE HIGHWAY 1 WELLINGTON IMPROVEMENTS PROJECT
TECHNICAL ASSESSMENT #5
INTEGRATED TRANSPORT ASSESSMENT

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1. INTRODUCTION

1. My full name is Duncan Barry Tindall. I hold the position of Technical Director in the Transport Planning and Traffic Engineering team at GHD New Zealand Limited (GHD).

2. I have been assisted in my assessment by Andrew Smith, Rebecca Young, Genevieve van der Merwe, and Emily Taunt who have completed surveys and assessment under my supervision. I have also relied on the work of Wellington Transport Analytic Unit who have undertaken transport network modelling to support my assessment.

Qualifications and experience

3. I hold the academic qualifications of Masters of Science in Traffic and Transport from the University of London (Centre for Transport Studies) and a Masters of Engineering in Civil Engineering, also from University of London (Imperial College). I am a Member of Engineering New Zealand. I have worked in the field of transport for 29 years and have been working and living in New Zealand since 2010. During this period, I have worked on a range of transportation planning projects, development planning and development control across New Zealand. Prior to joining GHD in 2019 I was an Associate with Beca New Zealand and an Associate Director with AECOM New Zealand limited, and the Implementation Lead for SmartGrowth, the Spatial Plan of the Western Bay of Plenty.

4. I have led the transport planning and the preparation of the Transport Assessment for the Riverlink NZ Upgrade Project. This included the assessment of multi-modal effects, the development of mitigations where required and engagement with stakeholders, including several public open days. I also appeared on behalf of the Applicants as the Expert Witness for Transport at the Environment Court hearing.

5. Additionally, I was engaged by Auckland Council as Transport Expert for Board of Inquiry for East West Link and SH1 Northern Corridor.

6. In 2024 I provided Technical Transport Planning support to Greater Wellington Regional Council (GWRC) for Proposed Plan Change 1 to the Regional Policy Statement for the Climate Change – Transport Hearing stream.

7. Further, I have supported NZTA and Local Authorities with the assessment and Expert Evidence at Hearings under the RMA for Plan Changes and Resource Consent applications for development proposals.

8. I have previously been involved with the design and assessment of projects that included tolls or user charging in Tauranga and, prior to moving to New Zealand, in the UK for London and Manchester.

9. I have been involved with projects along this corridor since 2021 with the Indicative Business Case for Mass Rapid Transit, where my role included the integration of that project with the work being undertaken in parallel with the SH1 Indicative Business Case. Following the completion of the indicative business cases (IBC), the projects were combined into the Transformational Package of Let's Get Wellington Moving where I was a member of the Governance Group.

10. Prior to undertaking my assessment, I visited the site on several occasions. These visits consisted of both driving the route and parallel roads and walking the route to observe conditions. These visits were undertaken at various times, including morning and evening peak periods and off peak.

Code of conduct

11. I confirm that I have read the code of conduct for expert witnesses contained in the Environment Court Practice Note 2023. This assessment has been prepared in compliance with that code, as if it were evidence being given in Environment Court proceedings. In particular, unless I state otherwise, this assessment is within my area of expertise and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

Project description

12. The State Highway 1 (SH1) Wellington Improvements project (the Project) is a Road of National Significance (RoNS) which improves SH1 in Wellington City. The proposal includes the construction of improvements to SH1 within Wellington City from north of the Terrace Tunnel to Kilbirnie.

13. The Project will provide for more efficient and reliable access on SH1 and includes second tunnels at The Terrace and Mt Victoria, a new layout at the Basin Reserve as well as improvements along the remainder of the SH1 corridor from north of the Terrace Tunnel to the intersection of Cobham Drive and Evans Bay Parade enroute to Wellington Airport. The Project aims to unblock critical bottlenecks on the state highway, maintain access for local movements and enable public transport growth.

Scope of assessment

14. My assessment addresses the following matters:

    i. The methodology I have used to assess the transport and traffic impacts of the Project

    ii. The existing environment

    iii. Effects of the Project during operation

    iv. Effects of the Project during construction

    v. Benefits of the Project

    vi. Recommended measures to avoid, remedy or mitigate adverse effects

2. EXECUTIVE SUMMARY

Existing environment

15. The SH1 corridor through central Wellington forms a critical component of the national and regional transport network, providing the primary connection between the wider region, Wellington's northern suburbs, the CBD, the eastern suburbs, Wellington Hospital, and Wellington Airport. The corridor also supports important local access functions and adjacent facilities for active modes and public transport services.

16. The existing environment is characterised by congestion and poor journey time reliability, particularly at the Terrace Tunnel and Mt Victoria Tunnel where two to one lane merges cause severe bottlenecks. Other conflict points exist around the Basin Reserve, along the Vivian Street and Karo Drive corridors through Te Aro, and along the Kent/Cambridge Terrace corridors. These locations represent known capacity constraints, resulting in unreliable journey times, poor network resilience, and significant delays during peak periods.

17. SH1 currently operates at or near its theoretical capacity for extended periods of weekdays and many hours during the weekends, which means it is vulnerable to incidents such as crashes or planned events. Congestion on SH1 results in traffic diverting onto parallel local roads, affecting residential amenity, public transport performance, safety, and the efficiency of the wider transport network.

18. The corridor traverses a complex urban environment comprising the CBD, residential, educational, open space, and institutional land uses. It also interacts with many intersections, high frequency public transport corridors and established walking and cycling routes.

19. Without intervention, in my opinion forecast growth in travel demand will exacerbate congestion, reduce journey time reliability, and further constrain Wellington's ability to support planned growth and intensification. I note from Mr Norman's Economic Assessment that he considers the congestion as being a factor that has limited the growth in parts of Wellington.

Benefits of the Project

20. I have assessed that the likely benefits of the Project include:

    i. **Improved efficiency and accessibility** – The Project removes key bottlenecks and provides continuous two-lane capacity in each direction through the Terrace and Mt Victoria tunnels and enhanced road configurations and traffic signal operations through the Te Aro / Basin Reserve corridors. Transport modelling indicated average journey time savings of approximately 4 to 7 minutes[1] (around 10 to 15%) on key strategic routes, including journeys between Johnsonville, the CBD, Wellington Hospital, and Wellington Airport. Travel time benefits will directly improve accessibility along the corridor from the northern and eastern suburbs thereby enabling further growth in those areas. These benefits are experienced on both SH1 and local roads as traffic is attracted back to the state highway and frees up space for other uses

    ii. **Improved journey time reliability** – By increasing capacity and reducing the number of conflict points, the Project improves the reliability and predictability of travel through the corridor. Reduced variability in journey times provides productivity benefits for commuters, business trips, freight, social and recreational journeys, and airport and

[1] Note that higher peak travel time savings will be experienced.

hospital related, time-sensitive travel. It also reduces the need for users to allow excessive contingency time

iii. **Enhanced network resilience** – The additional Terrace and Mt Victoria tunnels and improvements at the Basin Reserve significantly improve the resilience of the transport network. The Project increases the network's ability to accommodate incidents, maintenance activities, and major events with reduced widespread disruption, providing alternative routing and greater operational flexibility

iv. **Enhanced active mode facilities and public transport opportunities** – The new Mt Victoria Tunnel will include an upgraded shared use path that will enhance connectivity by active modes between Hataitai and the eastern suburbs and the CBD and other suburbs within the inner city. While not explicitly claimed as a benefit, the new SH1 and local road configurations are designed to be able to be used by public transport

Potential adverse effects without mitigation

21. I have assessed that the potential adverse effects of the Project include:

i. **Changes to local traffic patterns** – Some local roads, particularly in the Eastern Connections area (including Moxham Avenue), are forecast to experience increased traffic volumes due to changes in access arrangements and routing. This may negatively affect local amenity, public transport performance, and active mode travel if unmanaged

ii. **Parking removal** – The Project proposed to remove on-street parking in several locations, including along Vivian Street, parts of the Basin Reserve, Ruahine Street, and Wellington Road. While alternative parking is generally available nearby, the loss of parking may affect some local users and businesses

iii. **Property access changes** – Changes to intersection layouts, turning restrictions, and parking changes, may result in longer or less direct vehicle access for some properties, particularly in Te Aro, the Basin Reserve, and Eastern Connection areas

iv. **Construction related disruption –** Construction activities, including temporary closures of the Mt Victoria Tunnel shared path and other active mode routes, will disrupt walking and cycling connections and require temporary detours. In addition, the extended construction period (expected to span multiple years), will result in temporary traffic disruption, reduced capacity, detours, parking loss, and impacts to public transport reliability and local accessibility during certain construction periods, which may impact patronage if not managed adequately

Proposed measures to avoid, remedy or mitigate adverse effects, including conditions

22. My assessment has identified a range of operational, and construction related transport effects arising from the Project, and these are described in detail in later Chapters. My recommended measures to avoid, remedy or mitigate potential adverse effects include:

i. **Operation**

i. **Vivian Street:** Two key operational effects are identified:

(i) Additional traffic lanes, increased volumes and possibly high mean journey speeds create a moderate safety risk, particularly for pedestrians. In my opinion, this risk can be reduced to low through implementation of the Safe

System Audit[2] recommendations, which include coordinated traffic signals and active speed management outside of peak hours to discourage excessive speeds

(ii) The loss of on-street parking on Vivian Street results in a high adverse effect on business loading requirements, and a low effect on parking. I recommend that consideration is given to providing alternative loading locations nearby, or off-peak loading-only bays, which would reduce the adverse effect to low

ii. **Basin Reserve Cricket Ground:** Two key operational effects are identified:

(i) Pedestrian access from the north is moderately adversely affected due to increased traffic conflicts. Mitigation in the design consists of a 9.5m wide pedestrian crossing and providing additional pedestrian storage from that initially allowed for, reducing the adverse effect to low

(ii) St Mark's School pick up and drop off area experiences increased traffic exposure, creating a moderate safety risk for vulnerable users. Mitigation now in the design following my initial assessment includes an amended layout with one way flow and improved visibility at crossings, which reduces the effect to negligible

iii. **Moxham Avenue**: Increased traffic results in moderate adverse effects on active mode safety and bus reliability. Mitigation included in the design following public engagement carried out in late 2025 consists of providing for cycles via an alternative shared use path along Ruahine Street / Wellington Road, traffic calming measures on Moxham Avenue, improved pedestrian crossing infrastructure, and kerbside management to maintain public transport efficiency, reducing effects to low

ii. **Construction**

i. **Ghuznee Street:** Construction of the replacement Ghuznee Bridge over SH 1 would create a moderate adverse effect with standard construction management measures including advance notice, detour and parking management, intersection control adjustments. By retaining westbound access for buses only the effect on PT can be reduced to low

ii. **Terrace Tunnel:** During construction, the loss of parking in the Terrace Tunnel section results in limited parking availability in the area, assessed as a moderate effect

iii. **Mt Victoria Tunnel Walking and Cycling Access**: The temporary closure of the shared path through the tunnel for up to 3 years results in a very high adverse effect for pedestrians and cyclists. Key mitigations could consider subsidised travel and higher frequencies for existing bus services through the Hataitai bus tunnel for affected users, enhancements to alternative routes to make these more attractive, and clear communication and engagement with users, which together would reduce the overall effect to moderate

iv. **Hataitai:** Construction may result in moderate adverse effects on bus journey times and reliability through Hataitai. Monitoring of bus performance during construction is recommended, with responsive measures such as signal phasing

[2] Concept Design Safe System Audit, WSP (June 2025)

adjustments or temporary bus priority implemented where required, reducing the effect to low

v. **Hataitai Park:** Limited access to the park and associated parking loss during construction will have a moderate effect. Mitigation can be accommodated through the alternative construction methodologies provided in the Constructability Report to reduce the duration of the closure, which will reduce the overall effect to low

23. In this report I have assessed the forecast transport effects that I consider the delivery of the Project will create. This is based on the best understanding I have of the Project as it is developed at this time, and also of the expected future conditions at the time of opening and then 20 years later.

24. I consider that whilst there will undoubtedly be changes to both the Project and the future environment compared to the assumptions at this time, the locations and quantum of the relative effects of the Project against the Do Minimum are a fair and robust basis for the assessment.

25. With the recommended mitigation measures in place, most of the adverse effects I have identified can be reduced to low or negligible levels, and in my opinion the higher risk impacts, particularly during construction, can be meaningfully managed.

26. It is my opinion that the Project will deliver significant long-term benefits in journey time savings, reliability, and network resilience, and the residual effects are acceptable provided mitigation is implemented as recommended.

3. ASSESSMENT FRAMEWORK

Planning context

27. There are numerous Objectives and Policies in statutory planning documents that are relevant to assessing the transport effects of the Project. Key provisions of these instruments - including the National Policy Statements on Infrastructure and Urban Design, the Regional Policy Statement for the Wellington Region (including proposed Change 1), and the District Plan - are set out in the NZTA's application for approvals for the Project under the FTAA. I have assisted my colleagues who have prepared that FTAA application to evaluate the Project against those provisions, as set out in the application.

Guidance and scope

28. When preparing this assessment, I have taken into account the guidance from Waka Kotahi Research Report 422 – Integrated Transport Assessment Guidelines (2010)[3].

29. The guidelines identify that "an Integrated Transport Assessment will often be required as part of the AEE to consider the physical and environmental issues associated with the proposal". Whilst I note that the guidelines were written in the context of a consenting pathway that predates the FTAA being followed for the Project, I consider that the principles as they relate to the assessment of transport remain valid, and therefore this is appropriate to have as a base.

30. In assessing these issues, the guidance states the following actions are necessary:

    i. **Focus on all potential effects including cumulative effects:** it is important to assess what the future effect will be of a proposed transportation facility or land use development including, if appropriate, the objectives, policies and rules in the district plan

    ii. **Consider the issues** of congestion, induced traffic, social effects, land transport noise, air quality and climate change etc.

    iii. **Consider all proposals in the context of supporting a broader transport strategy**, e.g. a Regional Land Transport Strategy (RLTS)[4], any regional or district plan transport strategies, and the content of any regional growth strategy

    iv. **Be aware of changing public attitudes, expectations and perceptions** concerning acceptable effects and acceptable levels of transportation accessibility in relation to land transport

31. In noting the guidance above, I have considered that the appropriate scope for my assessment should include:

    i. Active transport network (walking and cycling)

    ii. Public transport network (including rail and buses)

    iii. Road network (general and freight traffic)

    iv. Safety for all modes and users

    v. Parking

[3] RR 422 Integrated transport assessment guidelines (nzta.govt.nz)

[4] I note that the RLTS has since been replaced with the Regional Transport Plan, and I have considered this in my assessment as the intent of the guidance.

vi. Property and community access, including vehicle crossings and servicing requirements

32. Whilst my scope is limited to the items above, I do note that some of the effects relating to these items lead to secondary effects such as economic benefits, changes to the social impact, noise and air quality assessments and are all assessed in separate Specialist Reports. These assessments use the same data as I have relied on or have used this Integrated Transport Assessment as a basis for their assessments.

4. ASSESSMENT METHODOLOGY

Approach to assessing effects

33. In this section, I describe the methodology I used to assess the potential effects of the Project on the transport environment.

Scale of effects

34. In undertaking my assessment, I have used a graded approach to describing effects. The nature of this assessment, considering the variety of transport modes that are impacted means that there is a subjective nature to this classification. In order to provide transparency to my assessment I used the following as the basis for the descriptions of scale of adverse effects:

    i. **Negligible** – A consequence of the scheme that results in a theoretical effect but one that would be unlikely to be perceived in reality

    ii. **Low** – Minor change from existing Do Minimum conditions. Temporary or short-term impacts or long term change will be noticeable, but environment will be overall similar to pre-development conditions

    iii. **Moderate** – Material change from existing Do Minimum conditions in the short, medium or long term. Noticeable to an affected individual, and some people may change their behaviour including time of travel, considering changing mode for some trips. May make things harder, but not impossible

    iv. **High** – Major loss or major alteration to the existing Do Minimum conditions such that the post-development environment will be fundamentally changed compared to the pre-development environment. This includes removing the option to utilise a preferred mode of travel or requires a detour with an increase in journey time or distance of more than 20%

    v. **Very high** – Total loss of, or very major alteration to, the existing Do Minimum conditions, such that the environment post development will be fundamentally changed. Longterm impacts that may be irreversible. Examples are when access is no longer available with no alternate option available

35. I used an equivalent scale for positive effects.

Active transport network

36. The assessment of the active transport network, referring to walking, cycling, and micro-mobility modes, has been undertaken using primarily qualitative assessments of changes in the quality of the connections, and the directness of travel routes. The assessment has been informed by the facilities detailed on the Project drawings.

37. I have used data that is collected from the users of a popular fitness tracking and activity sharing app known as ‘Strava’ to provide qualitative evidence of the relative popularity of routes used for both walking and cycling (separately). This data is shown as heatmaps with the existing environment chapter of the report. And whilst it is not a tool that can be used to forecast future route choice or activity levels, I have used it to understand the number of current users potentially affected by Project changes.

38. I based my assessment on the general presence of facilities to support walking and cycling, but I gave more weight to facilities which provided connections along key ‘desire lines’. Desire lines are theoretical lines between locations that generate or attract a concentration of journeys that

is higher than surrounding areas. An example of this is between Te Aro and Massey University Campus, a clearly concentrated desire route.

39. Other desire lines include the linkage from Hataitai to Te Aro, the CBD and Wellington Regional Hospital, and routes to destinations such as the Basin Reserve, St Mark's School and Wellington College.

40. I have approached my assessment of active modes from the perspective of amenity (route length, gradient, perceived safety) for active modes as opposed to motorised vehicles where the journey time is the focus, as impacted by capacity constraints (queues and delays).

41. It is recognised that there is an interdependency between the assessment of effects for active modes, the assessment of effects for transport and the assessment of effects for urban design and social amenity. My assessment was prepared in conjunction with the urban design and social impact assessments to support a consistency in approach.

42. Whilst primarily a qualitative assessment, the traffic models (primarily Aimsun) provide information related to the pedestrian delays to cross at signalled intersections. Where there is a signalled pedestrian crossing at an intersection, the average delay for a pedestrian to cross the intersection was taken from the model as a baseline to inform the qualitative assessment.

Safety

43. I consider that the transport safety effects of the Project arise from a combination of component effects. My view on these is drawn from different approaches to give me the understanding of the overall effect for the Project, and the effects at specific locations.

44. Starting with the actual SH1 corridor, I have reviewed data on past crashes that have been recorded from 1 July 2020 to 30 June 2025, noting that these do tend to show a bias to those crashes that resulted in injuries. Whilst crashes that result only in property damage can be an indicator of increased risk of other crashes that do result in injuries, individuals are less likely to report to the police and therefore the crash details would not appear in the database.

45. I considered this information on the nature and frequency of crashes on the existing network in the context of the proposed scheme to provide a basis for the identification of the potential safety benefits on the corridor from the scheme. Consideration of safe and appropriate speeds for the urban environment also formed part of my assessment.

46. I have also relied on the Safe System Audit that was undertaken on the Investment Case design as the starting point for my assessment. This Audit is a focussed review of the scheme undertaken by professionals with additional training focussed on safety for all road users. The report is prepared to identify to the design team of safety issues that may be within the scheme and allow for design refinements during the subsequent detailed design phases.

47. In this specific case I have considered the Audit recommendations alongside commentary from the design team and the project drawings included in this application to consider what residual risks there may be.

48. In all of the above, the safety of all road users was considered, including pedestrians, active modes and those in motorised vehicles.

49. I also consider that the scheme will lead to indirect safety effects outside of the Project boundary, and this arises as a result in changes to travel patterns and traffic volumes off SH1. These indirect effects may be negative or positive, and where pertinent I have highlighted these.

50. These considerations extend to the overall changes to the number of people travelling, the distance they travel, potential mode shift that occurs as a result of the Project, and changes to the routes that people take when traversing the corridor.

Public transport

51. As I present in the following chapter, the majority of the public transport routes for the area are routed on local roads, not SH1. As such, I have considered the Project's effects on public transport through changes to mode share and the changes to the congestion leading to travel time and travel time variability on the wider network, including those locations where the routes cross SH1.

52. I note that the routes of buses are controlled by Metlink (GWRC), and not NZTA. As such, whilst there are opportunities to utilise the Project to provide new or diverted routes, this is not part of the application or in the control of NZTA. I have therefore assumed that the current bus network, including frequencies is retained. Where the Project requires a change in a bus route, for example at the Basin, I have assumed the most direct route with the Project layout would be taken. I consider this is an appropriate, if conservative, approach to assess the specific effects of the Project.

53. I also note that Wellington City Council (WCC), as the Road Controlling Authority (RCA) for the local road network, ultimately determines whether a road is suitable for use by public transport services. This includes approval of bus stops, shelters and associated public transport infrastructure, as well as permitting for the operation of double-deck and articulated high-capacity vehicles. While these matters sit outside the control of NZTA and are not part of this application, they are relevant to how public transport services may operate on the local road network during construction and following implementation of the Project.

Road network (general and freight traffic)

54. The One Network Framework (ONF), developed by NZTA, is a system that categorises New Zealand's roads into seven groups based on their movement (volume, type of traffic, strategic importance and multi-modal role), and their place (adjacent land use, role of the street, and urban or rural context). In an urban environment these categories include:

    i. Transit Corridor
    ii. Urban Connector
    iii. Activity Streets
    iv. Local Streets
    v. City Hubs
    vi. Main Streets
    vii. Civil Spaces

55. As appropriate I have noted the ONF categorisation of each section of the state highway and adjacent local roads throughout my evidence.

56. The assessment of the Project's effects on the road network has considered the changes to the traffic flows, including the proportion of freight vehicles. The travel times, both along individual links and between key points on the local network including the delays at intersections have been used as indicators of the effects.

57. The effect on wider traffic distribution has been included, specifically in relation to re-routing, or the potential for re-routing, between Oriental Parade, Evans Bay and Mt Victoria tunnel, and along SH1 through the Terrace Tunnel versus Waterloo Quay and Customhouse Quay. I also considered other alternate routes.

58. As part of the road network assessment, I considered the resilience of the network to allow for planned and unplanned events that may result in re-routing between these alternate routes, including considering the frequency and duration of the potential closures.

59. I also considered the variability of journey time through the network. Whilst absolute journey time is an important factor in the amenity for people travelling and an important indicator in their likelihood to make discretionary journeys, reliability is an important factor for productivity and important time sensitive journeys to national and regional destinations such as to the hospital and airport. This also applies to commuter journeys, where individuals generally need to plan to arrive at the destination at a specific time and so have to factor in the upper likely journey time in their journey planning. This also applies to commercial movements and can influence the number of destinations that can be booked to serve in a day.

60. I have selected some key locations within Wellington to use as indicators of the travel times with and without the Project, with the information coming from Traffic Models. And whilst there are many more individual journeys that do, and will occur on the network, these locations serve to provide an overview of the effects. These key locations and routes are shown in Figure 1.



Figure 1 – Key locations for modelling journey times

61. I have also been cognisant of the changes to the road network as it relates to the residential areas of Hataitai and Mt Victoria (area to the east of Kent Terrace) and the new routes for access to and egress from those properties. In this case I have considered both the journey

time and journey length to Johnsonville, Wellington Central, Cobham Drive and Wellington Hospital.

62. In the above paragraphs I have referred to the use of Traffic Models to support my assessment. These models have been prepared by the Wellington Transport Analytics Unit (WTAU), a team hosted by GWRC and with funding contributions including from NZTA, WCC, and GWRC.

63. The Traffic Modelling Report provides an overview of the models used, the assumptions supporting the models and the evidence of peer review undertaken on the models. Through the preparation of this report I have engaged with the team using the models and through that have had sufficient access to be confident that the information I use in the assessment is robust for the purpose of supporting the Project's effects, and the scale of these effects.

64. Two types of traffic models have been used as the basis of the assessment. A strategic region wide traffic model referred to as the Wellington Strategic Transport Model (WTSM) and an Aimsun microsimulation model. This Aimsun model takes data from the WTSM, and so there is a high degree of alignment between the two model layers, with each offering some greater clarity on different effects. The WTSM Traffic modelling has been undertaken for two future assessment years, 2033 and 2053, whereas the Aimsun model is only viable for the 2033 assessment year.

65. The WTSM provides region wide coverage and is well suited at providing information to support my assessment of the likely travel demands and mode share as well as daily traffic flows on roads, particularly related to the long-term diversions and rerouting effects of the Project.

66. The Aimsun model is better suited to supporting a detailed understanding of what effects would occur at individual intersections, and how variable the journey times are for trips within the model extent. I have used the Aimsun model primarily for the assessment of the bus travel times and variability, local area assessments of travel times where there is localised congestion and changed access routes, and the construction scenarios.

67. Travel time variability was assessed using the Aimsun model using the journey times of the individually simulated vehicles across the analysis period. Standard deviation measures the extent to which individual travel times differ from the average travel time and is used as a proxy for travel time reliability. A larger standard deviation indicates greater variability and less predictable journey times, while a smaller standard deviation indicates more consistent travel times. For ease of interpretation, results are reported as changes in travel time variability, with standard deviation serving as the underlying statistical measure.

68. For the assessment I have used the term ‘Do Minimum’ to relate to a reference case in the future where the Project has not been implemented. However, this forecast does allow for schemes outside of the Project that are expected to be in place. These are detailed in Chapter 5, under ‘Future environment (without the project)’.

69. I then use the term ‘Project Option’ to describe the combination of that future scenario with the addition of the Project’. For this assessment I have considered two future scenarios with the project, these are 2033 and 2053.

70. Noting the timescales for the Project implementation and the scale of development across the region, I recognise that the actual future traffic flows and conditions at any point on the network will differ from that shown in the modelling. However, I am confident that the relative change between the ‘Do Minimum’ and the ‘Do something – Project Option’ is likely to be reflective of the actual change at the time of the opening of the Project and at a representative time in the future (20 years post opening), and this is by definition more relevant to the assessment of the effects of the Project than the absolute model values.

71. I have based my assessment of the construction effects on the 2033 Do Minimum network. Whilst construction is expected to spread over several years and the commencement date of the construction may occur earlier than 2033, I consider that this provides a balanced assessment approach of the likely effects of construction.

Property access

72. Where the Project results in a specific change to the ability to access, or the route needed to reach the access, consideration was made of the distance and legibility of the alternate route. This included direct changes to individual properties and the effects of changes to the network, such as the introduction of one-way restrictions or restrictions on the turns available at intersections.

Parking

73. The assessment of parking considered the total public parking capacity on and adjacent to the Project, and separately the suitability of that parking for short term (shopper) or long term (commuter) parking. Parking was assessed with reference to current parking demand extrapolated into the future assessment years with adjustment for both mode shift and for possible policy changes.

74. Beneath the assessment of the overall capacity, specific consideration of the availability of local parking to serve frontage properties was made. This assessment focussed on locations where the Project had a direct effect on the provision of parking, such as removing on street parking, or access to an off-street car park.

75. I made specific assessments of changes to the locations of mobility parks and loading bays, considering the distance to alternate facilities and where appropriate the location of crossing facilities and the nature of the fronting businesses.

76. The current parking provision in the Project area is provided in several different forms. These can be grouped into the following categories:

    i. Private parking used by owner/occupiers (e.g. residential properties)

    ii. Private parking which is used by the public (e.g. Upper Willis Street Car Park)

    iii. Public off-street parking available for any use (e.g. Clifton Car Park)

    iv. Public off-street parking with specific intended purpose (e.g. Short term, Long term)

    v. Public on-street short term parking (e.g. P10, P60 spaces), and

    vi. Public on-street long term and unrestricted parking (e.g. P240 or unlimited).

Construction

77. For the construction phase of the Project, I have relied on the Constructability Report (2026) prepared by Hoff Consultants Limited and a Disruption Analysis Report (2026) prepared by Arc Advisory and WTAU to inform the assessment of effects described below.

78. Whilst I understand from the Constructability Report there is no final, confirmed construction methodology at this point, I have taken the methodology contained in the report as a feasible approach for the basis of assessment. I understand that the future detailed design process will provide further review of both scheme and the approach to construction. I have therefore sought to assess an ‘envelope’ of effects. This reflects that any alternate approach may deliver some benefits to one area, but equally potentially a slightly higher level of disruption in another.

79. This assessment therefore is a slightly conservative assessment that is based around the approach Mr Hoffman has included within his report but allows for some necessary degree of flexibility on behalf of the contractor at the time of implementation.

80. I have used the 2033 Aimsun model as the primary data source for the assessment of the construction effects. This model allows for a detailed assessment of the diversions that drivers may choose to take, and the way that congestion effects the travel time for general traffic and for buses. The model uses fixed assumptions on mode and the time of travel.

81. I have observed that drivers tend to respond in several ways to prolonged, established construction projects. Some do re-route or change modes in the manner that transport models tend to predict. However, there are several other responses, including changing the time of their journey to create a longer but flatter peak period in both morning and evening. Some change their actual destination, thereby avoiding the congested routes. And others make fewer trips, reducing the total network loading.

82. The above also applies to the parallel routes that become congested, with a 'ripple' effect of people who are not directly affected by closures or restrictions.

83. In several schemes in New Zealand, including Auckland and Tauranga, and internationally I have observed a relatively consistent drop of 20% in peak demand, made up of 10% peak spreading (trips occurring earlier or later) and another 10% diverted or suppressed trips.

84. Taking all this into account, and the alternatives for travel in Wellington including bus, train and active modes, I have taken a pragmatic approach to the assessment of the construction impacts. This is reflected in the use of reduced demands for the model, and considering the changes in the journey times for private vehicles and buses alongside an assessment of the reduction in trips that will be made.

85. Reflecting the further development of the design and approach to implementation that will occur prior to the commencement of works, I consider that this is an approach that balances the needs for an understanding of the effects of the construction in broad terms against the need to invest significant resources into the development of full traffic management plans and detailed assessments of multiple scenarios and locations that would still be unlikely to accurately reflect the actual future implementation. I note that the development of detailed Construction Traffic Management Plans is a proposed condition and discuss this within Chapter 8 - Assessment of Construction effects.

5. EXISTING ENVIRONMENT

Introduction

86. In this section I describe the existing road, public transport, and walking and cycling network for the Project area. I also describe the historic constraints, current and future growth trends and forecasts, land-use changes, and built form changes relevant to this assessment.

87. A description of the land use zoning within the study area is included within the AEE, however for the purpose of this report the existing land uses adjacent to the Project can be described as a mixture of city centre, residential, commercial areas and open space.

88. For descriptive purposes the Project area has been divided into five sections which include Terrace Tunnel, Te Aro, Basin Reserve, Mt Victoria Tunnel and Eastern Connections.

89. SH1, through the Project area, includes a range of characteristics. To the northwestern Project extents, the state highway is grade-separated and is designated a motorway. Towards the Airport, SH1 varies between one lane in the Terrace Tunnel and Mt Victoria Tunnel, two lanes on Vivian Street and three lanes on Kent Terrace. In the reverse direction there is a similar mix of one, two and three lane carriageways, retaining two lanes through the Terrace Tunnel northbound. Where high traffic demands need to pass through merges from two lanes to one lane, severe bottleneck congestion can occur. Also with multiple traffic signal controlled intersections along the route, there are frequent delays and queues that inhibit the flow of traffic.

90. Travelling towards the Airport as SH1 approaches the Terrace Tunnel the carriageway reduces from three to two to a single lane causing frequent bottleneck delays, and then widens back to three lanes before it meets the street grid at Willis Street, where it continues eastbound as Vivian Street that is typically two lanes. Travelling in the reverse direction northbound, SH1 runs along Karo Drive, approximately 280 m to the south of Vivian Street, and is typically three lanes until Willis Street where it reduces to two lanes.

91. Between Willis Street and the Basin Reserve, SH1 eastbound forms Vivian Street, integrated into the city streetscape but primarily carrying state highway traffic. Vivian Street also includes typical urban property accesses, on-street parking and pedestrian facilities. Westbound, SH1 is higher capacity, still with pedestrian and shared path facilities and signalised junctions but with more segregation from frontage activities and including the Arras Tunnel.

92. The Basin Reserve forms a clockwise gyratory that carries eastbound and westbound state highway traffic while also catering for north-south local traffic and buses (Kent/Cambridge to Adelaide Road) and a number of local access points as well as pick-up and drop-off facilities for schools, school bus services and events at the Basin Reserve Cricket Ground.

93. To the east of the Basin Reserve, SH1 goes through the Mt Victoria Tunnel with one lane in either direction (approximately 2.85 m each in width) and a narrow shared path for pedestrians and cyclists (approximately 1.4 m in width). This is a critical and heavily congested link, frequently forming bottlenecks due to the two to one lane merge and with intersections with limited capacity after the exit of the tunnel (Basin Reserve and Hamilton Road).

94. Through the eastern extents of the Project Area, SH1 forms an urban link road on Ruahine Street with one lane in either direction, southwards beside Hataitai Park, before turning eastwards again on Wellington Road with junctions with Hamilton Road / Kilbirnie Crescent and Evans Bay Parade and then becomes Cobham Drive forming a two lane in each direction dual carriageway continuing on to the airport and eastern suburbs.

95. In the following paragraphs I describe the key features of the Project area as they currently exist. I have followed a north to east order for this and describe the Project in five sections.

Terrace Tunnel

96. The Project area around the Terrace Tunnel is predominantly residential and city centre, with Te Herenga Waka – Victoria University of Wellington, University Halls of Residence and Kelburn Park located nearby. However, due to the grade separation of the tunnel, it has limited functional connection with the surrounding urban fabric. Figure 2 illustrates the land use in and around the Terrace Tunnel.

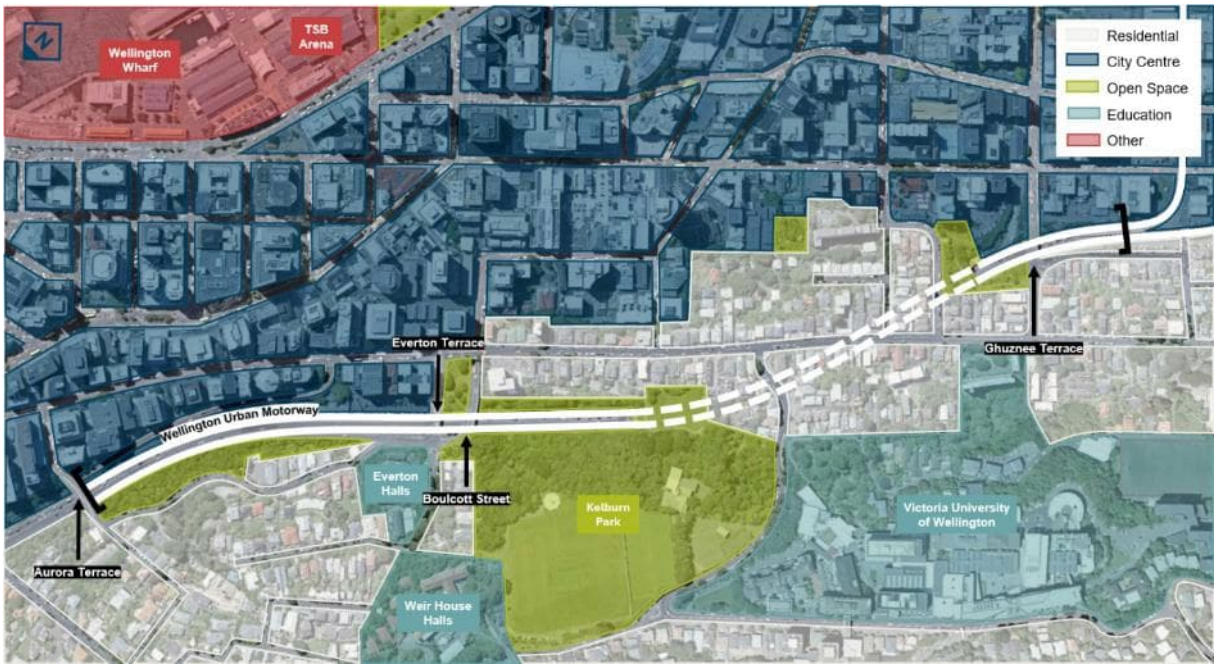


Figure 2 – Terrace Tunnel section extents

Road network

97. The section of SH1 that connects the north of the Terrace Tunnel to Willis Street features one traffic lane in the southbound direction and two lanes in the northbound direction. There are no intersections with the local road network in this section, but there are overbridges at Aurora Terrace, Everton Terrace, Boulcott Street, Ghuznee Street and Buller Street (SH1 northbound only).

98. SH1 Wellington Urban Motorway is classified as a Transit Corridor between the Aurora Terrace overbridge and the median island south of the Terrace Tunnel. It has a southbound ADT of 20,300 vehicles and a northbound ADT of 25,200 vehicles with 2.8% heavy vehicles in both directions (December 2024)[5]. This segment has a variable speed limit (VSL) ranging from 50-100 km/h in 10 km/h intervals. During peak periods the VSL typically displays 60 km/h southbound and 70-100kph northbound.[6]

99. SH1 Wellington Urban Motorway is classified as an Urban Connector between the median island south of the Terrace Tunnel to Willis Street. It has a southbound ADT of 21,300 vehicles and a northbound ADT of 26,600 vehicles with 2.8% heavy vehicles in both directions (December 2024).5 This segment has a variable speed limit (VSL) ranging from 50-100 km/h in 10 km/h intervals. The VSL typically displays 70 km/h northbound, and the mean operating

[5] ADT and Heavy Vehicle % retrieved from MobileRoad

[6] Mean Operating Speeds and One Network Framework Street Categories retrieved from NZTA MegaMaps 2024 Edition

speed is 37 km/h.6 Southbound there is a 50kph static sign just south of Ghuznee Street overbridge.

100. Ghuznee Street between The Terrace and Willis Street is classified as an Urban Connector. It has a bi-directional ADT of 12,800 vehicles with 4.0% heavy vehicles (June 2025).5 The posted speed limit is 50 km/h, and the mean operating speed is 36 km/h.6

Parking

101. There is no on-street parking on SH1 in this section of the Project. However, there are two public off-street car parking areas in close proximity. The Clifton Car Park is accessed from Shell Lane, Rosina Fell Lane and Kumutoto Lane. It has a combination of reserved and unreserved car parking spaces.

102. The Upper Willis Street Car Park is located adjacent to the intersection of Ghuznee Street and Willis Street. Table 1 summarises the parking capacity for both of these car parks.

Table 1 : Terrace Tunnel Project Area parking

Road Extent	Parking Extent
Clifton Car Park – Unreserved	193
Clifton Car Park – Reserved	257
Upper Willis Street Car Park	43
Total Parking Spaces	**493**

Public transport

103. There are no scheduled or school bus services that operate on SH1 Urban Motorway or within the Terrace Tunnel, and therefore no bus stops.

104. Two scheduled bus routes (routes 18 and 21) and eight school bus routes (routes 677, 736, 737, 739, 740, 768, 769 and 791) travel eastbound and/or westbound on Ghuznee Street, crossing the Ghuznee Street overbridge.[7]

105. A summary of the corridors used for both scheduled buses and school buses as well as the nearby bus stops are shown in Figure 3. Key bus stop patronage for the period 24 October 2025 – 30 October 2025 can be found in Annexure A . The arrival frequency at bus stops 5914, 6909 and 9707 during peak times are also shown. The peak times were approximated based on the duration Metlink operates peak rates (7:00 am to 9:00 am and 3:00 pm to 6:30 pm).[8]

[7] Bus routes and timetables retrieved from Metlink

[8] Bus routes and timetables retrieved from Metlink

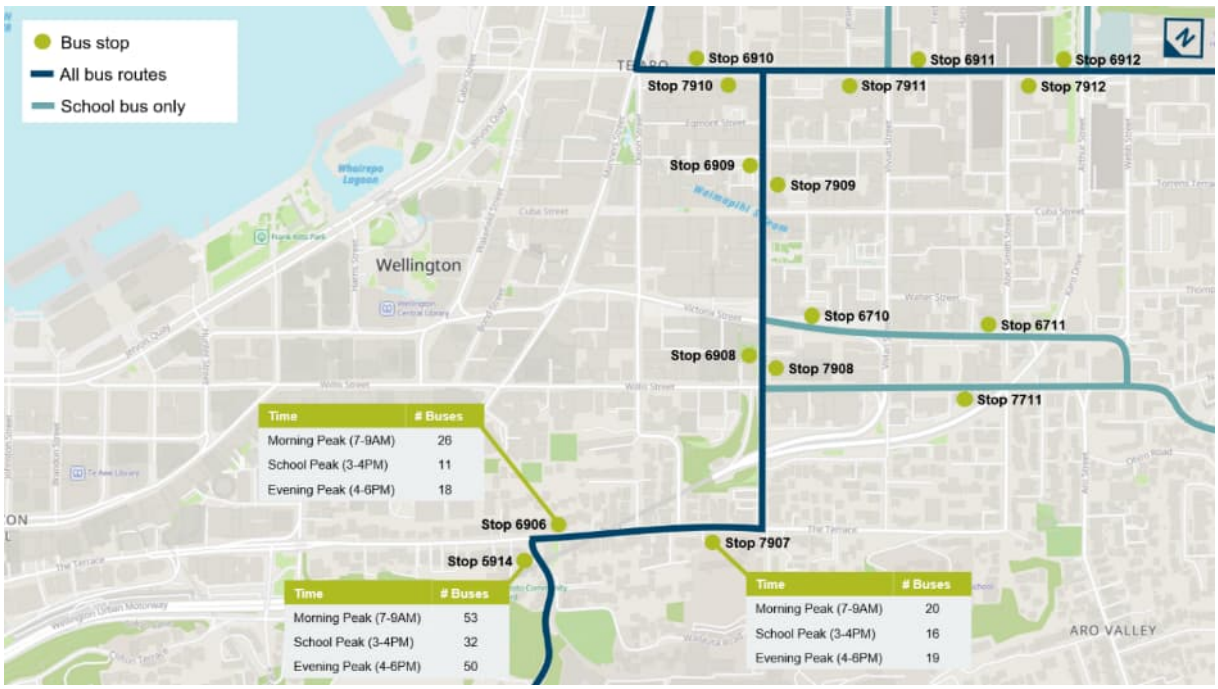


Figure 3 – Bus arrival frequency near Ghunzee Street overbridge

Walking network

106. The walking environment along this section of SH1 is limited, with no dedicated footpaths directly adjacent to the corridor, as I would expect given the urban motorway environment. Pedestrian connectivity across the corridor is facilitated by several overpasses, which serve as key links between the CBD and surrounding residential areas, as well as Te Herenga Waka – Victoria University of Wellington campus buildings. The walking connectivity across the corridor is shown in Figure 4.

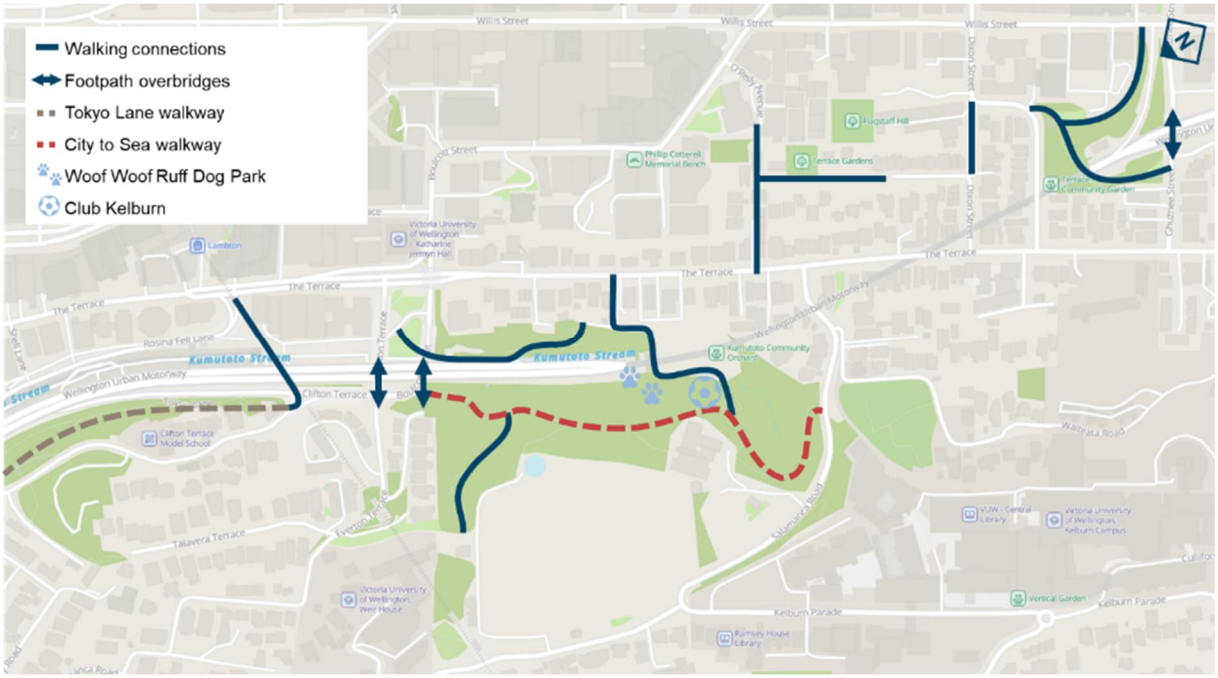


Figure 4 – Pedestrian connectivity across SH1 Wellington Urban Motorway

107. The Everton Terrace overbridge features 1.5-1.8 m wide footpaths on both sides of the road and serves as a key link between the main CBD and university accommodation areas. The Boulcott

Street overbridge features a footpath on its southern side and the Ghuznee Street overbridge features footpaths on both sides, both approximately 2 m wide.

108. In addition to these key overpasses, there are two paths which pass over the existing Terrace Tunnel, these include:

109. A path which connects The Terrace to Club Kelburn and Kelburn Park (via the City to Sea walkway and the 'Woof Woof Ruff' Dog Park). This also connects to another track which runs alongside SH1 Wellington Urban Motorway on the eastern side and connects to Kumutoto Lane

110. A path which connects Ghuznee Street with MacDonald Crescent and Willis Street

111. There is also a footpath which connects The Terrace, on either side of the SH1 off ramp, through to the Clifton Terrace cable car stop and Tokyo Lane walkway. Pedestrians use this footpath and the Tokyo Lane walkway to access the carpark, as well as to pass from Kelburn into the CBD.

112. Figure 5 shows a heatmap of the recorded walks on Strava for this section of the Project, highlighting pedestrians tend to favour Salamanca Road when travelling across SH1 Wellington Urban Motorway.

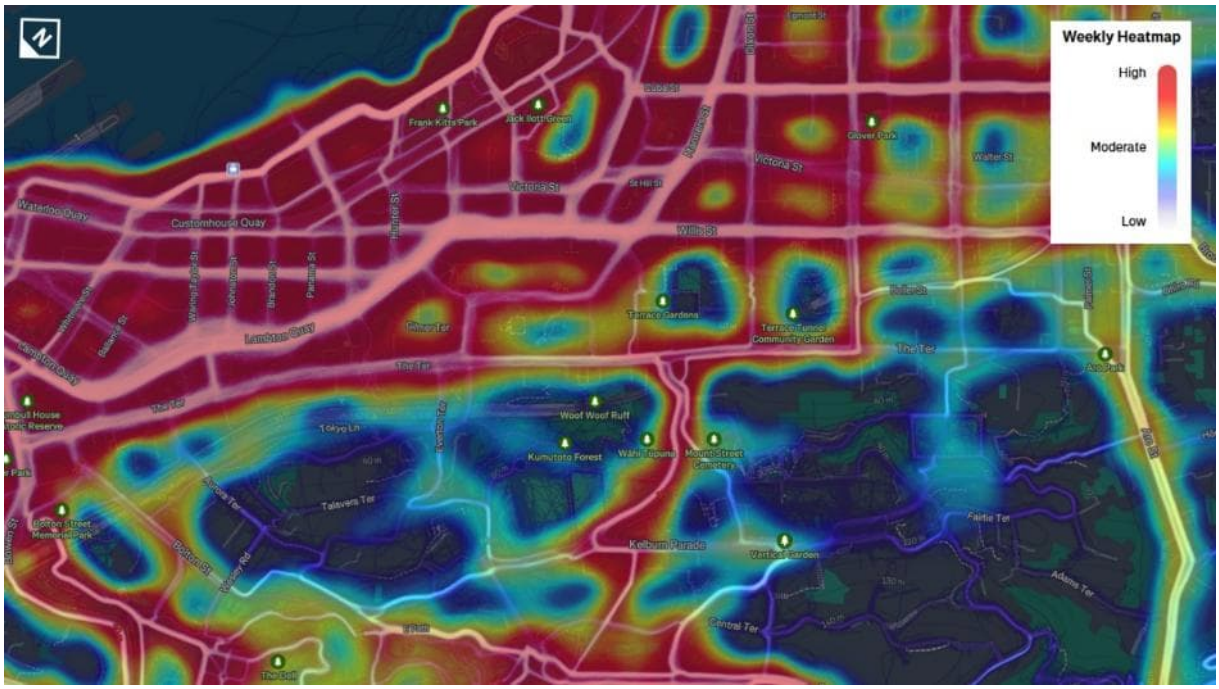


Figure 5 – Strava weekly heatmap for recorded walks in the Terrace Tunnel section

Cycling network

113. Cycling is prohibited within the Terrace Tunnel, due to the motorway nature of SH1 through this section.

114. Buller Street, which extends from the Ghuznee Street overpass, is classified as a ‘quiet route’ for cycling by GWRC and has marked sharrows on the road surface. This road further connects to Buller Street West and onto a shared path through to Abel Smith Street.

115. Ghuznee Street is part of the WCC bike network and there are wayfinding signs for cyclists present directing towards Aro Valley, Brooklyn, and Newtown which connect the area to the wider WCC and GWRC cycle network. The Terrace is also part of the WCC bike network, which connects up to Kelburn and Thorndon.

116. A Locky Dock parking facility for free and secure cycle parking is also provided on Willis Street, adjacent to the Ghuznee Street overpass. This also provides facilities to charge E-bikes.

117. Figure 6 shows a heatmap of the recorded cycles on Strava for this section of the Project, highlighting cyclists tend to favour Salamanca Road and Ghuznee Street when travelling across SH1 Wellington Urban Motorway but numbers are relatively low compared to other parts of the cycle network.

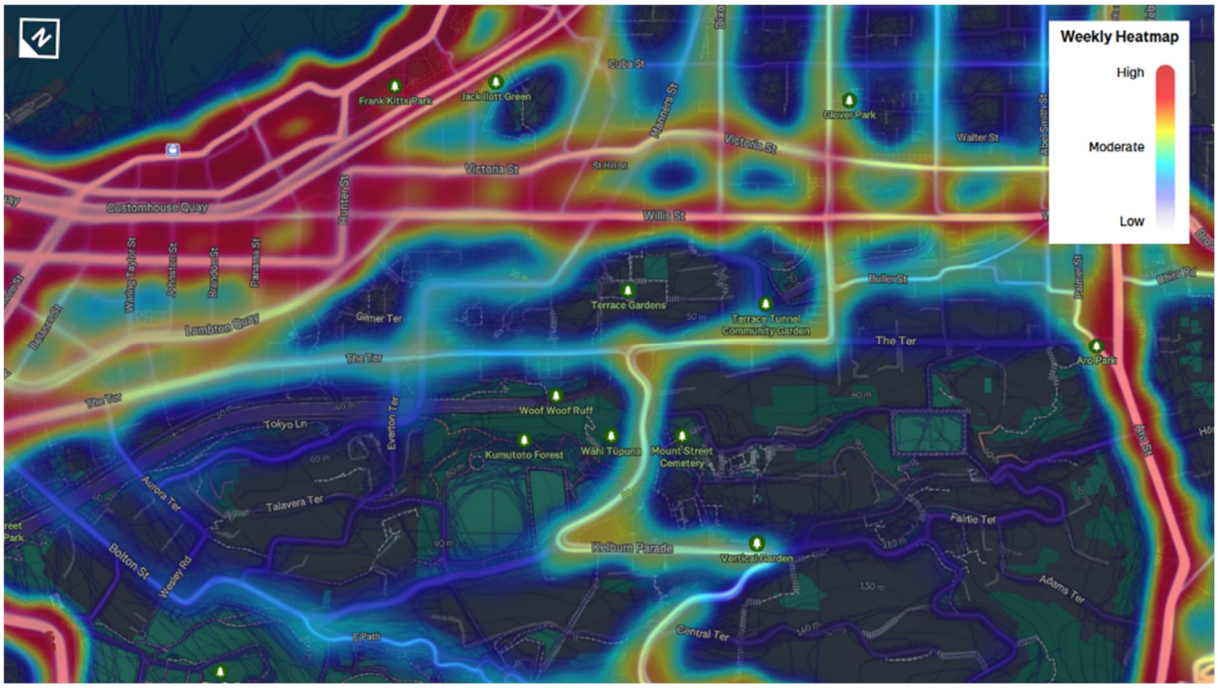


Figure 6 – Strava weekly heatmap for recorded cycles in the Terrace Tunnel section

Crash history

118. In order to provide a baseline for the safety of the Project, I have reviewed data from the Crash Analysis System (CAS) database of recorded crashes for the Project. Table 2 shows a summary of the recorded crashes.

119. The cause of the fatal crash on Ghuznee Street cannot be determined. The crash related to a pedestrian, and my assessment based on the information I have is that there is no clear link to the design of either Ghuznee Bridge or SH1.

Table 2: Terrace Tunnel to Willis Street crash history

Location	Fatal	Serious	Minor	Non-injury	Total
Ghuznee Street Bridge	1	0	1	0	2
Wellington Urban Motorway	0	0	11	75	86
Total Crashes	**1**	**0**	**12**	**75**	**88**

Te Aro

120. The area around Te Aro is predominantly city centre, with residential properties to the west of the inner city bypass trench and open spaces featured at various places. Figure 7 illustrates the land use in and around Te Aro (focussed on Vivian Street).



Figure 7 – Te Aro section extents

Road network

121. SH1 Vivian Street from Willis Street to SH1 Kent and Cambridge Terrace is classified as an Urban Connector. This eastbound one-way corridor features a mix of through lanes and left and right turning lanes. It has an ADT of 21,300 with 2.8% heavy vehicles (December 2024).5 The posted speed limit is 50 km/h, and the mean operating speed is 37 km/h.6

122. SH1 Buckle Street, SH1 Arthur Street and SH1 Karo Drive from the Basin Reserve to SH1 Wellington Urban Motorway are classified as Urban Connectors. These westbound one-way corridors feature a mix of through lanes and left and right turning lanes. SH1 Buckle Street has an ADT of 19,200 vehicles, and SH1 Arthur Street and SH1 Karo Drive have an ADT of 26,600 vehicles. All three sections have 2.8% heavy vehicles (December 2024).5 The posted speed limit is 50 km/h, and the mean operating speed is 40 km/h.6

123. SH1 Wellington Urban Motorway between SH1 Karo Drive and the Te Aro (Vivian Street) extents is classified a Transit Corridor, as shown by the black brackets in Figure 7. This corridor features two lanes in the northbound direction. The ADT on SH1 Urban Motorway is 26,600 vehicles with 2.8% heavy vehicles (December 2024).5 A variable Speed Limit is in effect with a typical posted speed limit of 70 km/h, and the mean operating speed is 65 km/h.6

124. Throughout the length of this section there are a series of Main Streets, Local Streets and Activity Streets that cross SH1 perpendicularly forming a grid like pattern providing local access and permeability. A summary of these streets is shown in Table 3.

Table 3: Te Aro (Vivian Street) surrounding streets

Location	ONF Classification	ADT	% Heavy Vehicles
Willis Street (North)	Main Street	6,100	9%
Willis Street (South)	Activity Street	9,300	8%
Victoria Street (North)	Main Street	11,900	11%
Victoria Street (South)	Main Street	11,400	11%
Walter Street	Local Street	300	3%
Bute Street	Local Street	300	3%
Cuba Street (North)	Main Street	2,300	6%
Cuba Street (South)	Main Street	2,600	5%

Location	ONF Classification	ADT	% Heavy Vehicles
Dunlop Terrace	Local Street	100	3%
Marion Street	Main Street	2,700	3%
Knigges Avenue	Local Street	100	3%
Taranaki Street (North)	Urban Connector	13,300	7%
Taranaki Street (South)	Urban Connector	13,700	13%
Tory Street (North)	Main Street	7,500	3%
Tory Street (South)	Main Street	8,400	4%

SH1 Vivian Street and Willis Street Intersection

125. The SH1 Vivian Street / Willis Street intersection is signal controlled, with two through lanes and one left-turn slip lane on the SH1 Vivian Street approach. Willis Street is a one-way northbound with two through lanes and a right-turn lane. This intersection is shown in Figure 8.



Figure 8 – SH1 Vivian Street / Willis Street existing intersection layout

126. The SH1 Vivian Street / Willis Street signals currently operate on a 120 second cycle time in both the AM and PM peak periods and include two signal phases.

127. This intersection includes kerb buildouts on both sides of the eastern leg of SH1 Vivian Street, which aid pedestrians by reducing crossing distances and improving visibility. A raised table zebra crossing is provided on the left-turn slip lane from SH1 Vivian Street turning westbound into Willis Street and signal controlled pedestrian crossings are provided on all four arms of the intersection.

128. Advanced cycle stop boxes are present on the northbound approach of Willis Street that is part of the WCC cycling network.

SH1 Vivian Street and Victoria Street Intersection

129. The SH1 Vivian Street / Victoria Street intersection is signal controlled, with two through-lanes, one left-turn slip lane and one right-turn lane on the SH1 Vivian Street approach. Victoria Street is a one-way southbound, with three through lanes and one left-turn lane. The left-turn slip lane on SH1 Vivian Street connects to a single northbound (contraflow) lane on Victoria Street, located north of the intersection. This intersection is shown in Figure 9.



Figure 9 – SH1 Vivian Street / Victoria Street existing intersection layout

130. The SH1 Vivian Street / Victoria Street signals currently operate on a 120 second cycle time in both the AM and PM peak periods and include two signal phases.

131. This intersection includes kerb buildouts on the eastern leg of SH1 Vivian Street and a raised table zebra crossing on the left-turn slip lane from Vivian Street turning westbound into Victoria Street. The northern section of Victoria Street features an extra-wide footpath with plantings, providing high pedestrian amenity for those travelling up and down Victoria Street. There are signal controlled pedestrian crossings on the four main arms of the intersection.

132. A dedicated cycle lane is provided at the intersection on the eastern side of Victoria Street and advanced cycle stop boxes are present on the southbound approach of Victoria Street. Victoria Street is classified as part of the cycling network.[9]

SH1 Vivian Street and Cuba Street Intersection

133. The SH1 Vivian Street / Cuba Street intersection is signal controlled, with one through-lane, one through and left-turn lane, and one right-turn lane on the SH1 Vivian Street approach. Cuba Street is a one-way north of the intersection and two-way south of the intersection. The southern Cuba Street approach has one combined through and right-turn lane as shown in Figure 10.

[9] Refer to Chapter 7, Paragraph 490 regarding potential the WCC proposed cycleway scheme at this location.



Figure 10 – SH1 Vivian Street / Cuba Street existing intersection layout

134. The SH1 Vivian Street / Cuba Street signals currently operate on a 121 second cycle time in the AM peak period and 120 seconds in the PM peak period and include two signal phases.

135. This intersection provides a kerb buildout on the northeast corner, which aids pedestrians crossing SH1 Vivian Street. Due to the key pedestrian desire line along Cuba Street, high pedestrian volumes are observed, particularly during peak periods which results in high pedestrian density waiting to cross. Signal controlled pedestrian crossings are provided on the four main arms of the intersection.

136. Cuba Street is identified by GWRC as a 'quiet route' for cyclists offering a less heavily trafficked alternative to Victoria Street, albeit with higher pedestrian footfall. Advanced cycle stop boxes are present on the northbound approach of Cuba Street, although Cuba Street is not shown as a key route in the WCC bike network plan.

SH1 Vivian Street and Taranaki Street Intersection

137. The SH1 Vivian Street / Taranaki Street intersection is signal controlled, with one through lane, one through and left-turn lane, and one right-turn lane on the SH1 Vivian Street approach. Taranaki Street is a key "urban connector" and is a two-way corridor with one through lane, one through and right-turn lane, and one left-turn lane on the southbound approach, and two through lanes and one right-turn lane on the northbound approach. This intersection has the highest demands, including much turning traffic, and therefore is a key constraint along the Vivian Street corridor. The intersection is shown in Figure 11.



Figure 11 – SH1 Vivian Street / Taranaki Street existing intersection layout

138. The SH1 Vivian Street / Taranaki Street signals currently operate on a 120 second cycle time in both the AM and PM peak periods and include four signal phases.

139. This intersection provides a kerb buildout on the northeast corner supporting pedestrian movement across SH1 Vivian Street. Pedestrians crossing Taranaki Street must cross five traffic lanes, which may contribute to longer crossing times and reduced comfort. There are signal controlled pedestrian crossings on the four main arms of the intersection.

140. Advanced cycle stop boxes are present on both Taranaki Street approaches, although Taranaki Street is not classified as part of the GWRC cycling network it is shown on the WCC cycle network.

SH1 Vivian Street and Tory Street Intersection

141. The SH1 Vivian Street / Tory Street intersection is signal controlled, with one through and left-turn lane, and one though and right-turn lane on the SH1 Vivian Street approach. Tory Street is a two-way corridor with one through lane and one right-turn lane the northbound approach. For the southbound approach there is a left turn lane, the middle lane is shared ahead and left and the third lane allows ahead movements only. Tory Street provides access to a number of large-scale retail outlets. The intersection is shown in Figure 12.



Figure 12 – SH1 Vivian Street / Tory Street existing intersection layout

142. The SH1 Vivian Street / Tory Street signals currently operate on a 122 second cycle time in the AM peak period and 124 seconds in the PM peak period and include three signal phases.

143. This intersection features a kerb buildout on the northeast corner to assist pedestrians crossing SH1 Vivian Street, and signal controlled pedestrian crossings are provided on the four main arms of the intersection.

144. Advanced cycle stop boxes are present on both Tory Street approaches, although Tory Street is not classified as part of the GWRC cycling network but is on the WCC cycle network map.

SH1 Vivian Street and Kent Terrace / Cambridge Terrace Intersection

145. The SH1 Vivian Street / Kent Terrace / Cambridge Terrace intersection is signal controlled with one left-turn lane, one shared through and right-turn lane and one right-turn lane on the SH1 Vivian Street approach. Cambridge Terrace is a one-way northbound, featuring two through lanes (one for general traffic and one bus lane), and Kent Terrace is a one-way southbound featuring three through lanes and one through (bus only) and left-turn lane into Pirie Street. Pirie Street is a two-way corridor with one combined left-turn and right-turn lane on the eastern approach to the intersection. This intersection is shown in Figure 13.

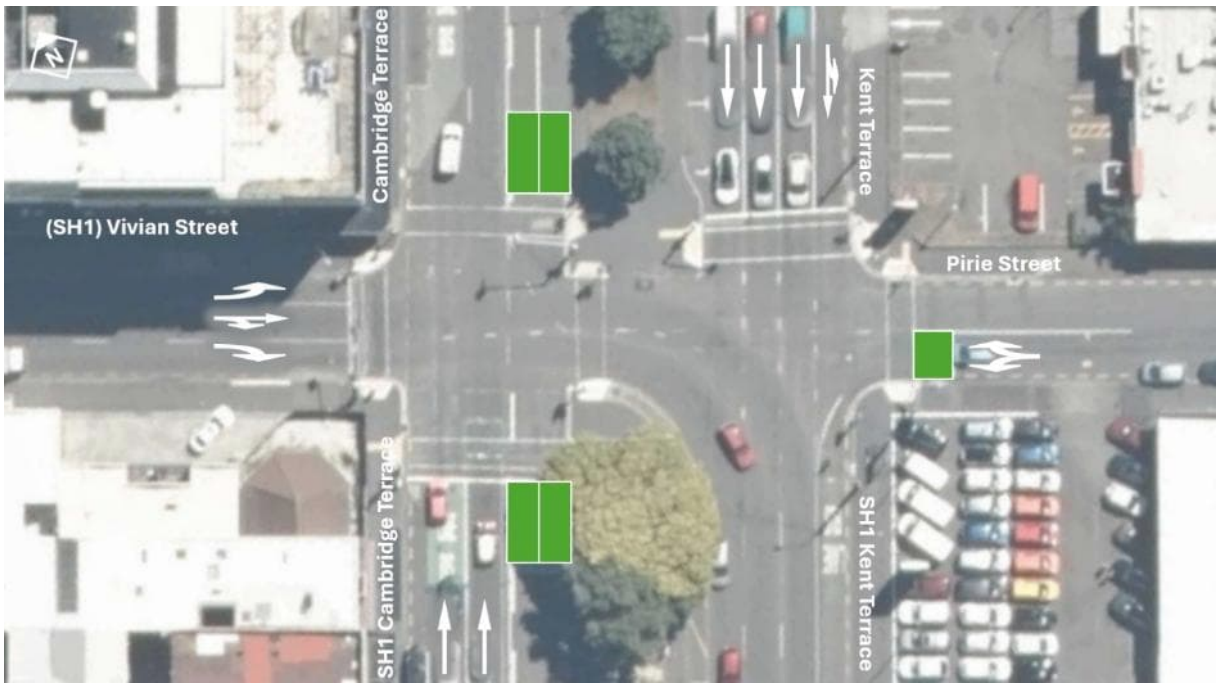


Figure 13 – SH1 Vivian Street / Kent / Cambridge Terrace existing intersection layout

146. The SH1 Vivian Street / SH1 Kent Terrace / Cambridge Terrace signals currently operate on a 120 second cycle time in the AM peak period and 121 seconds in the PM peak period and include three signal phases.

147. This intersection provides a signalised crossing which spans across both Cambridge Terrace and Kent Terrace on the northern approach. On the southern approach, there is only one signalised crossing which spans Cambridge Terrace. Signalised pedestrian crossings are also noted across SH1 Vivian Street and Pirie Street.

148. Cambridge Terrace is a key link in the WCC cycling network and has a separated two-way cycleway present along the eastern side of Cambridge Terrace to support cyclists travelling north and south along Kent and Cambridge Terrace. An advanced cycle stop box is also noted on the Pirie Street approach. Kent and Cambridge Terrace are part of the cycling network.

SH1 Karo Drive and Cuba Street Intersection

149. The SH1 Karo Drive / Cuba Street intersection is signal controlled with one designated through-lane, one through and left-turn lane, and one through and right-turn lane on the SH1 Arthur Street approach. Cuba Street is a two-way corridor with one through and right-turn lane on the southbound approach and one through and left-turn lane on the northbound approach. This intersection is shown in Figure 14.



Figure 14 – SH1 Karo Drive / Cuba Street existing intersection layout

150. The SH1 Karo Drive / Cuba Street signals currently operate on a 111 second cycle time in the AM peak period and 119 seconds in the PM peak period and include two signal phases.

151. This intersection features a kerb buildout on the northeast and southwest corner to assist pedestrians crossing Cuba Street. The southeast corner includes a pedestrian shelter, providing weather protection. Signalised pedestrian crossings are provided on all four legs of the intersection.

152. Advanced cycle stop boxes are provided on both Cuba Street approaches. The southeast and southwest legs also provide a dedicated cycle crossing which aligns with the shared path discussed in Paragraph 174. Cuba Street is classified as part of the GWRC cycling network but is not part of the WCC cycle network.

SH1 Karo Drive and Willis Street / Abel Smith Street Intersection

153. The SH1 Karo Drive / Willis Street / Abel Smith Street is signal controlled with one through and left-turn lane, one designated through-lane, and two right-turn lanes on the SH1 Karo Drive approach. Willis Street is a one-way northbound with two through lanes and one left-turn lane. Abel Smith Street is a two-way corridor with one left-turn lane. This intersection is shown in Figure 15.



Figure 15 – SH1 Karo Drive / Willis Street / Abel Smith Street existing intersection layout

154. The SH1 Karo Drive / Willis Street / Abel Smith Street signals currently operate on a 120 second cycle time in the AM peak period and 123 seconds in the PM peak period and include three signal phases.

155. This intersection features pedestrian shelters on all approaches, except for the northeast approach between Willis Street and Abel Smith Street. There are signalised pedestrian crossings on all five arms of the intersection.

156. A shared path is provided on the southern side of Karo Drive(east) and cycle sharrow markings are provided on the western leg of Abel Smith Street, which aligns with the shared path described in Paragraph 144. Advanced cycle stop boxes are also noted on the Willis Street approach although Willis Street is not classified as part of the GWRC cycling network but is on the WCC cycle network map.

Parking

157. There is a total of 76 time restricted on-street car parking spaces on SH1 Vivian Street. There are no mobility parking spaces nor are there any loading bays. There is a taxi stand located immediately east of the Vivian Street / Cuba Street intersection with space for 5 vehicles. A summary of the on-street parking capacity for Vivian Street is shown in Table 4.

Table 4: Vivian Street parking capacity

Section Extents	Time restricted	Coupon parking	Mobility parking	Loading zones	Taxi / car share
Victoria Street to Cuba Street	22	0	0	0	0
Cuba Street to Taranaki Street	10	0	0	0	5
Taranaki Street to Tory Street	22	0	0	0	0
Tory Street to Cambridge Terrace	22	0	0	0	0
Total	**76**	**0**	**0**	**0**	**5**

158. There is a total of 183 time restricted on-street car parking spaces within a 100 m walking distance from Vivian Street. There are three mobility parking spaces and 20 loading bays. There

are no taxi stands or car share parking spaces. A summary of the on-street parking capacity for the streets surrounding Vivian Street is shown in Table 5.

Table 5 : Surrounding streets parking capacity

Section Extents	Time restricted	Coupon parking	Mobility parking	Loading zones	Taxi / car share
Victoria Street to Taranaki Street	73	0	2	15	0
Cuba Street to Taranaki Street	47	0	0	2	0
Taranaki Street to Tory Street	25	0	0	0	0
Tory Street to Cambridge Terrace	38	0	0	3	0
Total	**183**	**0**	**2**	**20**	**0**

159. The details of the key off-street parking facilities are as follows.

i. Wilson Parking (102 parking spaces and one multi-storey building)

ii. Prime Property Group (16 parking spaces)

iii. Care Park Ltd. (50 parking spaces)

iv. Top of Tory uncovered (131 parking spaces)

160. Parking restrictions for Vivian Street and surrounding streets are typically as follows with no restrictions outside of these times or on public holidays.

i. 2 hours maximum Monday to Friday between 8:00 am - 5:00 pm

ii. 3 hours maximum Monday to Friday between 5:00 am - 8:00 pm

iii. 3 hours maximum Saturday to Sunday between 8:00 am - 8:00 pm

161. A visual summary of the location of these parking spaces is shown in Figure 16 and Figure 17.

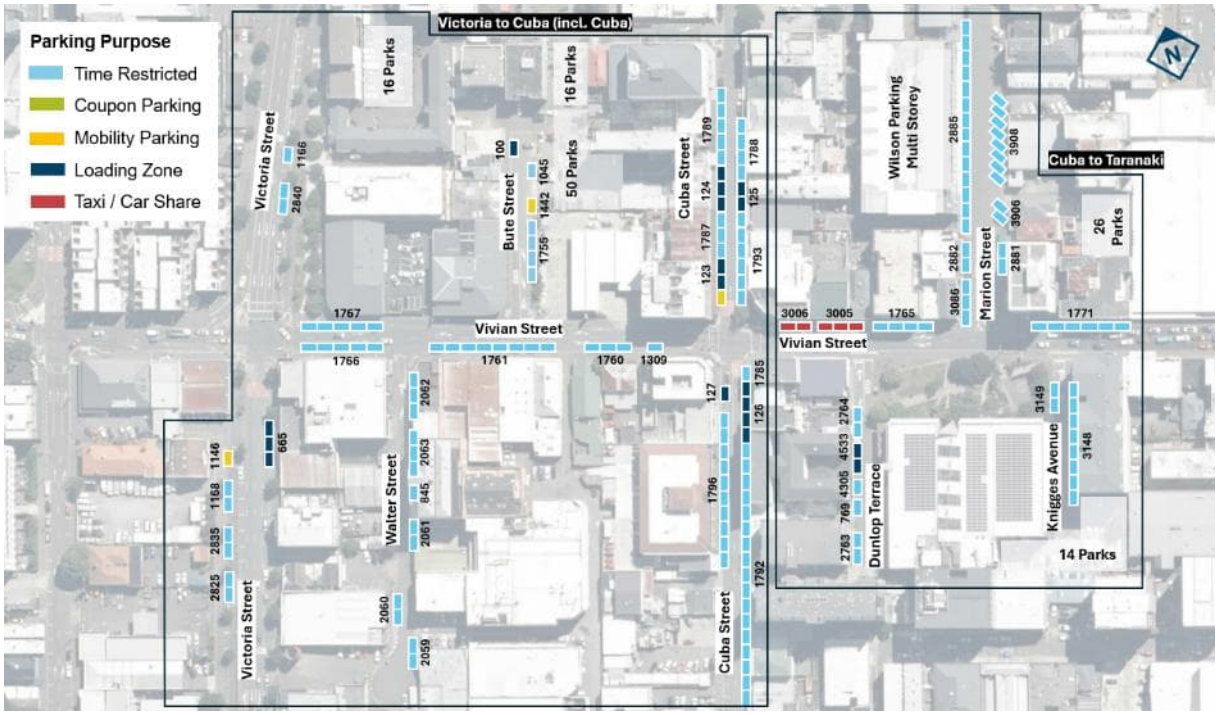


Figure 16 – Existing parking overview (Victoria Street to Taranaki Street)

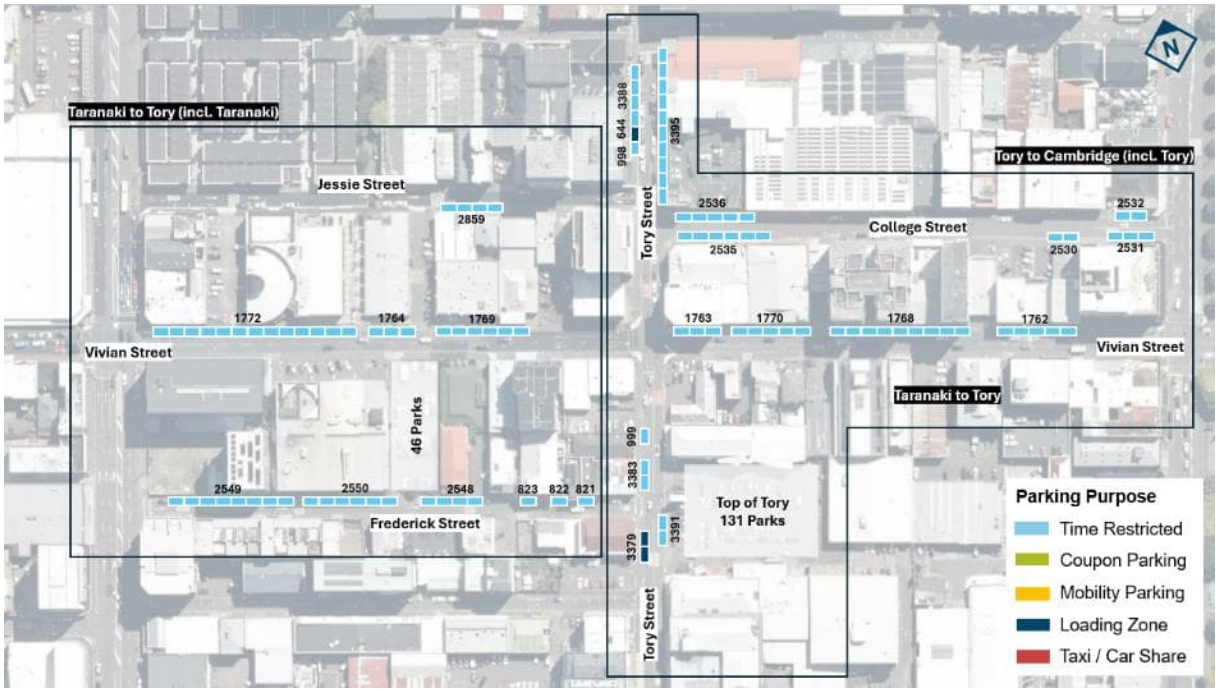


Figure 17 – Existing parking overview (Taranaki Street to Cambridge Terrace)

162. A parking occupancy survey was undertaken by WCC between Wednesday 8 April and Tuesday 14 April 2026, during the following time periods: 7:00 am to 9:00 am, 12:00 pm to 2:00 pm, and 5:00 pm to 7:00 pm. I have used this information to analyse the effects of the parking loss on Vivian Street in Section 7 Operational Effects.

Public transport

163. Multiple scheduled bus routes interact with SH1 as they travel through the Te Aro area, these include:

    i. Three scheduled bus routes (routes 3, 18 and 27) and four school bus routes (routes 739, 740, 769 and 791) travel northbound and/or southbound on Taranaki Street, crossing the SH1 Vivian Street and SH1 Buckle Street intersections

    ii. Four scheduled bus routes (routes 7, 17, 25 and 39) and two school bus routes (routes 625 and 677) travel southbound on Victoria Street, crossing the SH1 Vivian Street and SH1 Karo Drive intersections

    iii. Four scheduled bus routes (routes 7, 17, 25 and 39) and one school bus route (route 677) travel northbound on Willis Street, crossing the SH1 Vivian Street and SH1 Karo Drive intersections

    iv. Five school bus routes (routes 719, 736, 737, 768 and 791) travel eastbound on SH1 Vivian Street and four school bus routes (routes 739, 740, 769 and 791) travel westbound on SH1 Buckle Street

    v. 16 scheduled bus routes and 13 school bus routes travel through the SH1 Vivian Street, Kent Terrace, Cambridge Terrace, and Pirie Street intersection. These consist primarily of northbound movements to the city centre (via Cambridge Terrace) and southbound movement towards the Basin Reserve (via Kent Terrace). Courtenay Place to the north is a busy bus interchange hub

164. A summary of the corridors used for both scheduled buses and school buses as well as the nearby bus stops are shown in Figure 18. Key bus stop patronage for the period 24 October 2025 – 30 October 2025 can be found in Annexure A . The arrival frequency at bus stops 7711,

7911, 6911, 7912, 6912 and 6012 during peak times are also shown in Figure 18. The peak times were approximated based on the duration Metlink operates peak rates (7:00 am to 9:00 am and 3:00 pm to 6:30 pm).

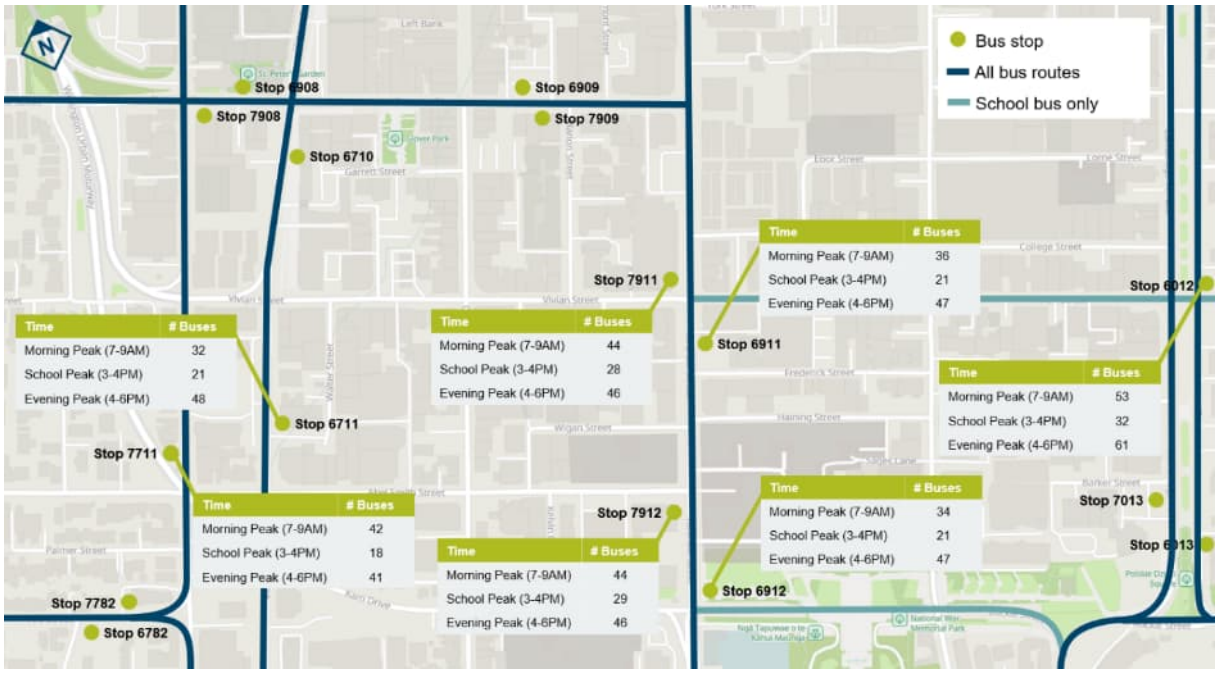


Figure 18 – Bus arrival frequency at Te Aro bus stops

Walking network

165. SH1 Vivian Street provides continuous footpaths on both sides of the carriageway, typically between 2.2-3.0 m wide. These footpaths support pedestrian movements along the corridor and connect to key intersections and destinations. The walking network is shown in Figure 19.

166. SH1 Karo Drive, provides pedestrian connectivity on both sides of the road from Willis Street to Cuba Street. There is a footpath along the northern side and a shared path along the southern side, which is a continuation from Buller Street. At the intersection with Cuba Street, the shared path continues on the northern side, while the southern side becomes a shared zone until Taranaki Street.

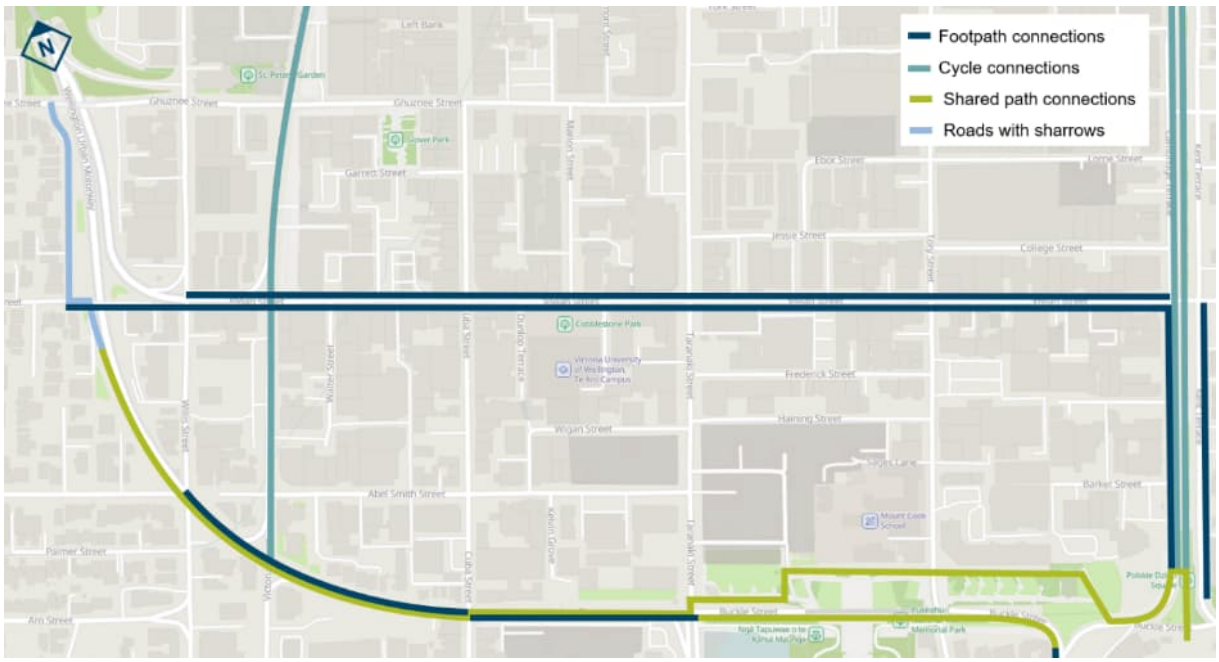


Figure 19 – Walking and cycling network in the Te Aro (Vivian Street) section

167. On SH1 Vivian Street between Cuba Street and Taranaki Street, and again from Tory Street to Cambridge and Kent Terrace, verandahs are generally present, offering shelter and improving pedestrian amenity in adverse weather conditions.

168. Several vehicle accesses along Vivian Street open directly onto the footpath with limited visibility, particularly adjacent to the retail outlets on the northern frontage to Vivian Street at the western end. These locations present potential safety concerns due to the restricted sightlines for drivers exiting across the footpath.

169. At the intersection between Vivian Street and Dunlop Terrace, a raised table facilitates pedestrian movement across Dunlop Terrace, providing a direct connection to the adjacent university campus. Additional pedestrian amenities include seating at the Cuba Street intersection.

170. Figure 20 shows a heatmap of the recorded walks on Strava for this section of the Project, highlighting high pedestrian presence along most of the roads in this section.

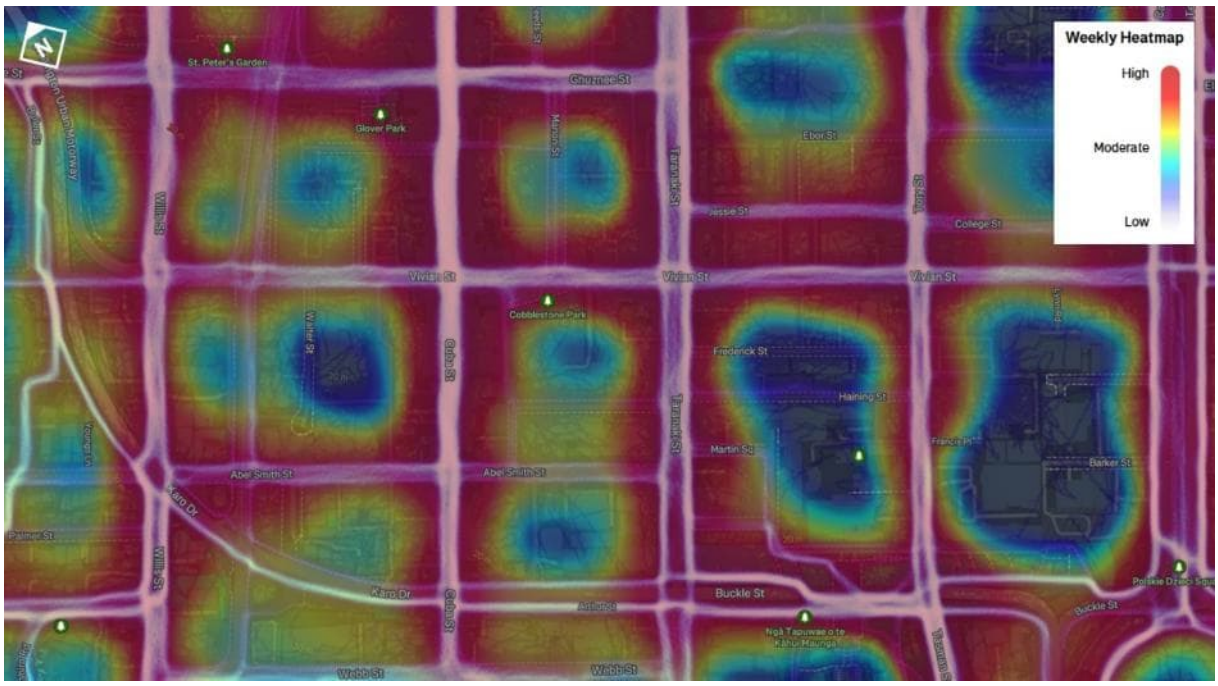


Figure 20 – Strava weekly heatmap for recorded walks in the Te Aro (Vivian Street) section

Cycling network

171. Vivian Street does not have designated cycle lanes or paths, so cyclists share the road space with general traffic. I consider that the lack of the designated cycle lanes and the high-traffic nature of the street may lead to a reduced attractiveness of the route for cyclists who will therefore favour parallel routes with cycle infrastructure or lower traffic flows, such as Ghuznee Street and Manners Street. Cycles are not permitted in the bus only section of Manners Street, between Willis Street and Victoria Street. I note that the shared use path along Karo Drive is identified as the primary east-west cycle link in the WCC cycle network. The cycling facilities are shown in Figure 19 above.

172. While Vivian Street itself does not have formal cycling infrastructure, as noted on the WCC cycle network map intersecting streets offer varying levels of support for cyclists:

    i. Victoria Street is on the cycle network, and includes on-road cycle lanes, providing a more structured commuter-like cycling environment

    ii. Cuba Street is identified by GWRC as a 'quiet route' for cyclists[10], offering a less heavily trafficked alternative to Victoria Street, albeit with higher pedestrian footfall

173. Cycle parking facilities are present near Vivian Street, including:

    i. On Cuba Street, just north of Vivian Street and on Dunlop Terrace, just south of Vivian Street, adjacent to the Te Herenga Waka – Victoria University of Wellington Architecture Campus

    ii. A Locky Dock parking facility for free and secure cycle parking is provided on Dixon Street, near its intersection with Cuba Street and on Willis Street near its intersection with Ghuznee Street. These provide facilities to charge E-bikes

174. As described in the Walking network section, there is a shared path along the southern side of Karo Drive from Abel Smith Street to its intersection with Cuba Street, in which it then continues

[10] But is not on the WCC cycle network.

on the northern side to the National War Memorial Park. This is the primary east-west route on the WCC cycle network map.

175. Figure 21 shows a heatmap of the recorded cycles on Strava for this section of the Project, highlighting a greater cycling presence on Kent and Cambridge Terrace, and along SH1 Karo Drive.

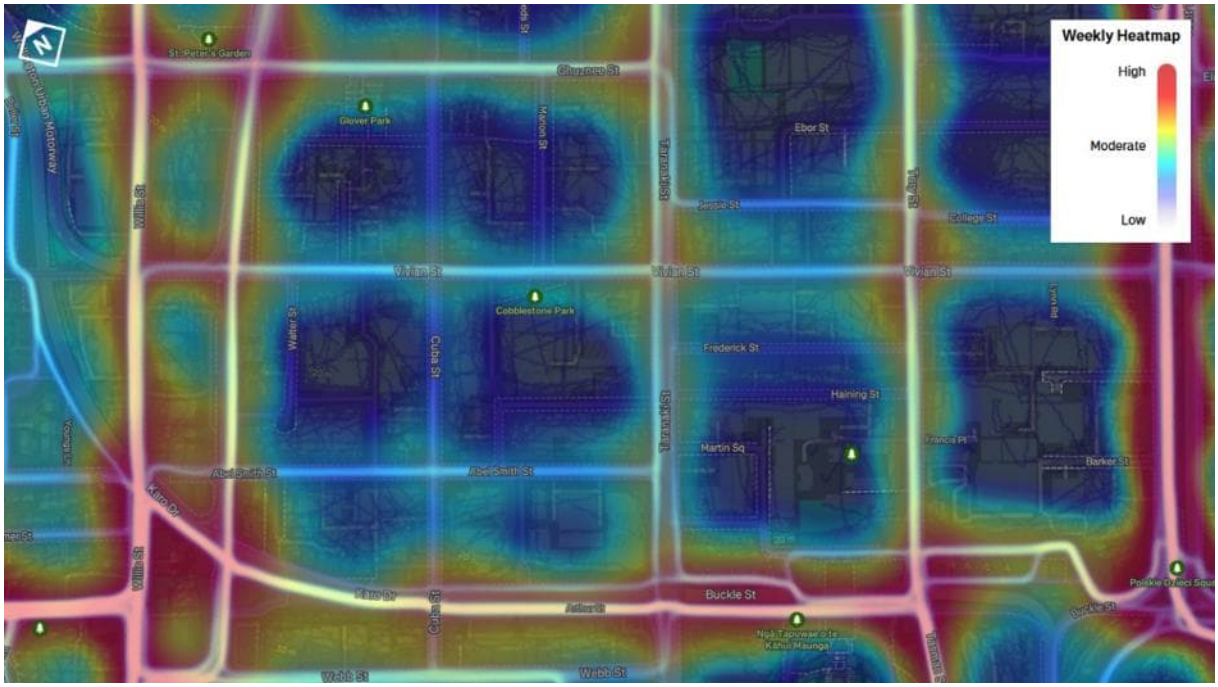


Figure 21 – Strava weekly heatmap for recorded cycles in the Te Aro (Vivian Street) section

Crash history

176. In order to provide a baseline for the safety of the Project, I have reviewed data from the Crash Analysis System database of recorded crashes for the Project. Table 6 shows a summary of the recorded crashes.

177. Four of these crashes resulted in a serious injury, all of which involved a vulnerable road user. Two crashes involved pedestrians being struck while crossing Arthur Street as they failed to give way to oncoming traffic. One crash involved a vehicle clipping a cyclist's handlebars causing the cyclist to fall as they were both turning right onto Kent Terrace from Vivian Street. The last one involved a turning truck which failed to give way to a pedestrian who had right of way.

Table 6 : Te Aro (Vivian Street) crash history

Location	Fatal	Serious	Minor	Non-injury	Total
Arthur Street / Cuba Street Intersection	0	1	0	9	10
Arthur Street / Taranaki Street Intersection	0	0	7	18	25
Arthur Street Midblock	0	1	0	4	5
Karo Drive / Victoria Street Intersection	0	0	3	14	17
Karo Drive / Willis Street Intersection	0	0	4	16	20
Karo Drive Midblock	0	0	1	2	3
Vivian Street / Bute Street Intersection	0	0	0	1	1
Vivian Street / Cambridge Tce / Kent Tce Intersection	0	1	1	15	17

Location	Fatal	Serious	Minor	Non-injury	Total
Vivian Street / Cuba Street Intersection	0	0	2	1	3
Vivian Street / Dunlop Terrace Intersection	0	0	0	5	5
Vivian Street / Lynn Road Intersection	0	0	0	1	1
Vivian Street / Marion Street Intersection	0	0	1	1	2
Vivian Street / Taranaki Street Intersection	0	0	2	13	15
Vivian Street / Tory Street Intersection	0	1	0	6	7
Vivian Street / Victoria Street Intersection	0	0	2	11	13
Vivian Street / Walter Street Intersection	0	0	0	2	2
Vivian Street / Willis Street Intersection	0	0	7	8	15
Vivian Street Midblock	0	0	7	18	25
Wellington Urban Motorway Midblock	0	0	0	5	5
Total Crashes	**0**	**4**	**37**	**150**	**191**

Basin Reserve

178. Figure 22 illustrates the land use in and around the Basin Reserve. The area is predominantly residential and commercial, with several schools including St Mark's School and Wellington College, a hall of residence, two churches, and Pukeahu National War Memorial Park located nearby. There are several vehicle dealerships noted to be located fronting to SH1 Kent and Cambridge Terrace. The Basin Reserve serves as a venue for cricket matches and other large events.

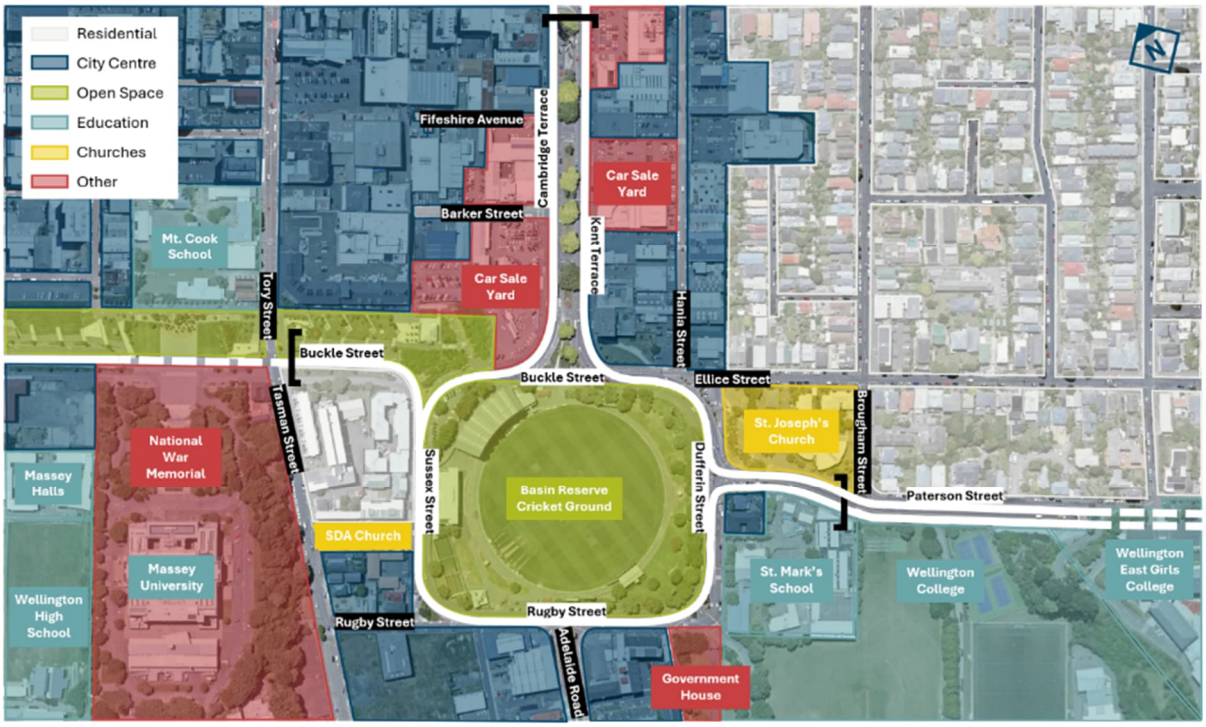


Figure 22 – Basin Reserve extents

Road network

179. Cambridge Terrace from the Basin Reserve to SH1 Vivian Street is classified as a Main Street featuring two lanes[11] in the northbound direction (one of which is a dedicated bus lane from 7am to 7pm). It has an ADT of 7,100 vehicles with between 6.0-8.0% heavy vehicles (June 2025). The posted speed limit is 50 km/h, and the mean operating speed is 33 km/h[12].

180. SH1 Kent Terrace from SH1 Vivian Street to the Basin Reserve is classified as an Urban Connector featuring four lanes in the southbound direction (one of which is a dedicated bus lane from 7am to 7pm). It has an ADT of 19,200 vehicles with 2.8% heavy vehicles (December 2024). The posted speed limit is 50 km/h, and the mean operating speed is 37 km/h.

181. Buckle Street between Cambridge Terrace and SH1 Kent Terrace is classified as a Local Street and passes the northern entrance to the Basin Reserve. It has an ADT of 1,800 vehicles with 5.0% heavy vehicles (June 2025). The posted speed limit is 50 km/h, and the mean operating speed is 23 km/h. This section of road is closed during events to allow for safe crossing for event attendees.

182. SH1 Ellice Street from SH1 Kent Terrace to SH1 Dufferin Street is classified as an Urban Connector. It is a one-way corridor, featuring three lanes in the eastbound direction that feed into both the Mt Victoria Tunnel (east) and Dufferin to Adelaide Road (south). The posted speed limit is 50 km/h, and the mean operating speed is 37 km/h.

183. SH1 Dufferin Street from SH1 Ellice Street to SH1 Rugby Street is classified as an Urban Connector. It is a one-way corridor, featuring two lanes in the southbound direction that pass adjacent to a busy single lane school drop off area. The posted speed limit is 50 km/h, and the mean operating speed is 37 km/h.

184. SH1 Rugby Street from SH1 Dufferin Street to SH1 Sussex Street is classified as an Urban Connector. It is a one-way westbound corridor, featuring four lanes between SH1 Dufferin Street and Adelaide Road and three lanes between Adelaide Road and SH1 Sussex Street. The posted speed limit is 50 km/h, and the mean operating speed is 35 km/h.

185. SH1 Sussex Street from SH1 Rugby Street to SH1 Buckle Street is classified as an Urban Connector. It is a one-way corridor, featuring three lanes in the northbound direction that diverge into two lanes into the Arras Tunnel and two lanes onto Buckle Street and Cambridge Terrace. The posted speed limit is 50 km/h, and the mean operating speed is 35 km/h.

186. SH1 Buckle Street (Arras Tunnel) from Sussex Street to Taranaki Street is classified as an Urban Connector. It is a one-way corridor, featuring two lanes in the westbound direction, which increases to three lanes through the Arras Tunnel, and to four lanes at the intersection with Taranaki Street. The posted speed limit is 50 km/h, and the mean operating speed is 40 km/h.

187. Whilst I expect some variation in flows around the Basin, data shows the flows are approximately 19,200 vehicles a day with 2.8% heavy vehicles (December 2024).

SH1 Kent and Cambridge Terrace and SH1 Ellice Street Intersection

188. SH1 Kent Terrace provides four southbound lanes on approach to SH1 Ellice Street. The three general traffic lanes follow the curve onto SH1 Sussex Street. The kerbside bus lane has a pre-signal at the pedestrian / cycle crossing across Kent Terrace which allows buses to “jump”

[11] The previous third lane has been reconfigured into the two way cycleway on the east side of Cambridge Terrace.

[12] The single northbound lane for traffic often experiences delays as shown by the relatively slow operating speed.

ahead of traffic and cross into lane three to get onto Dufferin Street. Connection between Buckle Street and SH1 Ellice Street are provided via a Give Way control as shown on Figure 23.



Figure 23 – Buckle Street / SH1 Ellice Street existing intersection layout

SH1 Ellice Street and SH1 Dufferin Street Corner

189. SH1 Ellice Street features four lanes on approach to SH1 Dufferin Street. Two lanes are designated for left turns onto SH1 Paterson Street (approach to Mt Victoria Tunnel), while the other two lanes continue through onto SH1 Dufferin Street to access Adelaide Road, Wellington Hospital and the southern suburbs. Connectivity between Ellice Street and SH1 Paterson Street is provided via a left turn give way. Vehicles intended to travel from Ellice Street to SH1 Dufferin Street must weave across the two lanes heading to Mt Victoria Tunnel and merge with the traffic from Kent Terrace. This latter movement is very difficult to achieve. A left turn slip lane is also provided for vehicles travelling from SH1 Ellice Street onto Ellice Street or Hania Street. This section of SH1 is shown on Figure 24.



Figure 24 – SH1 Ellice Street / SH1 Dufferin Street existing intersection layout

SH1 Dufferin Street and SH1 Rugby Street Corner

190. SH1 Dufferin Street features two lanes on approach to SH1 Rugby Street. These are fed from two lanes on each of the SH1 Ellice Street and SH1 Paterson Street (Mt Victoria Tunnel) approaches that are control by a traffic signalised intersection. Connectivity between SH1 Paterson Street and SH1 Dufferin Street is provided via two left-turn lanes controlled by the traffic signals. SH1 Dufferin Street also features a one-lane kerbside school pick-up and drop-off zone and kerb separated bus lane. The posted speed limit within this area is 50 km/h and the mean operating speed is 16 km/h[13]. This section of SH1 is shown on Figure 25. I do note that the speed limit through the school drop off is expected to be reduced to 30kph during school pick up and drop off times in the future.

[13] The slow operating speed highlights the delays caused by multiple conflicting movements in this location.



Figure 25 – SH1 Dufferin Street / SH1 Rugby Street existing intersection layout

SH1 Rugby Street and Adelaide Road Intersection

191. The SH1 Rugby Street / Adelaide Road intersection is a signal-controlled T-intersection. On approach, SH1 Rugby Street is a one-way carriageway with three through lanes and one left-turn lane. Adelaide Road is two-way carriageway with two left-turn lanes, Adelaide Road has kerbside bus lanes which begin / end approximately 50 m south of Rugby Street. This intersection is shown in Figure 26.



Figure 26 – SH1 Rugby Street / Adelaide Road existing intersection layout

192. The SH1 Rugby Street / Adelaide Road signals currently operate on an 87 second cycle time in the AM peak period and 85 seconds in the PM peak period and include two signal phases.

SH1 Rugby Street and SH1 Sussex Street Corner

193. SH1 Rugby Street features three westbound lanes on approach to SH1 Sussex Street. All three lanes follow the curve onto SH1 Sussex Street; however, the left-most lane can also be used to continue through onto Rugby Street. Connectivity between Rugby Street and SH1 Sussex Street is provided via a left turn Stop control. This section of SH1 is shown on Figure 27.



Figure 27 – SH1 Rugby Street / SH1 Sussex Street existing intersection layout

SH1 Sussex Street and SH1 Buckle Street Corner

194. SH1 Sussex Street features three northbound lanes on approach to SH1 Buckle Street. One lane provides left-turn movements onto SH1 Buckle Street (westbound into the Arras Tunnel), one lane provides right turn movements onto Buckle Street, and the centre lane provides access to both SH1 Buckle Street (westbound Arras Tunnel) and Buckle Street (and access onto Cambridge Terrace). This section of SH1 is shown on Figure 28.



Figure 28 – SH1 Sussex Street / SH1 Buckle Street existing intersection layout

Parking

Cambridge Terrace and Kent Terrace between Vivian Street and Basin Reserve:

195. On SH1 Kent Terrace, there are 32 vehicle parks with pay and display restrictions and a 16 m section of restricted parking for drainage vehicles.

196. Additional parking is available on the local roads adjoining the state highway. On the western kerb of Cambridge Terrace there are 6 vehicle parks and an additional 28 m loading zone with a 10-minute restriction. Barker Street and Fifeshire Avenue provide an additional 12 and 8 bays.

Basin Reserve:

197. There are a total of 10 on-street time restricted parking spaces and 43 on-street coupon parking spaces on SH1 around the Basin Reserve. There are no mobility parking spaces or taxi stands. Six drop off/pick up parking spaces are located within the Dufferin Street slip lane and are used for dropping off and picking up students from the nearby schools. Outside of school hours these are time restricted parking spaces. A summary of the on-street parking capacity for the Basin Reserve and Kent Terrace is shown in Table 7.

Table 7: SH1 Basin parking capacity

Section Extents	Time restricted	Coupon parking	Loading zones
North of the Basin Reserve	32	0	0
Northeast of the Basin Reserve	4	5	0
Southeast of the Basin Reserve	4	13	6*
Southwest of the Basin Reserve	0	25	0
Total	**40**	**43**	**6**

* *Time restricted parking spaces outside of school times.*

198. There are a total of 28 on-street time restricted parking spaces and 63 on-street coupon parking spaces within a 100 m walking distance from the Basin Reserve and Cambridge Terrace Kent Terrace. There are no mobility parking spaces, loading bays, taxi stands, or car share parking spaces. A summary of the on-street parking capacity for the streets around the Basin Reserve and Kent Terrace is shown in Table 8.

Table 8 : Local road parking capacity

Section Extents	Time restricted	Coupon parking	Loading zones
North of the Basin Reserve	26	0	7
Northeast of the Basin Reserve	0	18	0
Southeast of the Basin Reserve	0	0	0
Southwest of the Basin Reserve	2	46	0
Total	**28**	**64**	**7**

199. Parking restrictions for Kent Terrace and local surrounding streets is typically as follows:

   i. 2 hours maximum Monday to Friday between 8:00 am - 5:00 pm

   ii. 3 hours maximum Monday to Friday between 5:00 pm - 8:00 pm

   iii. 3 hours maximum Saturday to Sunday between 8:00 am - 8:00 pm

200. Parking restrictions for the Basin Reserve and local surrounding streets many roads have Coupon Parking Zones which allow up to 2 hours of free parking, but require a coupon for longer stays between 8:00 am and 6:00 pm Monday to Friday.

201. A visual summary of the location of these parking spaces is shown in Figure 29 and Figure 30. There is also car parking associated with the Basin Reserve Cricket Ground, which is shown below.

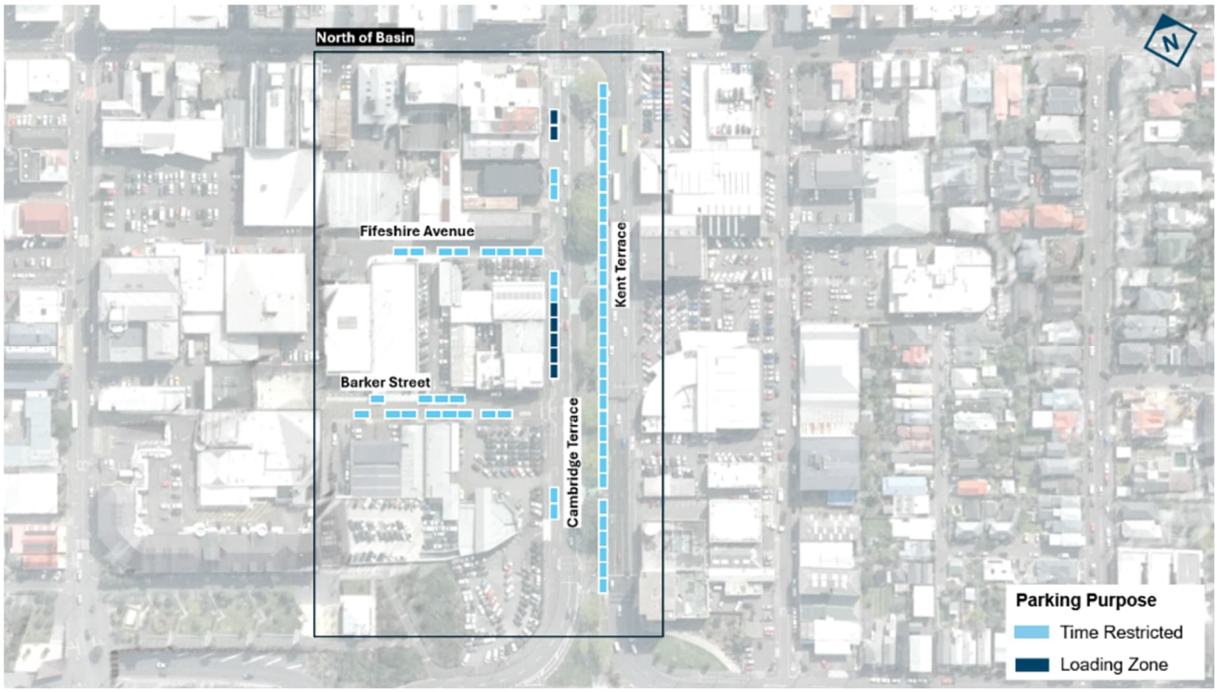


Figure 29 – Existing parking overview (Kent Terrace)

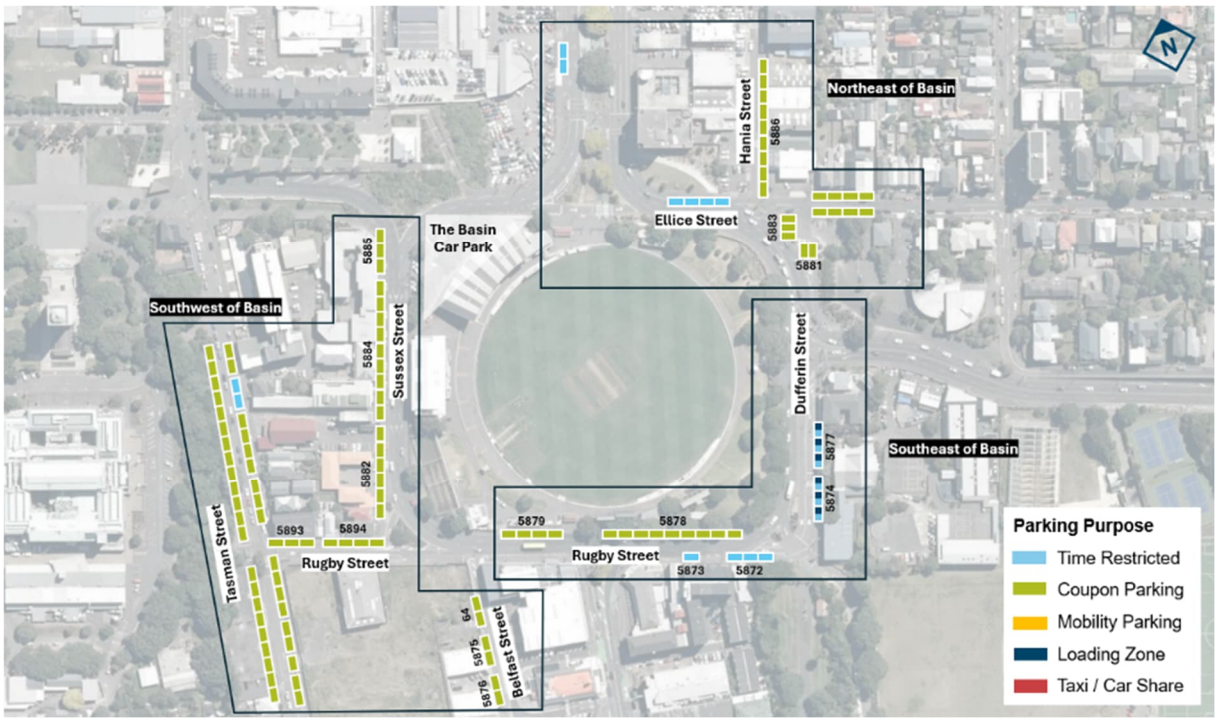


Figure 30 – Existing parking overview (The Basin)

202. A parking survey was undertaken by WCC between Wednesday 8 April and Tuesday 14 April 2026, during the following periods: 7:00 am to 9:00 am, 12:00 pm to 2:00 pm, and 5:00 pm to 7:00 pm. The recorded parking occupancy around the Basin Reserve is shown in Table 9.

Table 9 : The Basin current parking occupancy

Number of parks occupied around the Basin Reserve at present								
Time Period	**Section Extents**	**Mon**	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**	**Sun**
07:00 - 09:00 am	Northeast of Basin	0	0	1	0	0	0	1
	Southeast of Basin	11	9	7	9	7	8	6
	Southwest of Basin	17	13	12	13	16	20	18
12:00 - 02:00 pm	Northeast of Basin	0	0	0	0	0	0	1
	Southeast of Basin	8	8	5	5	6	6	7
	Southwest of Basin	9	11	11	12	12	18	17
05:00 - 07:00 pm	Northeast of Basin	0	0	0	3	1	0	1
	Southeast of Basin	9	8	9	5	9	7	10
	Southwest of Basin	13	13	8	10	11	18	17

203. As part of my assessment, I have analysed the effects of the parking loss around The Basin further in Section 7 Operational Effects.

Property Access

St Mark's School, Wellington College and Government House

204. St Mark's School and Wellington College, located on the south-eastern corner of the Basin Reserve (SH1 Dufferin Street) have pick-up, drop-off and school bus stop facilities within the highway designation boundary. Separated from the main circulatory carriageway by pedestrian guard rail, there is one lane with kerb-side pick-up and drop-off zones designed for use during school start and end times, and a kerb separated offside bus lane served by a zebra crossing.

205. Both of these lanes are then controlled by a Stop control which gives priority to an exit from the circulatory carriageway giving direct vehicle access to Wellington College and Government

House. Both lanes then exit back onto the Basin Reserve circulatory carriageway by way of give-way markings.

206. Access to these properties is enabled from all directions by way of the Basin Reserve gyratory system, with all movements possible. There is an additional exit onto SH1 Paterson Street westbound (closer to the Mt Victoria Tunnel portal) from the college which is used by both cars and school buses.

Basin Reserve Cricket Ground Pedestrian Access

207. Access to the Basin Reserve Cricket Ground for pedestrians is facilitated by way of two gates, one north and one south. For events, the northern access, the C.S. Dempster Gate (or adjacent gates), are the primary access back towards the city. Pedestrians have priority over the circulatory movement on the northern arm of the Basin Reserve Gyratory leading to the central reserve of SH1 Kent and Cambridge Terraces. From here pedestrians can cross to the outside of either SH1 Kent or Cambridge Terrace by way of signal-controlled pedestrian crossings or continue down the central reserve.

208. To the south, the John R. Reid Gate there is a signal-controlled pedestrian crossing to a central island which then allows access to the east and west sides of Adelaide Road by way of further signal-controlled pedestrian crossings.

209. When not in use for an event, the Basin Reserve is accessible to pedestrians and cyclists for a more direct north-south connection.

Basin Reserve Cricket Ground Vehicle Access

210. Access to the cricket grounds car parking is by way of a vehicle crossover on the western side of the Basin Reserve gyratory (off SH1 Sussex Street), and egress back onto the northern edge of the gyratory onto Buckle Street.

211. Direct access to the grounds is provided through the service entrance near the caretaker's hut on the southern side (SH1 Rugby Street).

Public Transport

212. 17 scheduled bus routes and 36 school bus routes use SH1 through the Basin Reserve section. A summary of the scheduled bus route movements is shown in Table 10 and a summary of the school bus movements (including re-entries and exits) is shown in Table 11.

Table 10: Scheduled bus routes within the Basin Reserve section extents

		Destination		
		Kent & Cambridge Terrace	Dufferin Street bus lane	Adelaide Road
Origin	Kent & Cambridge Terrace		1	7
	Dufferin Street bus lane	2		
	Adelaide Road	7		

Table 11: School bus routes within the Basin Reserve section extents

		Destination						
		Kent & Cambridge Terrace	Ellice Street	Mt Victoria Tunnel	Mt Victoria Tunnel (Wellington College)	Dufferin Street bus lane	Adelaide Road	Buckle Street
Orig in	Kent & Cambridge Terrace			1		7	1	

		Destination						
		Kent & Cambridge Terrace	Ellice Street	Mt Victoria Tunnel	Mt Victoria Tunnel (Wellington College)	Dufferin Street bus lane	Adelaide Road	Buckle Street
	Ellice Street	1		2		7	2	
	Mt Victoria Tunnel					1		1
	Mt Victoria Tunnel (Wellington College)	4					2	2
	Dufferin Street bus lane	2			2		2	
	Adelaide Road	5		1				
	Buckle Street							

213. The bus routes and bus stops for both scheduled buses and school buses within the Basin Reserve section are shown in Figure 31. A summary of key bus stop patronage for the period 24 October 2025 – 30 October 2025 can be found in Annexure A . The arrival frequency at bus stops 6013, 7013, 6010, 6014 and 7014 during peak times are also shown on Figure 31. The peak times were approximated based on the duration Metlink operates peak rates (7:00 am to 9:00 am and 3:00 pm to 6:30 pm).

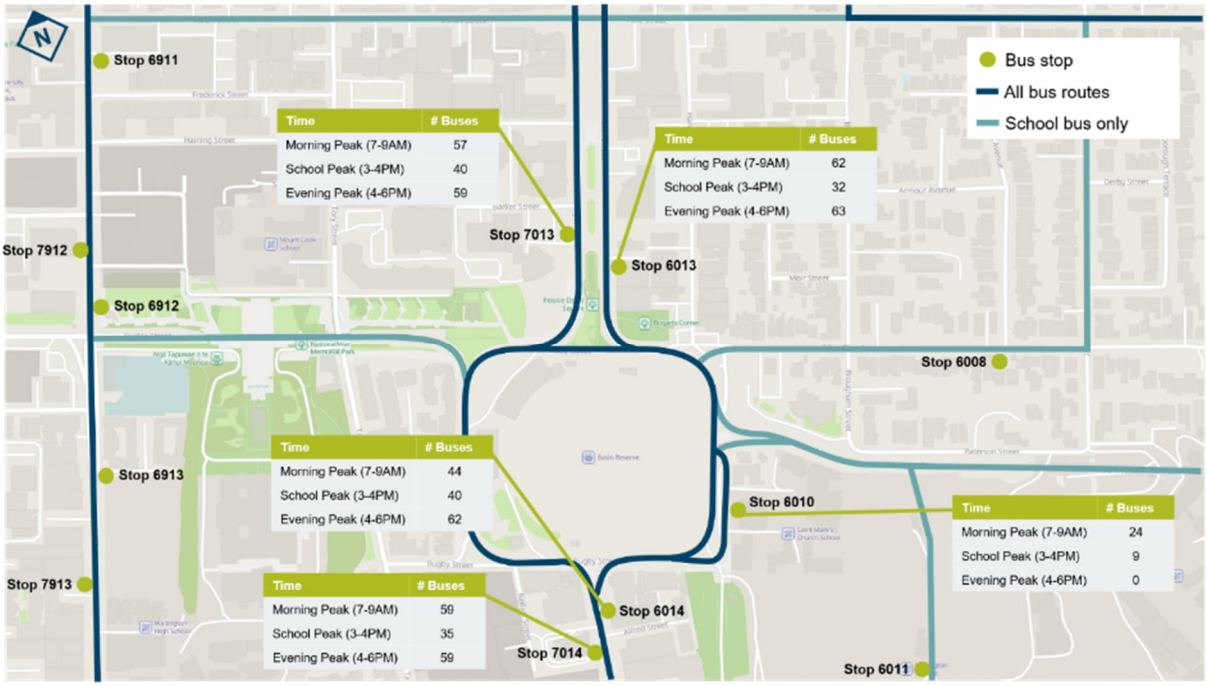


Figure 31 – Bus arrival frequency at Basin Reserve bus stops

Walking network

214. The area around the Basin Reserve includes several features that support pedestrian access to key destinations such as Pukeahu, the Basin Reserve itself and the nearby schools including St Mark's School and Preschool, Wellington College, and Wellington East Girls' College. Figure 32 outlines the key walking and cycling networks through this section.

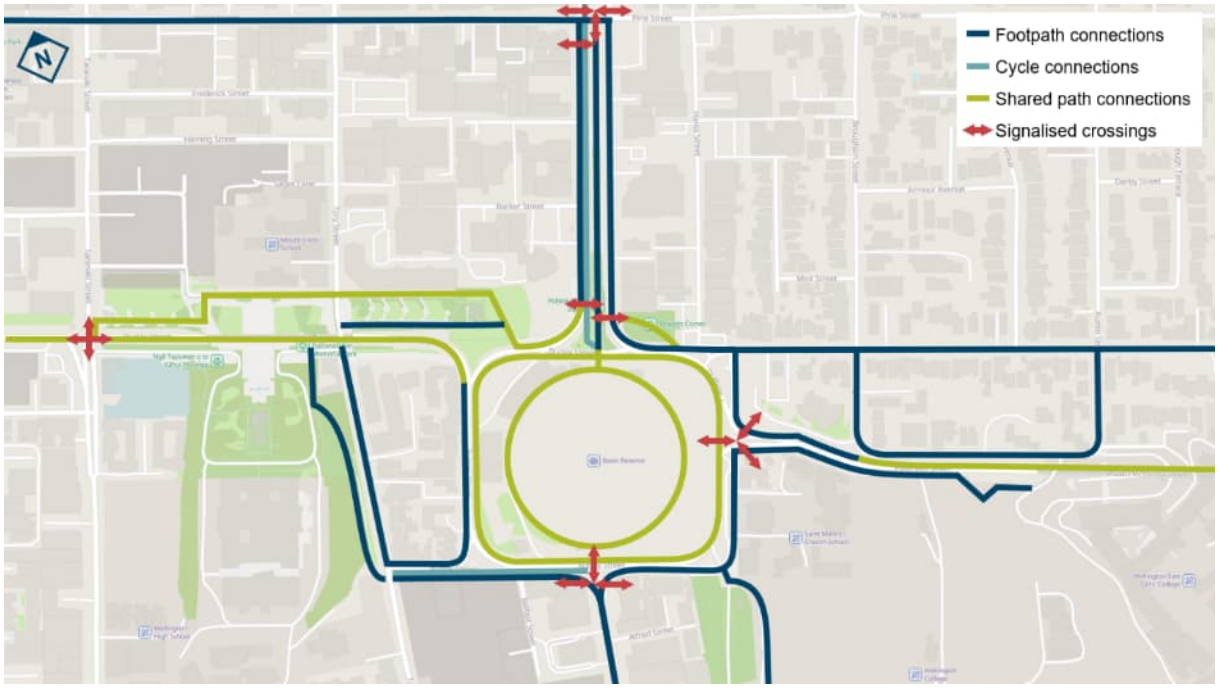


Figure 32 – Walking and cycling network through the Basin Reserve

215. SH1 Cambridge and Kent Terrace are separated by a central reservation, from its intersection with SH1 Vivian Street to the Basin Reserve, and both individual roads have footpaths on both sides. Within this central reservation, public seating is provided, offering amenity for pedestrians in the area. These areas were previously used for U-turn movements but were closed to accommodate the current cycling facilities on Cambridge Terrace adjacent to the median.

216. For those walking along SH1 Cambridge Terrace, there is a raised safety platform when crossing Barker Street and at the southern end of SH1 Cambridge and Kent Terrace, staggered mid-block signalised crossings facilitate pedestrian movement across the corridor.

217. The footpaths on either side of the central reservation combine with the cycleway forming a separated and at times shared path, known as the Commonwealth Walkway, which continues through the northern pedestrian access of the Basin Reserve via a raised zebra crossing on Buckle Street. The shared path runs through the Basin Reserve, connecting to Adelaide Road.

218. On the western side of Cambridge Terrace, another shared path, which is also part of the Commonwealth Walkway, extends from Buckle Street up to the Tasman/Tory Street and the Pukeahu National War Memorial Park. There is also a shared path that extends from SH1 Sussex Street to Tasman Street, south of the Arras Tunnel trench, which can be described as the Old Buckle Street pathway.

219. There is a footpath around the perimeter of the Basin Reserve on both sides of the road, which provide access to Hania Street, Ellice Street, Paterson Street, Dufferin Street, Adelaide Road, Belfast Street, and Rugby Street, as well as the shared paths described above. This perimeter path is narrow in places and I have observed is less utilised than the other routes I referred to when those are available (ie outside of events).

220. At the intersection of SH1 Paterson Street and SH1 Dufferin Street, there are signalised pedestrian crossings on each leg, as shown in Figure 33, which is a critical pedestrian route for students accessing the schools.



Figure 33 – Intersection of SH1 Paterson Street and SH1 Dufferin Street

221. A zebra crossing outside the Wellington College access facilitates movement for students accessing the school from the school bus stop (only across the drop off lane, not SH1).

222. Additionally, just west of the Mt Victoria Tunnel portal, a pedestrian access route leads uphill to Wellington East Girls' College, as shown in Figure 34. The footpath in this area is partially separated from the road by fencing, improving safety and comfort for students walking to and from school.



Figure 34 – Pedestrian access to Wellington East Girls' College

223. Figure 35 shows a heatmap of the recorded walks on Strava for this section of the Project, highlighting high pedestrian presence along most of the roads in this section.

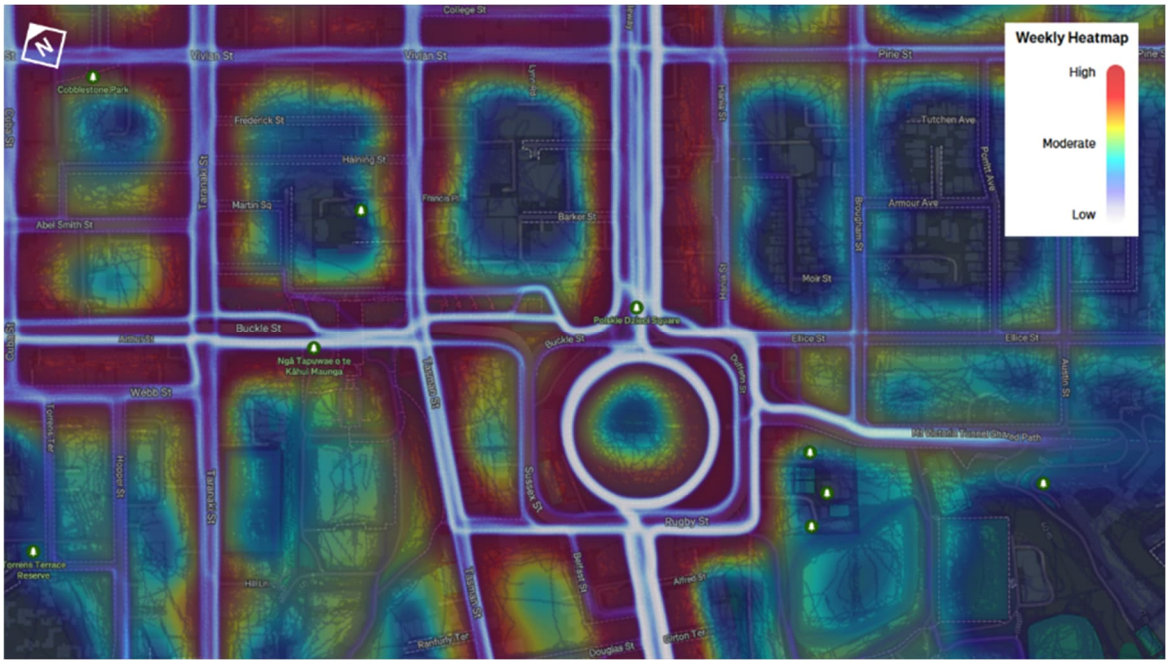


Figure 35 –Strava weekly heatmap for recorded walks in the Basin Reserve section

Cycling network

224. The Basin Reserve area features a mix of cycling infrastructure that supports movements between key destinations as previously shown in Figure 32. On the eastern side of Cambridge Terrace, within the Kent and Cambridge Terrace corridor, a protected bi-directional cycleway

lane runs adjacent to the footpath and central median. This is separated from traffic by rubber bumpers and safe-hit posts, providing a physical buffer and improving cyclist safety. This route forms part of a strategic cycling network connection between the waterfront and Wellington Hospital, supporting commuting and recreational cycling.

225. The protected cycle lane connects to the shared path described earlier which runs through the Basin Reserve, providing a connection to Adelaide Road. This also connects to the shared path, which extends up to Pukeahu.

226. Cycle parking is available within the central reservation between Cambridge Terrace and Kent Terrace, as well as on Buckle Street outside the C.S. Dempster Gate. These support short-term bike storage for those accessing nearby amenities or events.

227. Wayfinding signage and green bike decals are present along shared paths, guiding cyclists toward destinations such as the waterfront and Newtown. At the Vivian Street intersection, dedicated bike signals are provided, integrating the cycle lane into the intersection.

228. Table 12 presents cyclist counts for people on bikes entering and leaving the Basin Reserve by the Adelaide Road gates.

Table 12: Basin Reserve average daily cyclist counts[14]

Month	Average Weekday	Average Weekend day
July 2024	445	144
September 2024	480	175
February 2025	652	196
April 2025	531	211

229. Figure 36 shows a heatmap of the recorded cycles on Strava for this section of the Project, highlighting a greater cycling presence on Kent and Cambridge Terrace, Adelaide Road, Tasman Street, Rugby Street, Arthur Street, and along the Commonwealth walkway.

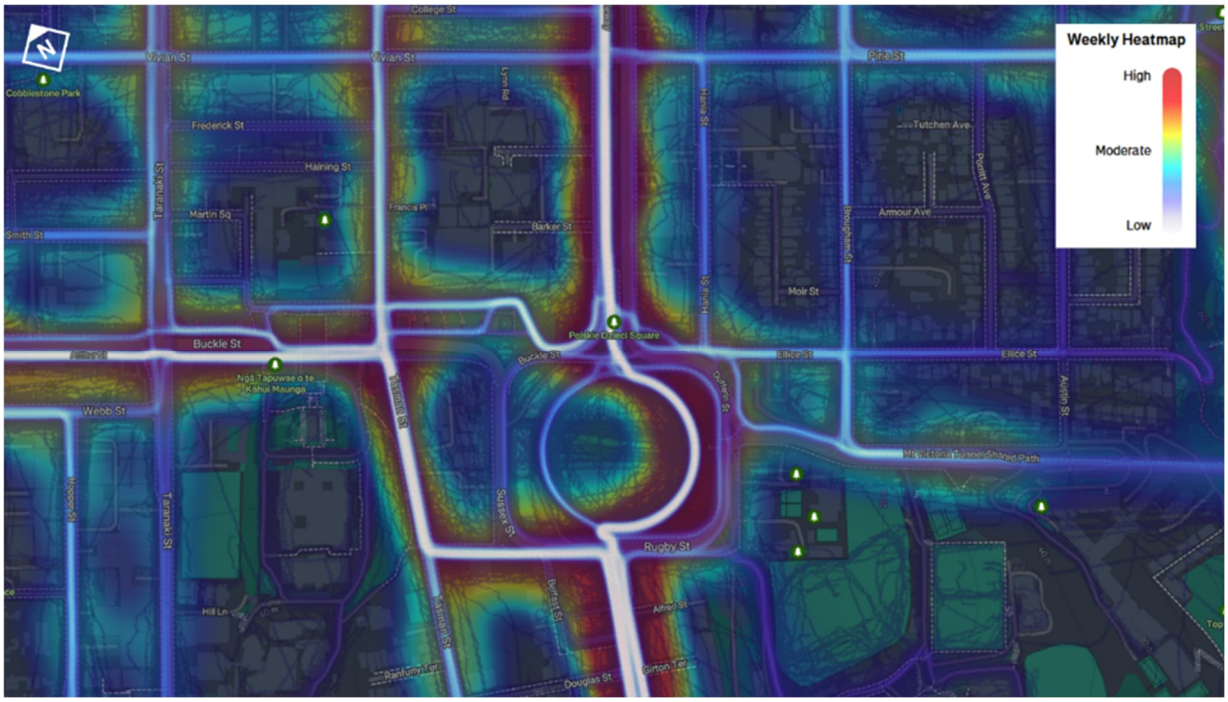


Figure 36 –Strava weekly heatmap for recorded cycles in the Basin Reserve section

[14] Cycle count data retrieved from Cycle data | WCC Transport Projects.

Crash history

230. In order to provide a baseline for the safety of the Project, I have reviewed data from the CAS database of recorded crashes for the Project Area. Table 13 shows a summary of the recorded crashes.

231. There were two crashes that resulted in a serious injury, both of which involved a vulnerable road user. One involved a cyclist travelling the wrong way around the Basin Reserve and being hidden from a turning vehicle. The other involved a pedestrian crossing outside of a designated crossing, combined with the driver being under the influence of alcohol. Both crashes were relating to human behaviour and are not a result of the road or roadside factors.

Table 13: Basin Reserve road crash history

Road Name	Fatal	Serious	Minor	Non-injury	Total
Buckle Street Midblock	0	0	6	5	11
Cambridge Terrace / Barker Street Intersection	0	0	1	0	1
Cambridge Terrace / Fifeshire Avenue Intersection	0	0	0	4	4
Cambridge Terrace Midblock	0	0	0	2	2
Dufferin Street / Ellice Street Intersection	0	1	1	2	4
Dufferin Street / Paterson Street Intersection	0	1	1	9	11
Dufferin Street Midblock	0	0	0	6	6
Kent Terrace / Ellice Street Intersection	0	0	2	4	6
Kent Terrace Midblock	0	0	1	8	9
Rugby Street / Adelaide Road Intersection	0	0	3	20	23
Rugby Street / Belfast Street Intersection	0	0	4	1	5
Rugby Street / Dufferin Street Intersection	0	0	0	2	2
Rugby Street / Sussex Street Intersection	0	0	1	5	6
Rugby Street Midblock	0	0	1	0	1
Sussex Street / Buckle Street Intersection	0	0	0	6	6
Sussex Street Midblock	0	0	2	10	12
Total Crashes	**0**	**2**	**23**	**84**	**109**

Mt Victoria Tunnel

232. The Mt Victoria Tunnel is 623 m long and connects the eastern suburbs and Wellington Airport to the centre of Wellington. The tunnel features one traffic lane in either direction and a narrow shared path on the northern side. Figure 37 illustrates the land use around the tunnel. The area is predominantly made up of residential and open space areas, with Wellington College and Wellington East Girls' College located nearby.



Figure 37 – Mt Victoria Tunnel Land Use

Road network

233. SH1 Paterson Street which passes through Mt Victoria Tunnel is classified as an Urban Connector and features one traffic lane in each direction. The bi-directional ADT is 38,300 vehicles and the heavy vehicle percentage is 2.8% (December 2024). The posted speed limit is 50 km/h, and the mean operating speed ranges from 45 km/h on the east of the tunnel to 48 km/h inside the tunnel. Traffic lanes within the tunnel are narrow (approximately 2.85 m), which constrains capacity.

234. Paterson Street, which is to the north-east of, and parallel to, the western Mt Victoria Tunnel approach is classified as a Local street and has a bi-directional ADT of 350 with 2.0% heavy vehicles (July 2023). The posted speed limit is 50 km/h, and the mean operating speed is 23 km/h.

235. Austin Street, Ellice Street and Brougham Street, which connect Paterson Street to the nearby neighbourhood are classified as Local streets with a bi-directional ADT between 700 and 1,100 vehicles, with 1.0-4.0% heavy vehicles (July 2023). The posted speed limit on these streets is 50 km/h, and the mean operating speed ranges from 21 km/h to 26 km/h.

Parking

236. No parking or pull over bays are provided through Mt Victoria Tunnel or on SH1 Paterson Street and SH1 Taurima Street on either side of the tunnel. A summary of the on-street parking capacity for the surrounding streets in this section is shown in Table 14.

Table 14: Mt Victoria parking capacity

Section Extents	Time restricted	Coupon parking	Residents parking
Paterson Street	0	15	7
Austin Street	0	6	4
Brougham Street	2	10	4
Total	**2**	**31**	**15**

237. A visual summary of the location of these parking spaces is shown in Figure 38. The parking restriction for the time restricted parking spaces on Brougham Street is 90 minutes Monday-Friday.



Figure 38 – Existing parking overview (Mt Victoria)

Property Access

Wellington East Girls' College

238. The college takes vehicle access from two accesses, one on Paterson Street and one at the intersection of Paterson Street and Austin Street, as well as pedestrian access by way of a pedestrian link onto SH1 Paterson Street adjacent to the western Mt Victoria Tunnel portal.

Public Transport

239. Six school bus routes (routes 601, 711, 719, 722, 769 and 770) travel through the Hataitai bus tunnel, the Basin from southern suburbs or Mt Victoria Tunnel. Bus routing is planned around the use of the bus stop (#6008) on the south side of Ellice Street[15]. There are no stops through the tunnel.

240. A summary of the corridors used for both scheduled buses and school buses as well as the nearby bus stops are shown in Figure 39. The arrival frequency at bus stops 6008, 6215, 7215, 6216 and 7216 during peak times are also shown. The peak times were approximated based on the duration Metlink operates peak rates (7:00 am to 9:00 am and 3:00 pm to 6:30 pm).

241. Whilst outside of the Project Area, the Hataitai bus tunnel is also shown in Figure 39. This is the key bus route for scheduled services that run between the CBD and the eastern Wellington, including to the Airport.

[15] Bus routes TBC

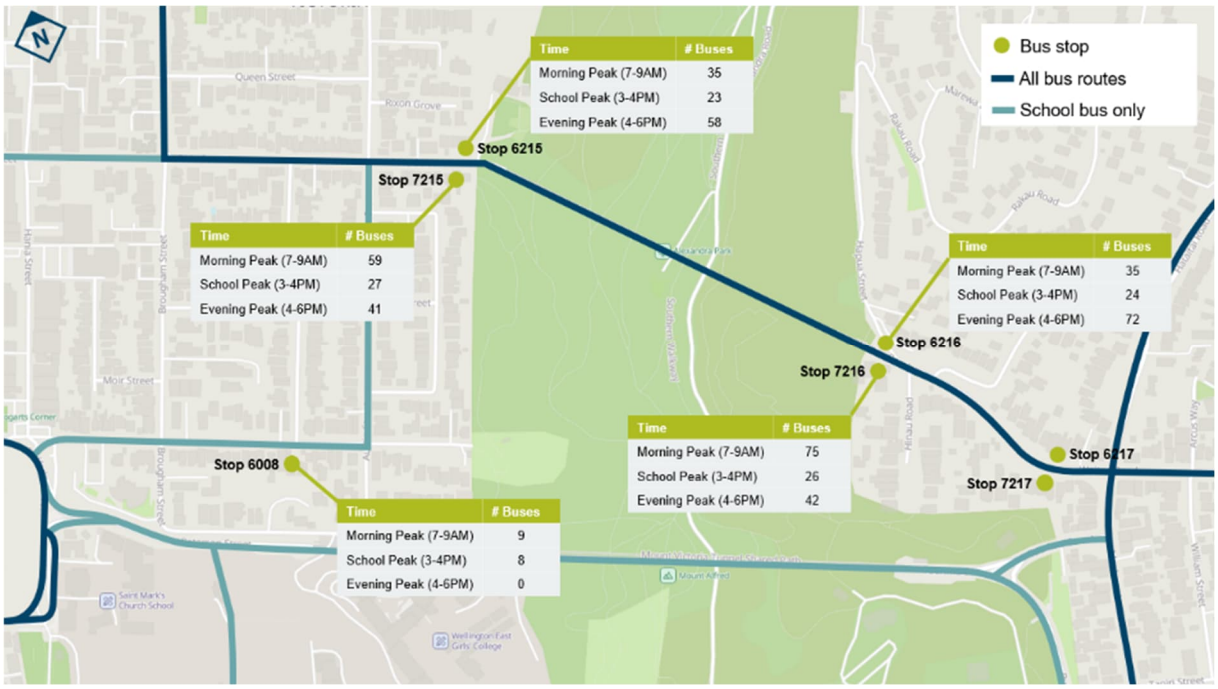


Figure 39 – Bus arrival frequency at Mt Victoria bus stops

Walking and Cycling Network

242. The walking and cycling connections near Mt Victoria Tunnel are shown in Figure 40.

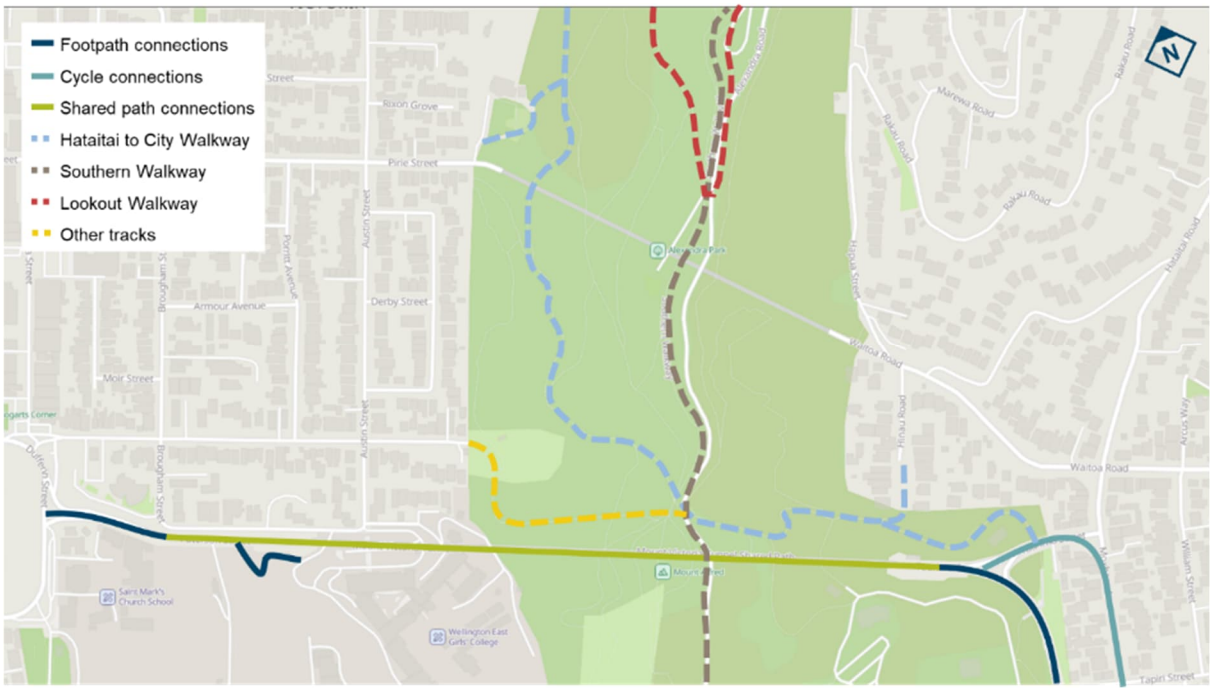


Figure 40 – Walking and cycling connections through and over the Mt Victoria Tunnel

243. At the western portal, a shared use path is provided along the northern side of SH1, which leads into the Mt Victoria Tunnel. At the eastern portal, the shared path continues from the tunnel to footpaths extending down Taurima Street on both sides of the road, and SH1 Ruahine Street on the eastern side. Cyclists are directed onto Taurima Street to share the road with vehicles. Sharrow markings are present to indicate the expectation of cyclists being in the road through the 30 km/hr village area.

244. The Mt Victoria Tunnel itself includes an elevated and narrow shared pedestrian and cycle path along its northern side, providing a connection between the city and the eastern suburbs of Wellington. The path is not separated by mode, and it accommodates both directions of pedestrian and cyclist traffic. The path is narrow, at approximately 1.4m, and offers poor amenity. Cyclists are asked to give way to pedestrians via signage shown in Figure 41.



Figure 41 – Shared path through Mt Victoria Tunnel and signage

245. Table 15 presents cyclist counts for Mt Victoria Tunnel shared path.

Table 15: Mt Victoria Tunnel average daily cyclist counts[14]

Month	Average Weekday	Average Weekend day
February 2024	372	144
August 2024	361	149
June 2025	313	120
September 2025	345	118

246. Multiple walking tracks are provided over the top of the Mt Victoria tunnel, with the most direct route being the Hataitai to City walkway, which is shown in Figure 40. The walkway has notably different characteristics on each side of Mt Victoria.

247. On the CBD side, the walkway is flat and wide, with a generally gentle gradient. This section includes seating and operates as a shared facility for both pedestrians and cyclists. Access to the walkway on this side is available from Marjoribanks Street, Lawson Place, and Pirie Street, making it well connected to the surrounding street network.

248. In contrast, the Hataitai side of the walkway is significantly steeper and narrower. This section includes multiple narrow staircases and presents a markedly different level of accessibility compared to the CBD side. The walkway connects to Taurima Street and Hinau Road in Hataitai, with parts of the path running along the edge of the hillside near the eastern tunnel portal.

249. Both sides of the walkway are sufficiently sheltered from sun, providing a relatively protected walking environment.

250. There is also an access route to the Hataitai to City walkway from Ellice Street, however, this connection is very steep and not well-formed. I have shown photographs of this pathway in Figure 42.



Figure 42 – Access to Hataitai to City Walkway from Ellice Street

Crash History

251. In order to provide a baseline for the safety of the Project, I have reviewed data from the CAS database of recorded crashes for the Project Area. Table 16 shows a summary of the recorded crashes.

252. There have been two reported crashes that have resulted in a serious injury in this section. The first involved a cyclist turning left from Brougham Street onto Ellice Street and failing to give way to a vehicle that was heading straight through the intersection on Ellice Street. The second involved a pedestrian attempting to cross Paterson Street outside of the designated crossing facilities and colliding with a vehicle exiting the tunnel.

Table 16: Mt Victoria Tunnel crash history

Location	Fatal	Serious	Minor	Non-injury	Total
Mt Victoria Tunnel Midblock	0	0	2	6	8
Paterson Street / Brougham Street / Austin Street Midblock	0	1	1	13	15
Brougham Street / Ellice Street Intersection	0	1	1	0	2
Austin Street / Ellice Street Intersection	0	0	0	1	1
Total Crashes	**0**	**2**	**4**	**20**	**26**

Eastern Connections

253. Figure 43 illustrates the land use in and around the Eastern Connections section. The area is predominantly residential, with a commercial area on Moxham Avenue. Several schools including Kilbirnie School, St Patrick's College and Evans Bay Intermediate School, as well as Hataitai Park and Kilbirnie Park are also located in the area.

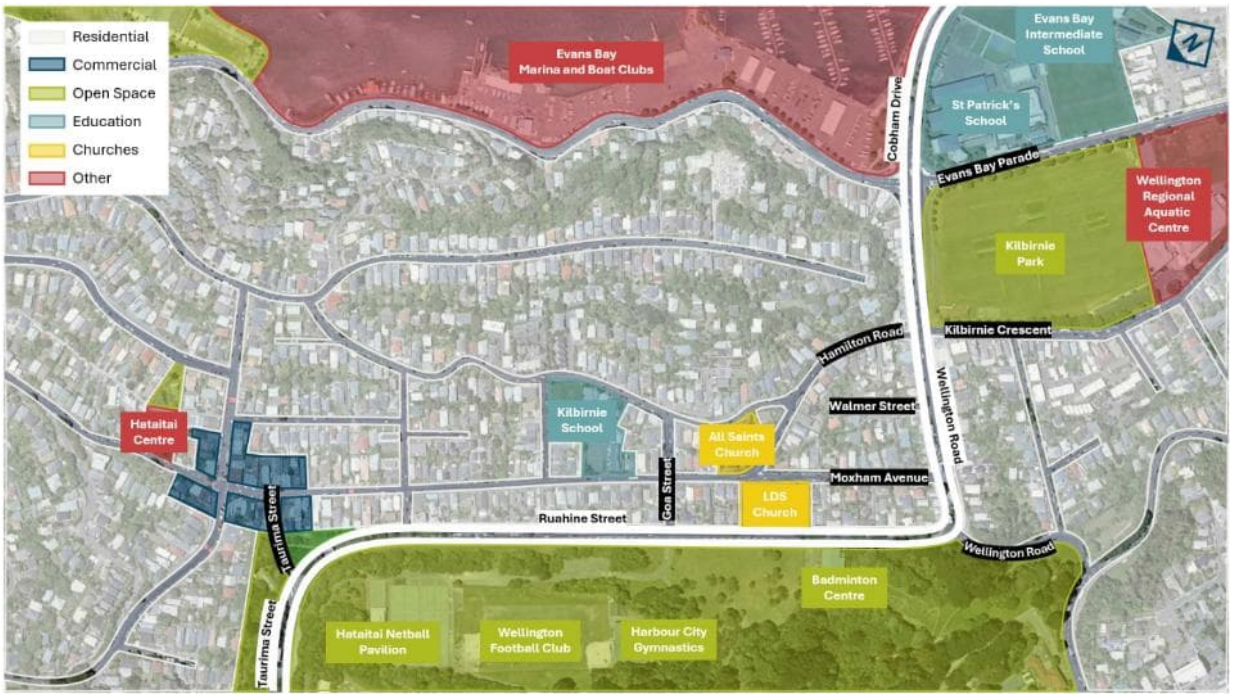


Figure 43 – Eastern Connections Land use

Road network

Mt Victoria Tunnel to Cobham Drive Midblock

254. The section of SH1 that connects the Mt Victoria Tunnel with Cobham Drive features one traffic lane in each direction between Mt Victoria Tunnel and Hamilton Road, and two traffic lanes in each direction between Hamilton Road and Cobham Drive.

255. SH1 Taurima Street and SH1 Ruahine Street are classified as Urban Connectors. Both streets have a bi-directional ADT of 34,200 vehicles and a heavy vehicle percentage of 2.8% (December 2025). The posted speed limit is 70 km/h, and the mean operating speed is 49 km/h on both streets. Taurima Street to the east of the state highway is classified as an Urban Connector with a bi-directional ADT of 5,900 vehicles and a heavy vehicle percentage of 5.0% (March 2024). The speed limit is 30 km/h, and the mean operating speed is 32 km/h on this section of Taurima Street.

256. SH1 Wellington Road is classified as an Urban Connector. It has a bi-directional ADT of 34,200 vehicles on the western end between SH1 Ruahine Street and Hamilton Road and 32,900 vehicles on the eastern end between Hamilton Road and Evans Bay Parade. The heavy vehicle percentage ranges between 2.8% near SH1 Ruahine Street and 1.5% near Evans Bay Parade (December 2024). The posted speed limit is 50 km/h throughout the entire extents, with a mean operating speed of 42 km/h on the western end, and 39 km/h on the eastern end.

257. Hamilton Road is classified as an Urban Connector between SH1 Wellington Road and Kupe Street. It has a bi-directional ADT of 6,700 vehicles and a heavy vehicle percentage of 11.0% (June 2025). The posted speed limit is 50 km/h, and the mean operating speed is 32 km/h.

258. Kilbirnie Crescent and Evans Bay Parade are classified as Activity Streets between SH1 Wellington Road and their intersection near Bay Road. Kilbirnie Crescent has a bi-directional ADT of 8,900 vehicles.

259. Moxham Avenue is classified as an Urban Connector between Kupe Street and Tapiri Street and an Activity Street between Tapiri Street and Waitoa Road. It has a bi-directional ADT of

4,700 vehicles on the southern end near Kupe Street and 8,400 vehicles on the northern end near Waitoa Road. The heavy vehicle percentage ranges between 7.0% near Waitoa Road and 8.0% near Kupe Street (June 2025). The posted speed limit is 50 km/h on the southern end, with a mean operating speed of 41 km/h and 30 km/h on the northern end, with a mean operating speed of 35 km/h. Under the 2033 Do Minimum scenario, the corridor, particularly around Hataitai Village, becomes constrained by congestion and queueing associated with turning movements at Taurima Street and the approach to SH1, with blocking-back effects leading to southbound flows that are 30 to 50 percent lower than existing.

Taurima Street (SH1) / Ruahine Street (SH1) / Taurima Street Intersection

260. The intersection of Taurima Street and Ruahine Street is controlled by a Give Way on Taurima Street as shown in Figure 44. A separated right-hand turning lane followed by a merge lane is provided to support right-hand turning traffic travelling from Taurima Street towards Mt Victoria Tunnel[16]. Right hand-turns are not permitted from Ruahine Street onto Taurima Street.



Figure 44 – Taurima Street (SH1) / Ruahine Street (SH1) / Taurima Street Intersection

Ruahine Street (SH1) / Goa Street / Hataitai Park Entrance Intersection

261. The intersection of Ruahine Street, Goa Street, Hataitai Park Entrance is controlled by a Give Way on Goa Street and Hataitai Park Entrance as shown on Figure 45. Right hand turning bays are provided for traffic turning into Goa Street and Hataitai Park Main Entrance from Ruahine Street.

262. In preparing this assessment I was made aware of some specific challenges and issues of congestion at the egress of Hataitai Park, particularly after weekend sports games, such as the regular netball league games. The issue occurs when those vehicles wishing to turn right out of the Park are needing to wait for an adequate gap in the busy traffic flow from both directions of traffic on SH1, and the resultant queue forms a blockage that prevents even the left turners from joining SH1.

[16] People exiting here must make numerous decisions, making manoeuvres very challenging at times.



Figure 45 – Ruahine Street (SH1) / Goa Street / Hataitai Park Entrance Intersection

Ruahine Street (SH1) / Wellington Road (SH1) / Wellington Road Intersection

263. The intersection of Ruahine Street and Wellington Road is controlled by a Give Way on Wellington Road. The Wellington Road approach features a separated Give Way for left and right turning traffic, the Wellington Road (SH1) approach features a Give Way for left turning traffic, and the SH1 Ruahine Street approach features a Give Way for right turning traffic[17].

Wellington Road (SH1) / Hamilton Road / Kilbirnie Crescent Intersection

264. The eastbound Wellington Road approach has one through lane, one combined through and left-turn lane, and one right-turn lane, all signal-controlled. The signals currently operate on a 100 second cycle time in both the AM and PM peak periods and include three signal phases. The westbound approach features one through lane and one right-turn lane under signal control, along with a left-turn slip lane governed by a Give Way. Hamilton Road offers a through and right-turn lane plus a separate left-turn lane, both signalised. Kilbirnie Crescent includes one through and right-turn lane controlled by signals and a left-turn slip lane with a Give Way.

Wellington Road (SH1) / Cobham Drive (SH1) / Evans Bay Parade Intersection

265. Wellington Road includes two through lanes and a right-turn lane controlled by signals, along with a left-turn slip lane governed by a Give Way. The signals currently operate on a 103 second cycle time in the AM peak and 100 second cycle in the PM peak and include three signal phases. Cobham Drive has a through lane, a combined through/left-turn lane, and a right-turn lane, all signalised. Both Evans Bay Parade approaches consist of a through lane and a right-turn lane under signal control, plus a left-turn slip lane managed by a Give Way.

Parking

266. There are a total of 56 on-street unrestricted parking spaces on Ruahine Street and SH1 Wellington Road. There are no mobility parking spaces, taxi stands or loading zones. A

[17] Right turns at this intersection can be very challenging at times.

summary of the on-street parking capacity for SH1 and surrounding streets in this section is shown in Table 17.

Table 17: Eastern Connections parking capacity

Section Extents	Not restricted	Time restricted
Ruahine Street	32	0
Wellington Road	24	0
Taurima Street	5	12
Moxham Avenue	104	23*
Waitoa Road	3	6
Tapiri Street	11	4
Raupo Street	12	0
Goa Street	19	1
Kupe Street	7	0
Walmer Street	11	0
Hamilton Road	3	0
Kilbirnie Crescent	19	0
Evans Bay Parade	22	0
Total	**272**	**46**

**Six of these parking spaces are part of a clearway that operates between 7:00 am and 9:00 am weekdays.*

267. A visual summary of the location of these parking spaces is shown in Figure 46 to Figure 49. Parking restrictions on Taurima Street, Waitoa Road, Moxham Avenue, Tapiri Street and Goa Street are typically as follows:

    i. 15 minute maximum on Waitoa Road and Moxham Avenue between 8:00 am to 8:00 pm

    ii. 60 minute maximum on Waitoa Road and Moxham Avenue at all times

    iii. 10-60 minute maximum on Taurima Street at all times

    iv. 60 minute maximum on Tapiri Street at all times

    v. 120 minute maximum on Goa Street between Tuesday to Friday 9:00 am to 5:00 pm



Figure 46 – Existing parking overview (Waitoa Road to Tapiri Street)



Figure 47 – Existing parking overview (Tapiri Street to pedestrian crossing)



Figure 48 – Existing parking overview (pedestrian crossing to Kupe Street)



Figure 49 – Existing parking overview (Moxham Avenue to Evans Bay Parade)

Public Transport

268. The Hataitai bus tunnel provides a dedicated single lane for buses to transit Mt Victoria without the requirement to travel along SH1 through the Mt Victoria Tunnel. Buses in either direction wait for bus signal to indicate that it is clear for them to proceed. Seven scheduled bus routes and seven school bus routes travel eastbound through the Hataitai bus tunnel, and seven scheduled bus routes and eight school bus routes travel westbound along Moxham Avenue to the Hataitai bus tunnel.

269. Fourteen scheduled bus routes and 25 school bus routes use SH1 at the Hamilton Road, Wellington Road, Kilbirnie Crescent intersection. A summary of the scheduled bus route movements is shown in

270. Table 18 and a summary of the school bus routes is shown in Table 19.

Table 18: Scheduled bus routes at the Hamilton Road, Wellington Road, Kilbirnie Crescent intersection

		Destination			
		Hamilton Road	Wellington Road (east)	Kilbirnie Crescent	Wellington Road (west)
Origin	Hamilton Road		3	4	
	Wellington Road (east)	3			
	Kilbirnie Crescent	4			
	Wellington Road (west)				

Table 19: School bus routes at the Hamilton Road, Wellington Road, Kilbirnie Crescent intersection

		Destination			
		Hamilton Road	Wellington Road (east)	Kilbirnie Crescent	Wellington Road (west)
Origin	Hamilton Road		4	4	
	Wellington Road (east)	1			1
	Kilbirnie Crescent	8			
	Wellington Road (west)		6	1	

271. Six scheduled bus routes and 13 school bus routes interact with SH1 at the Wellington Road, Cobham Drive, Evans Bay Parade intersection. A summary of the scheduled bus route movements is shown in Table 20 and a summary of the school bus routes is shown in Table 21.

Table 20: Scheduled bus routes at the Wellington Road, Cobham Drive, Wellington Road intersection

		Destination			
		Evans Bay parade (north)	Cobham Drive	Evans Bay Parade (south)	Wellington Road
Origin	Evans Bay parade (north)				
	Cobham Drive				3
	Evans Bay Parade (south)				
	Wellington Road		2	1	

Table 21: School bus routes at the Wellington Road, Cobham Drive, Evans Bay Parade intersection

		Destination			
		Evans Bay parade (north)	Cobham Drive	Evans Bay Parade (south)	Wellington Road
Origin	Evans Bay Parade (north)				
	Cobham Drive			1	2
	Evans Bay Parade (south)				
	Wellington Road		3	7	

272. Five school bus routes travel southbound on Ruahine Street then eastbound on Wellington Road and three school bus routes travel westbound on Wellington Road then northbound on Ruahine Street.

273. The bus routes and bus stops for both scheduled buses and school buses within the Eastern Connections section are shown in Figure 50. A summary of key bus stop patronage for the period 24 October 2025 – 30 October 2025 can be found in Annexure A . The arrival frequency at bus stops 6552, 7552, 6221, 7221, 6217 and 7217 during peak times are also shown Figure 50. The peak times were approximated based on the duration Metlink operates peak rates (7:00 am to 9:00 am and 3:00 pm to 6:30 pm).

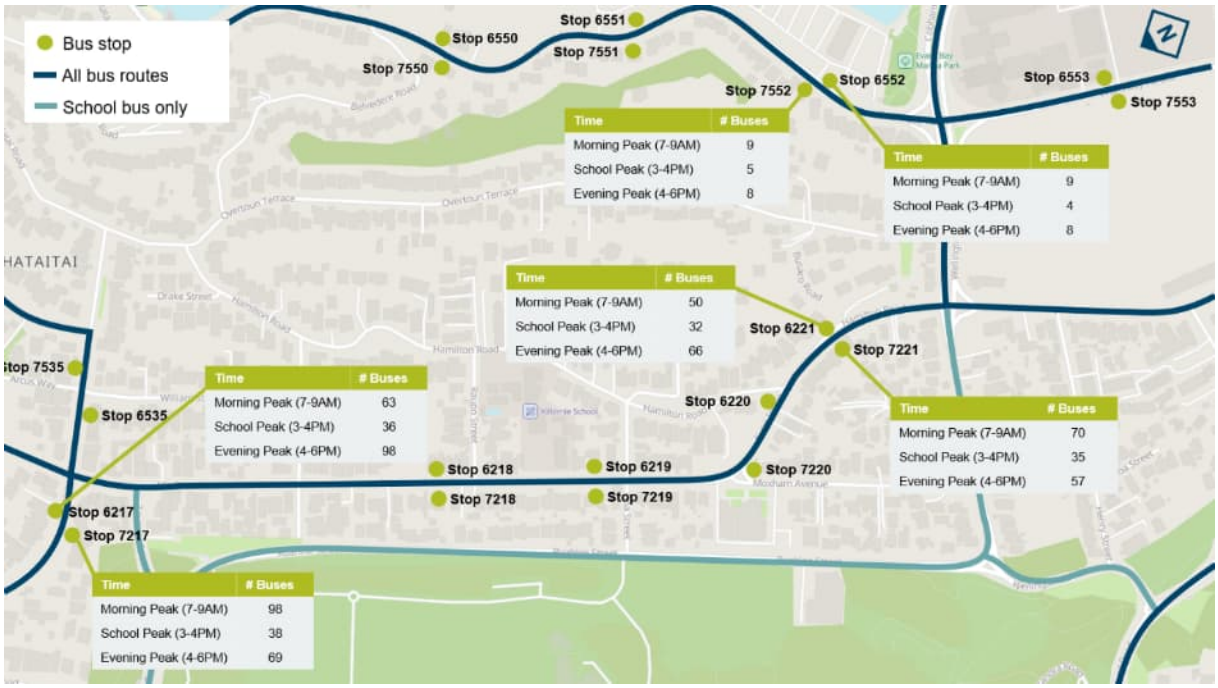


Figure 50 – Bus arrival frequency at Eastern Connections bus stops

Walking network

274. Pedestrian access along SH1 Ruahine Street is limited. A narrow footpath (1.5 m) runs along the eastern side of the corridor from the Mt Victoria Tunnel to opposite to the Wellington Badminton Centre. This section offers low pedestrian amenity due to its narrow width and close proximity to high-speed (70 km/h) traffic. Beyond the Badminton Centre, footpaths are provided on both sides of the road, improving accessibility. The walking network is shown in Figure 51.



Figure 51 – Walking and cycling network in Eastern Connections section

275. Despite the presence of footpaths, there are no controlled at-grade pedestrian crossings along this stretch of SH1 Ruahine Street to support access to the Badminton Centre, resulting in poor connectivity and safety for pedestrians. There is a midblock pedestrian refuge across Ruahine Street north of Goa Street which does not connect to a footpath on the west side of Ruahine Street but links to informal tracks into and through Hataitai Park. There is also a pedestrian overbridge that crosses Ruahine Street, linking Taurima Street in Hataitai Village with the Hataitai Netball Pavilion, Hataitai Park, and the Wellington Velodrome. This grade-separated facility plays a critical role in connecting residential areas with key recreational destinations.

276. At ground level, zebra crossings are provided on Taurima Street and Moxham Avenue, with kerb buildouts on the Moxham Avenue zebra crossing to reduce crossing distances and increase pedestrian visibility. There are two staircases on SH1 Ruahine Street, one providing access to the pedestrian overbridge, and another providing pedestrian access to Tapiri Street.

277. Further east, SH1 Wellington Road provides continuous footpaths on both sides of the corridor along its entire length. Full signalised pedestrian crossings are located at the intersection of Hamilton Road and SH1 Wellington Road, as well as at the intersection of SH1 Wellington Road and Evans Bay Parade (no crossing of western approach), offering safe and controlled crossing opportunities across this busy arterial road. Wellington Road has footpaths providing a walking route onto Crawford Road and Constable Street towards Newtown.

278. Figure 52 shows a heatmap of the recorded walks on Strava for this section of the Project, highlighting a greater pedestrian presence on Moxham Avenue and Hamilton Road, as opposed to SH1 Ruahine Street.

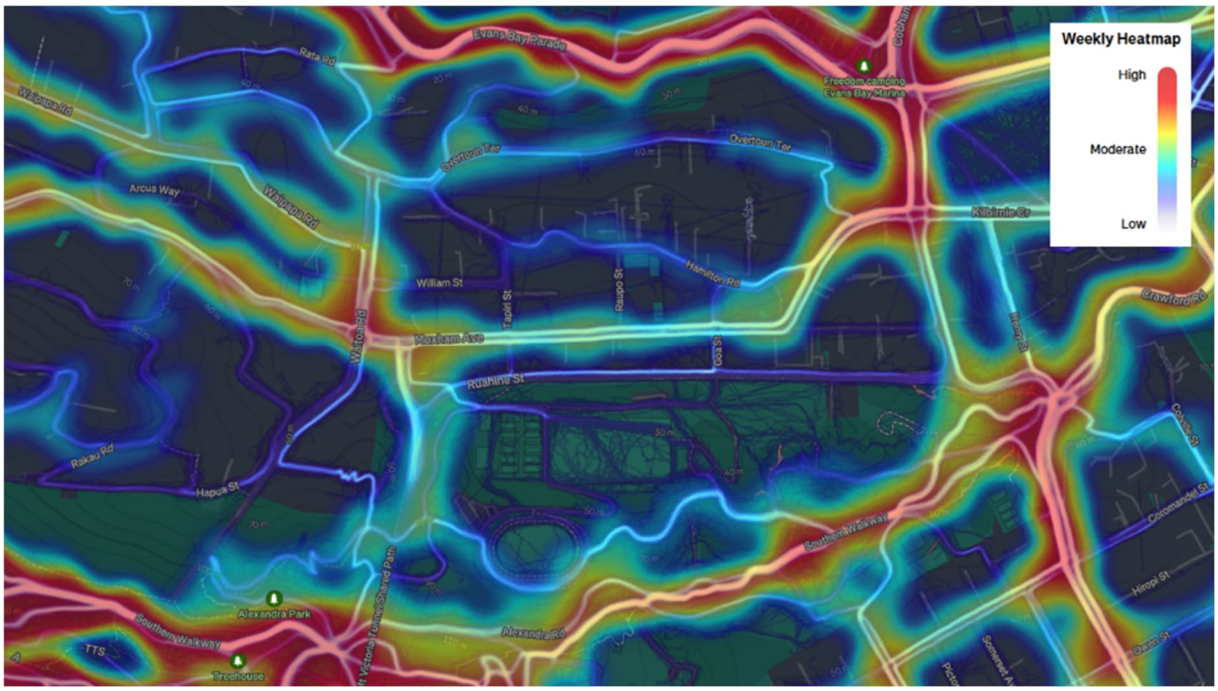


Figure 52 –Strava weekly heatmap for recorded walks

Cycling network

279. Due to the lack of dedicated cycling facilities along this section of SH1, cyclists are directed to use the surrounding local road network. The cycling network is shown in Figure 51 above. The WCC cycle network shows both Moxham Ave and Ruahine Street as possible cycle routes but acknowledges that there are conflict issues on both at this time.

280. Moxham Avenue is classified by GWRC as a recreational/commuting route, and the shared path from the Mt Victoria tunnel connects to Moxham Avenue via Taurima Street. Both streets feature sharrow markings (limited to the 30 km/h area), indicating a shared lane environment for people on bicycles and motorists. Cyclists travelling westbound typically rejoin SH1 via Taurima Street. Signage displayed at the entrance to Mt Victoria Tunnel asks cyclists to give way to pedestrians, creating a gap in the cycle network in this section.

281. Further east, Cobham Drive and Evans Bay Parade (south of Wellington Road) have protected bidirectional cycle lanes, providing connections to the wider cycling network in the eastern suburbs and supporting movement between these and the central city.

282. Figure 53 shows a heatmap of the recorded cycles on Strava for this section of the Project, highlighting a greater cycling presence on Moxham Avenue, Taurima Street and Hamilton Road, as opposed to SH1 Ruahine Street.

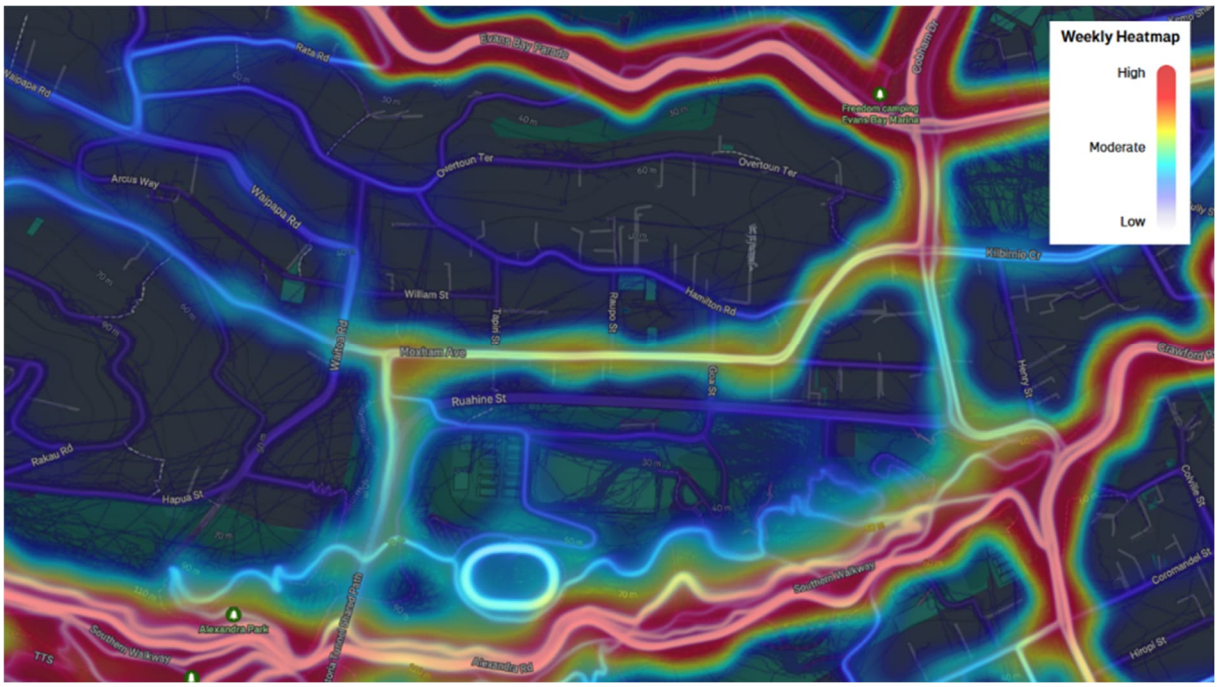


Figure 53 –Strava weekly heatmap for recorded cycles

Crash History

283. In order to provide a baseline for the safety of the Project, I have reviewed data from the CAS database of recorded crashes for the Project Area. In this section there were no fatal or serious crashes recorded during the period investigated. Table 22 shows a summary of the recorded crashes.

Table 22: Eastern Connections crash history

Location	Fatal	Serious	Minor	Non-injury	Total
SH1 Taurima Street Midblock	0	0	6	5	11
SH1 Ruahine Street Midblock	0	0	1	12	13
SH1 Wellington Road Midblock	0	0	1	7	8
SH1 Taurima Street / SH1 Ruahine Street / Taurima Street Intersection	0	0	6	10	16
SH1 Ruahine Street / Goa Street / Hataitai Park Entrance Intersection	0	0	0	2	2
SH1 Ruahine Street / SH1 Wellington Road / Wellington Road Intersection	0	0	2	17	19
SH1 Wellington Road / Moxham Avenue Intersection	0	0	0	1	1
SH1 Wellington Road / Hamilton Road / Kilbirnie Crescent Intersection	0	0	2	14	16
SH1 Wellington Road / SH1 Cobham Drive / Evans Bay Parade Intersection	0	0	4	8	12
Total Crashes	**0**	**0**	**22**	**76**	**98**

284. Eight crashes (six minor and two non-injury) resulted from drivers turning from Taurima Street onto SH1 Taurima Street and failing to give way to vehicles approaching on their right. An additional four non-injury crashes involved drivers travelling from the Mt Victoria tunnel towards the airport who failed to recognise the road curvature at the Taurima Street / Ruahine Street intersection.

285. Seven crashes (one minor and six non-injury) resulted from drivers turning right from SH1 Ruahine Street onto Wellington Road and failing to give way to vehicles travelling through towards Mt Victoria Tunnel. A further seven crashes (one minor and six non-injury) resulted

from drivers turning right from Wellington Road onto SH1 Wellington Road and failing to give way to vehicles from both directions.

286. Six crashes (one minor and five non-injury) resulted from drivers turning from SH1 Wellington Road (west) onto Kilbirnie Crescent and failing to give way to through vehicles on SH1 Wellington Road (east). Two crashes (one minor and one non-injury) resulted from drivers turning from Hamilton Road onto SH1 Wellington Road (west) and failing to give way to through vehicles on Kilbirnie Crescent.

287. Two crashes (one minor and one non-injury) resulted from drivers turning right from Evans Bay Parade onto SH1 Wellington Road and failing to give way to through vehicles on Evans Bay Parade. One minor crash occurred when a vehicle turning left from SH1 Wellington Road into Evans Bay Parade failed to give way to an oncoming vehicle.

288. A total of 12 (one minor and 11 non-injury) rear-end crashes occurred at intersections throughout this section and a further 18 (2 minor and 16 non-injury) occurred in mid-blocks on the state highway due to drivers failing to see queued traffic.

Journey time reliability

289. As shown in Figure 54 and Figure 55 journey time reliability during the morning peak period (7:00 am to 9:00 am) is poor on the routes that are shown. The data for the graphs was taken from records of the VMS displays on SH1 at Cobham Drive and adjacent to ‘Placemakers’ in Kaiwharawhara.

290. At certain times of day, the variability in journey times is significant, with the difference between the fastest and slowest journeys within the same hour being almost double, which I consider can be attributed to congestion arising from ‘bottlenecks’ along the corridor.

291. SH1 experiences higher travel time variability when compared to the Quays route between Kaiwharawhara to Wellington Airport. Conversely for the Cobham Drive to Wellington CBD route, the route via the Bays experiences greater travel time variability in the morning peak compared to SH1.

292. The data shows that during peak demand periods, average travel times increase, as does travel time variability.

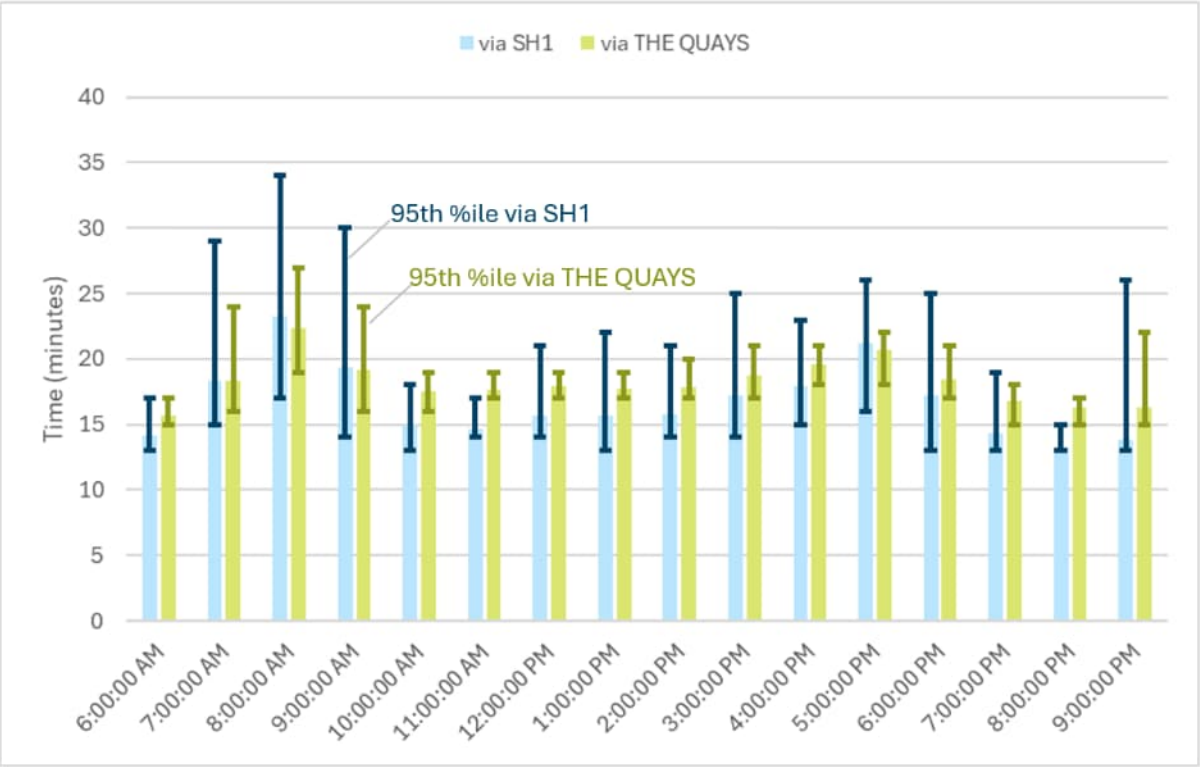


Figure 54 – Kaiwharawhara to Wellington Airport VMS

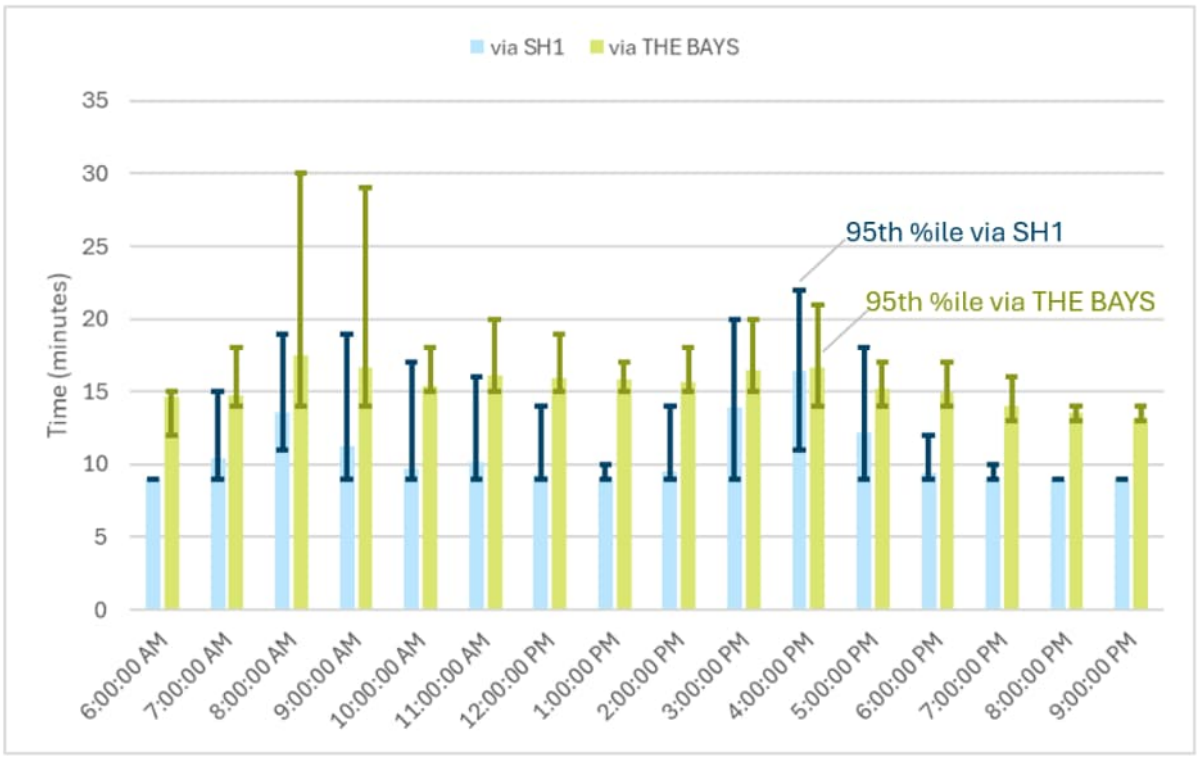


Figure 55 – Cobham Drive to Wellington CBD VMS

Weekend conditions

293. Whilst the information I presented above focusses on weekday conditions, I note that SH1 through the Project Area remains busy on a weekend, and Saturday especially. As I present

below there are some differences with the pattern of movements on a Saturday, and the purpose of the journeys.

294. The figures below show hourly flows on Vivian Street and Terrace Tunnel for typical weekdays and weekends. They show that whilst the AM peak is slightly higher in a weekday, and the weekend reaches its peak flow later, the interpeak flows are sustained at a level at or above the weekday interpeak through until 4pm.

295. I am also aware that there is a higher frequency of planned events that occur in Wellington which create altered traffic patterns on weekends than weekdays. This includes events at the Basin Reserve, through the inner city and along the waterfront and at the Wellington Regional Stadium amongst other parades and events. As such the variation on weekends is greater in terms of traffic patterns than weekdays.

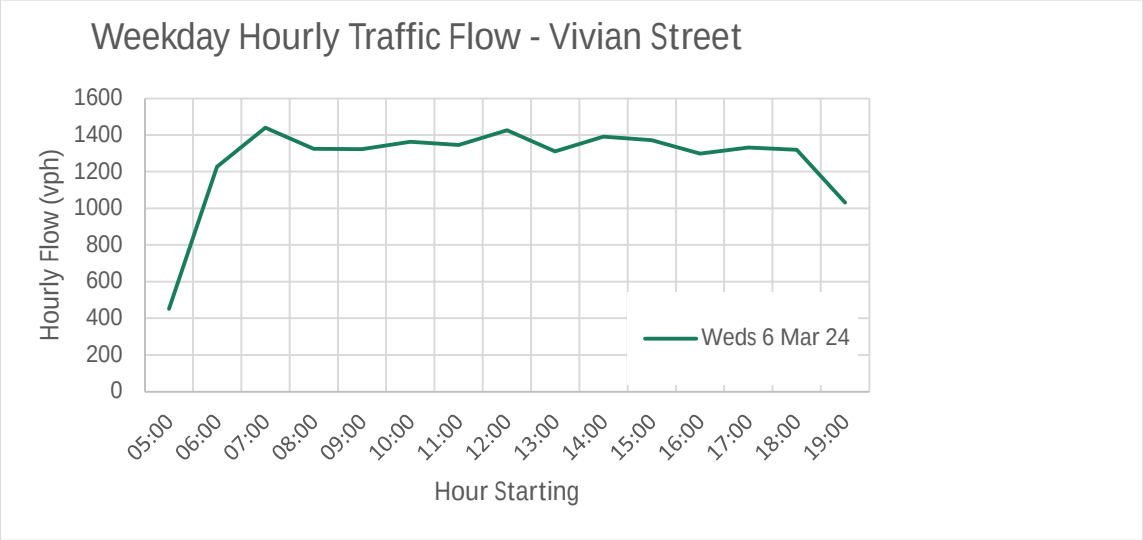


Figure 56 – Weekday Flow Patterns on Vivian Street

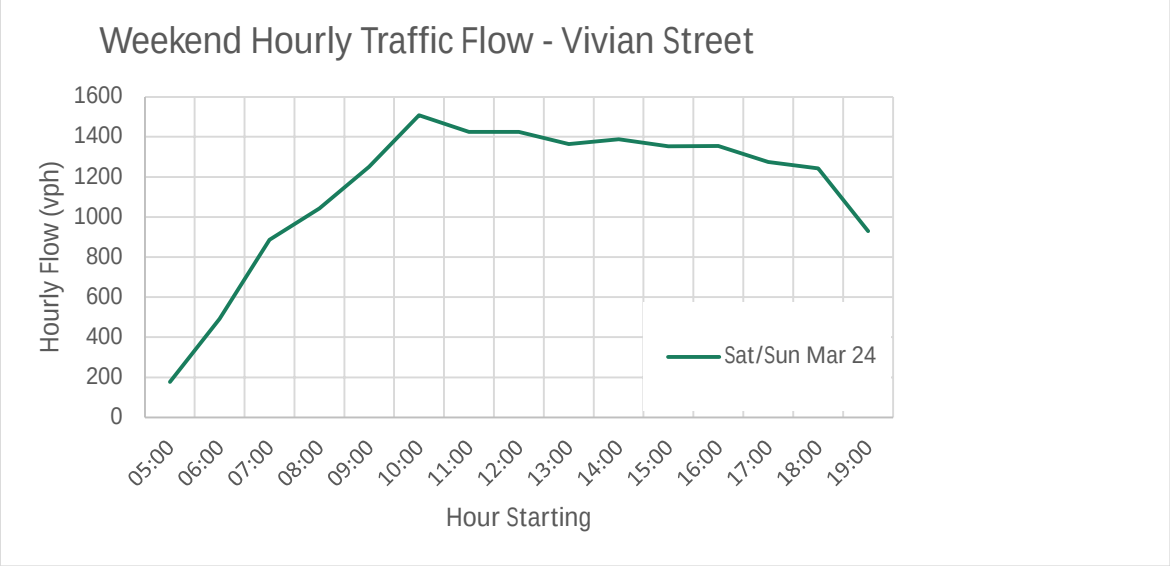


Figure 57 – Weekend Flow Patterns on Vivian Street

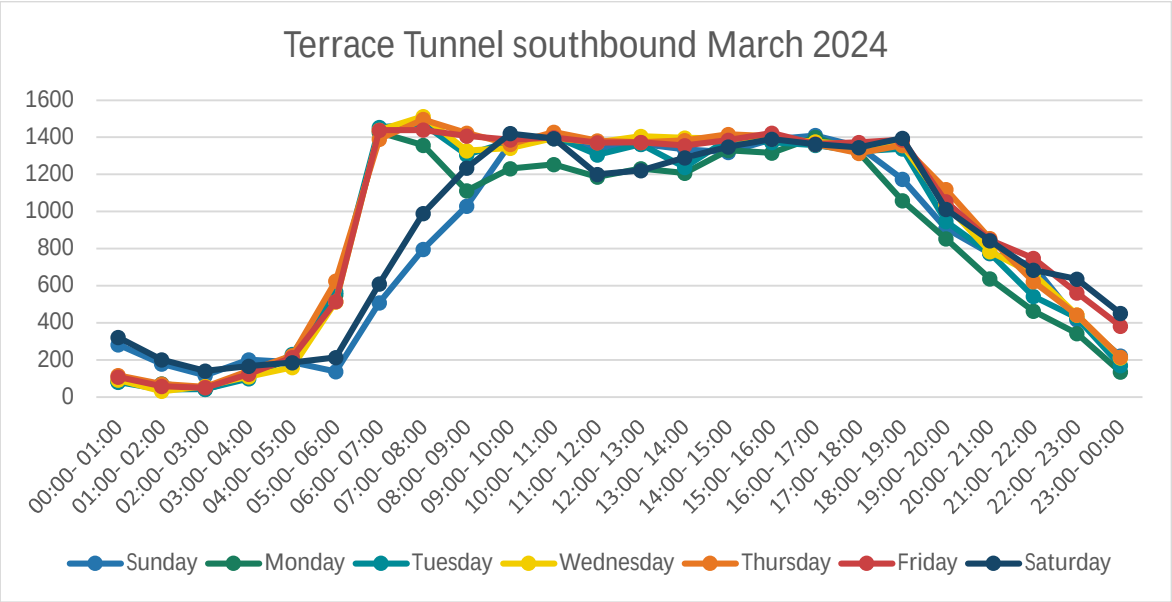


Figure 58 – Hourly Flow Patterns Terrace Tunnel Southbound

296. The figures above show that the volumes travelling along SH1 could be considered broadly equivalent to the weekday volumes particularly in the later morning and early afternoon.

297. However, I also note that whilst there are similarities in the volumes along the corridor, there are differences in the proportions of journey purpose and indeed the origins and destinations for these trips.

298. When considering the Greater Wellington region, Data from the Ministry of Transport Household Travel Survey and the NZTA's 'Journey Monitor' both provide insight into the purposes of journeys across the week. These both show that the weekday trips have a high proportion of work or business trips, accounting for over half the trips in the morning peak and 30% throughout the day. However on a weekend, the proportion of work trips is approximately a third the weekday proportion.

299. Whilst there is variation throughout the day, shopping trips form approximately 25% of trips on both weekdays and weekends. Sports and exercise related trips are relatively consistent at 5% and 8%, albeit the weekend early morning is higher.

300. The largest difference comes from the contribution of social visits and entertainment which are almost triple the weekday rates at 27% of trips.

301. I note that these figures are across the Wellington Region and I am not aware of a reliable dataset that would be specific to the users of the Project or travellers in the Project Area. My expectation is that there would be a higher proportion of sports trips as a result of the proximity to Kilbirnie Park, the Regional Aquatics Centre, and Hataitai Park facilities.

302. I consider the nature of the weekend trips, even for similar trip purposes is more variable than a weekday. For example for both retail and sports purpose trips, the actual locations of those may vary weekly as people shop for different goods, or engage in sports against different teams in alternate venues.

303. As a result, the ability to produce a robust forecasting model to reflect weekends is extremely limited, as the models require a consistent set of observed traffic flows, journey times and origin and destinations to calibrate and then validate.

304. In the case of the Project, I do not consider that this is a significant limitation on my ability to assess effects. As I showed above in Figure 56 to Figure 58 the weekend traffic flows are very

consistent with the weekday traffic flows. And it is therefore my opinion that whilst there would be some localised differences in the patterns of movements, where the weekday assessment shows the Project has added capacity to SH1, and attracts trips from the local network, this would also occur on a weekend. Likewise, where there are increased delays on a weekday for certain movements, I would expect that in general they would be replicated on a weekend.

305. In later chapters I do make reference to specific destinations and features of the Project that have specific relevance to the operational performance on a weekend, I have only quantified the forecast weekday performance benefits and disbenefits.

Future environment (without the Project)

306. Whilst there is a constant level of change across the Wellington Region, with development that affects the demand side of transportation, and also the 'supply' side of transport, it is my view that at present there are very few specific schemes that are committed and likely to have an impact on the Project assessment. Below I describe the changes I have assumed will be implemented as a 'baseline' for the future with and without the Project. Where I refer to the 'Do Minimum' in this assessment I refer to this baseline that is a future year with the following schemes implemented but in the absence of the works proposed by the Project.

Harbour Quays

307. WCC is planning for and have indicated commitment to changes to the road layout on Customhouse Quay, Jervois Quay, Cable Street and Wakefield Street to improve the capacity of the corridor for buses during the peak periods.

308. Typically, the changes will result in the kerbside lanes in each direction become a peak period bus lane reducing traffic capacity from 3 to 2 lanes, with associated changes to the lane widths and changes to the bus stops to provide greater passenger capacity and amenity.

309. I understand that these infrastructure changes are proposed to be implemented during the 2027 financial year, and on completion there will be changes to the routes and services through central Wellington to make use of the new infrastructure[18].

310. Overall, the scheme is intended to ease public transport congestion on the Golden Mile through delivering an alternate parallel route. This is often referred to as the 'dual spine' or 'second spine'.

Golden Mile

311. The 'Golden Mile' is a well known colloquial description for Lambton Quay, Lower Willis Street, Manners Street and Courtenay Place. WCC has considered removing general traffic from the 'Golden Mile' section of the inner-city streets which accommodates the main bus through route on Lambton Quay, Lower Willis Street, Manners Street and Courtenay Place. This would enable creation of bus priority lanes along the corridor.

312. The changes would remove or reduce access for private cars from Courteney Place during the daytime (7am-7pm), and instead they would divert to Wakefield Street. Additional facilities to improve walking and cycling have also been considered for the corridor.

313. This project was initially anticipated to be delivered during 2027. However as I was completing this report, WCC revisited the proposed scheme and commenced a review of alternate proposals for the Golden Mile. Whilst the final form and timing of any changes to accommodate

[18] Project Business Case (Significant) - Harbour Quays Corridor - Bus Priority (Draft for Consultation), WCC & GW, May 2026

bus priority through Lambton Quay, Lower Willis Street, Manners Street and Courtenay Place is currently unconfirmed, I consider that the core elements that will impact traffic flows and public transport, and therefore be directly pertinent to the assessment of the Project, are unlikely to change significantly from the specific elements assumed to be in place in the transport modelling for the 2033 Do Minimum scenario.

Karo Drive

314. NZTA have decided to implement Karo Drive improvements during 2026/27 given the immediate travel time benefits it offers to state highway users.

315. The key proposed changes to the road network at the SH1 Karo Drive / Willis Street intersection are:

    i. Reallocation of one of two right-turn lanes from Karo Drive into Willis Street northbound to provide three through lanes for the SH1 through movement

    ii. Alterations to the Inner City Bypass (ICB) trench to provide three lanes for approximately 200 m before merging into two lanes

316. The planned Karo Drive improvements involve reallocating one of the two right turn lanes into Willis Street and widening the road which will then a merge back to two lanes before the Terrace Tunnel. In addition, NZTA will be making minor changes to kerbs, footpaths and pedestrian crossings as well as changes to underground services and utilities. The pedestrian shelter, barrier arms and light poles will be moved and the road will be resealed.

Traffic volumes

317. The figures below are taken from the WTSM model and provide a summary of the forecast traffic volumes in 2033 during AM peak (6:00 am to 9:00 am three hour totals), PM peak (3:00 pm to 6:00 pm three hour totals), and daily flows under the Do Minimum scenario in Figure 59, Figure 60, and Figure 61 respectively. The thickness of the lines and numbers reflect the forecast traffic flows on each road.

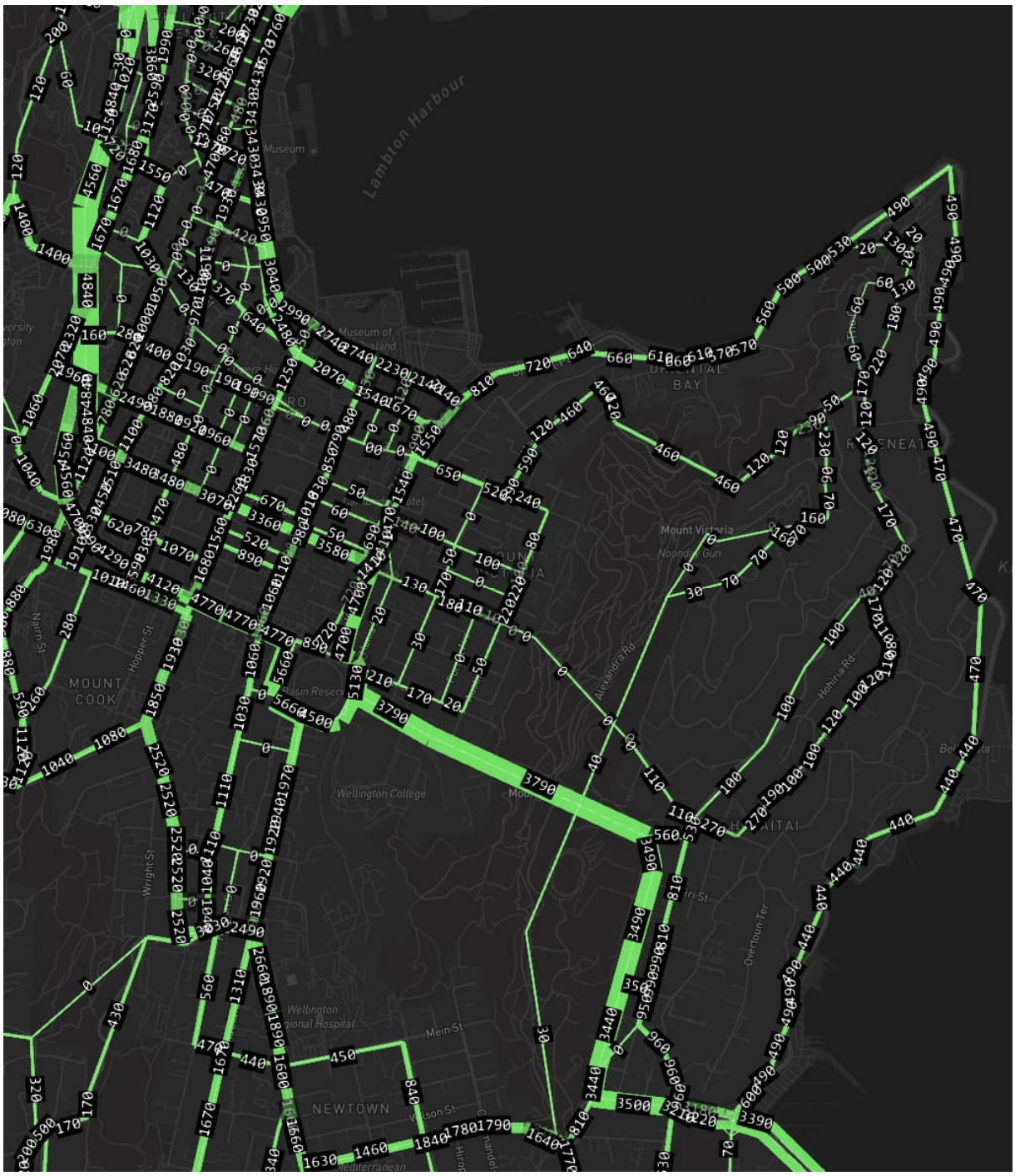


Figure 59 – Volume plot 2033 AM peak – Do Minimum



Figure 60 – Volume plot 2033 PM peak – Do Minimum

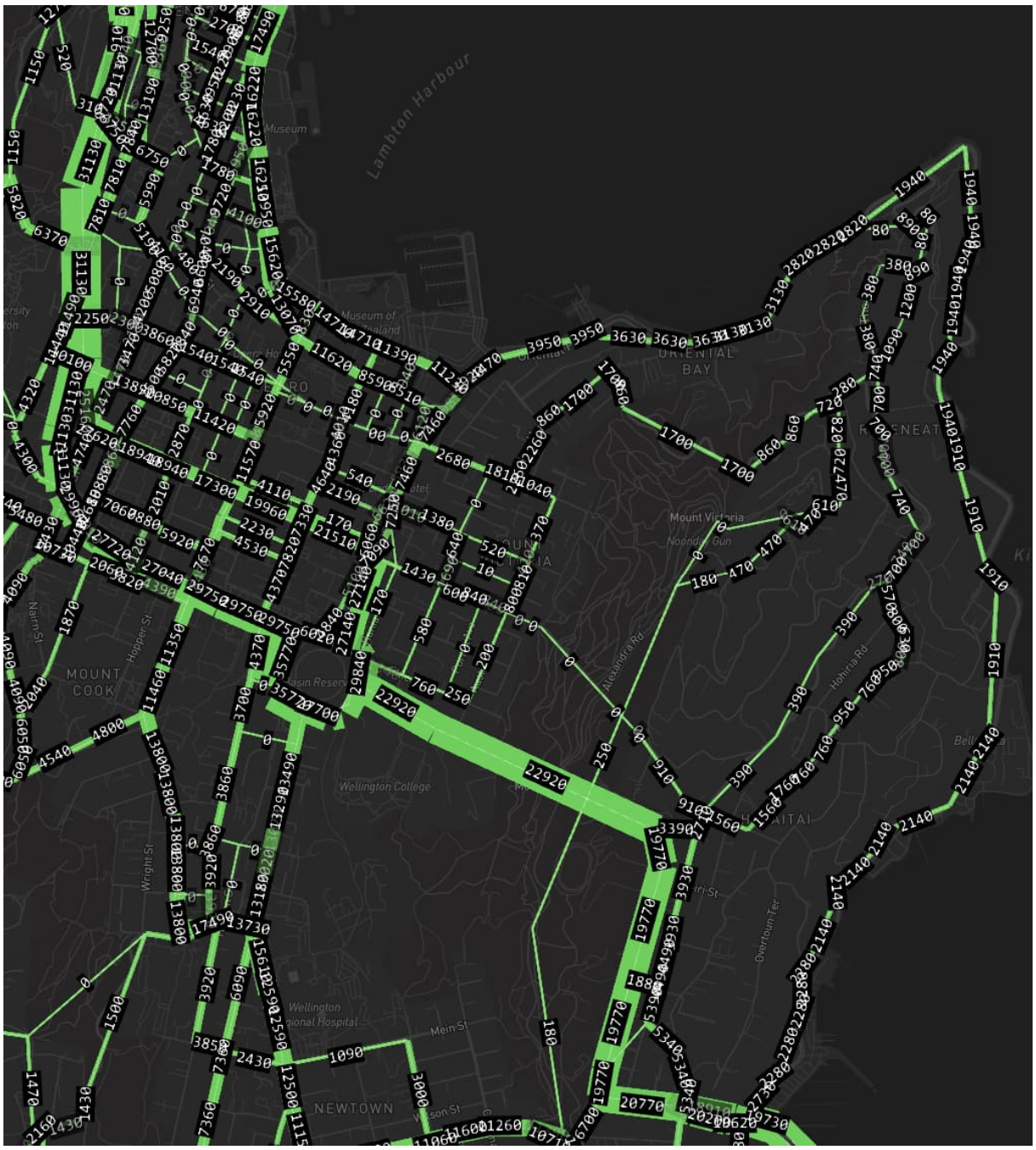


Figure 61 – Volume plot 2033 daily traffic – Do Minimum

318. The modelling shows that on a daily basis the network will continue to serve an increasing number of vehicles through to 2033. Whilst there are parts of the network which are at capacity presently (2026) the increased daily and peak period flows show that there is the demand to support a spreading through the peak.

319. I have also identified through the detailed modelling of the project some areas where there will be a marked decline in the level of service as a result of the demands moving above the available capacity and creating new issues that are not (or rarely) observed on the network.

320. An example is the increased traffic on Ruahine Street which constrains the traffic that can exit Hataitai via Taurima Street and through the Mt Victoria Tunnel. As a consequence from this, the queue of vehicles is modelled to extend back and to block the roundabout between Waitoa Road and Moxham Avenue. This creates a significant delay for the buses heading towards the

airport as they come through the Hataitai tunnel. It also results in traffic diverting down Moxham to Goa Street.

321. The figures below present a summary of the forecast traffic volumes in 2053 during AM peak (6:00 am to 9:00 am), PM peak (3:00 pm to 6:00 pm), and daily flows under the Do Minimum scenario in Figure 62, Figure 63, and Figure 64, respectively. The thickness of the lines and numbers reflect the forecast traffic flows on each road.



Figure 62 – Volume plot 2053 AM peak – Do Minimum

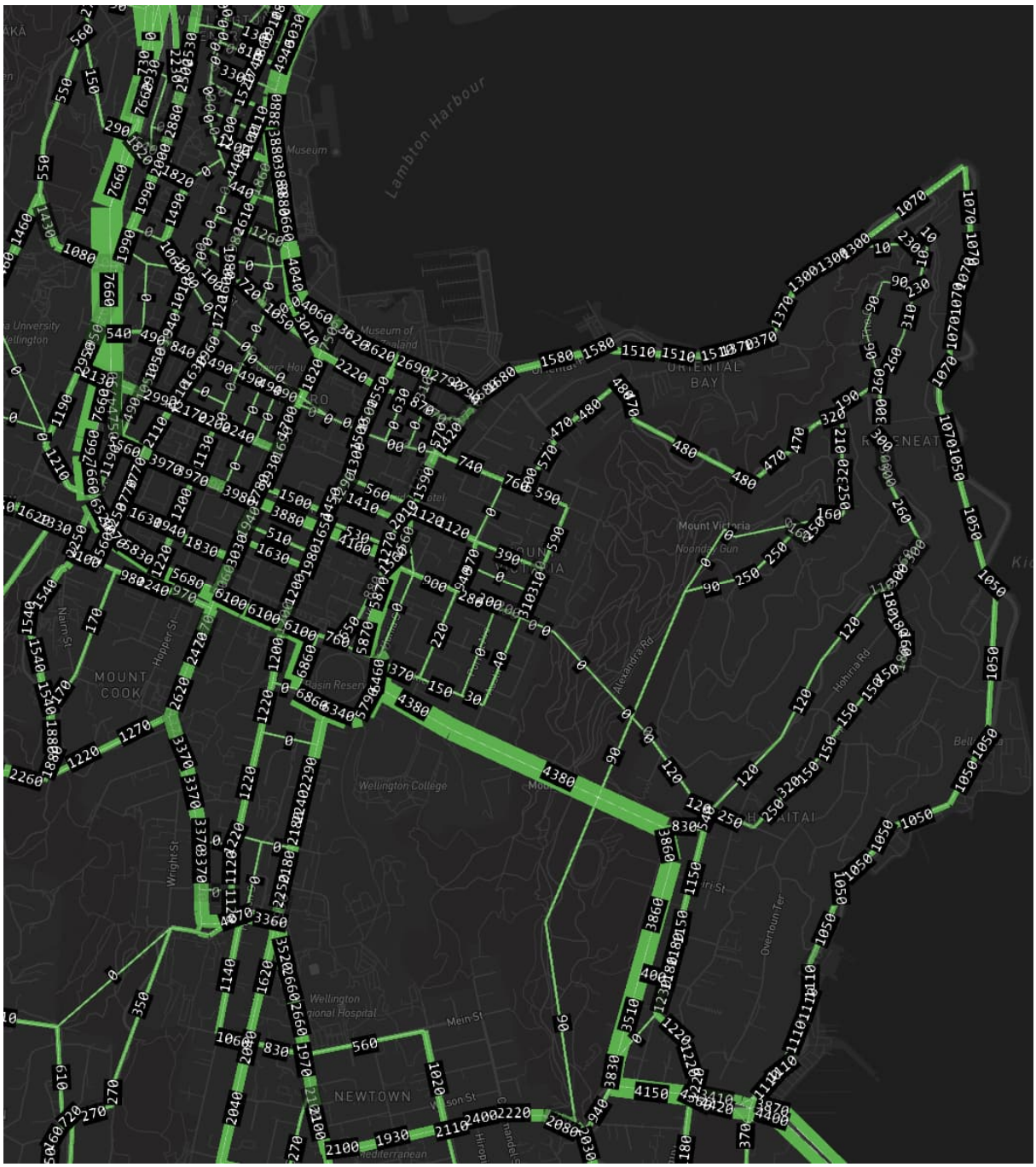


Figure 63 – Volume plot 2053 PM peak – Do Minimum



Figure 64 – Volume plot 2053 daily traffic – Do Minimum

322. The figures above show that whilst there is the expected growth in traffic across the network in by 2053, the growth is unequal. For example the round the bays route increases by some 34% compared to SH1 Mt Victoria which only increase by 5%[19].

323. Similar patterns can be seen to the north, with minimal further increases in traffic through the Terrace Tunnel but growth on the local roads through Kelburn.

324. I also note that the modelling suggests routes through the CBD are not expected to see significant increases in traffic flow. Noting the overall increases across the network, this uneven distribution of growth I would interpret as being the result of capacity bottlenecks in the network.

[19] I do note that the model is known to understate the flows on the 'around the Bays' route, and this is a recognised and accepted feature of the WTSM. For the purpose of this assessment of effects it is the change in flows that I consider more critical than the absolute values, and I still consider the model fit for purpose.

6. BENEFITS OF THE PROJECT (POSITIVE EFFECTS)

325. I understand that the Project is intended to support economic growth and productivity and deliver the following improved outcomes:

    i. Efficiency (reduced journey times for vehicles using SH1)

    ii. Journey Time Reliability

    iii. Resilience

Efficiency

326. As shown in the following chapter, the Project delivers 4-7 minute average time savings[20] on various journey routes throughout the peak periods in both 2033 and 2053 (10-15% of total journey time) between Johnsonville and the Airport. These savings are delivered not just on SH1, but also on local roads as a result of traffic being attracted off the local roads and onto SH1.

327. The journey time savings reduce the costs of travel and improve accessibility to the places they need or wish to travel. Mr Norman in his Economic Assessment covers the broader benefits that arise from this improved efficiency.

328. From a pure transport perspective, I consider these savings to be significant, especially on key national and regional journeys to Wellington Airport, Wellington Hospital and the CBD. The benefits of the Project increase into the future as otherwise congestion would increase further as the current network is at capacity in many locations. This additional capacity relieves the congestion bottlenecks and supports the continued growth of the City and allows for new development within the city via intensification which would otherwise be precluded by the transport network being at capacity.

329. By providing a quicker SH1 route with more reliable journey times and additional capacity, more drivers will choose this route compared to the local alternatives such as Oriental Parade, Harbour Quays or Constable Street. Each of these routes currently experiences delays, and will benefit from a reduction in traffic with the Project. This means that local residents and businesses directly gain from the Project without necessarily using SH1 themselves.

330. The decongestion of local roads facilitates future projects, outside of the scope of the Project, but which can use the spare capacity on the network to support all modes, including public transport. However, as these opportunities are not part of the Project, I have not considered any benefits arising from these potential projects.

331. The modelling shows that traffic flows on SH1 increase throughout the length between a point north of Aotea Quay and Calabar Road and the reverse journey. At either end the volume increase is only some 3% (indicating growth from the wider region) but through the centre of Wellington the increases on SH1 are up to 40% above the Do Minimum. This shows that the Project would deliver a quicker SH1 route with more reliable journey times and therefore traffic is attracted onto SH1 from local alternate routes.

332. Noting the reduced journey time with the increased traffic volumes being carried, this shows a substantial traffic efficiency benefit and growth occurring from the Project.

[20] Note that these are average peak period travel times, and during higher demand times the savings can be higher.

Journey time reliability

333. I referred to the improved efficiency in the paragraphs above, and I linked that to a reduction in the journey times that are forecast by the modelling undertaken for the Project. As outlined in the approach to my assessment, the strategic models that I have relied on provide a journey time that is representative of the average journey time for specific periods of the day.

334. However I consider that, from an individual traveller's perspective, the variability in that journey time can be as important, or in some cases even more important a factor in their perception of the journey. This is especially relevant for time sensitive journeys such as those for critical medical appointments at hospital or flight departures at the airport.

335. As traffic demands increase it is an observed fact that travel times start to increase exponentially and thereby many people experience variable travel times and greater delays than the average peak reported by the traffic modelling. The significance of this is also included in Mr Norman's Assessment where the variability of journey time has an economic impact too.

336. I understand this latter effect is related to the need to leave earlier to guarantee arrival at a specific time to account for variable delay, and potentially leaves 'wasted' time even if the journey is not delayed. An example is a commuter that needs to be at work for an 8am shift, that has a journey of 25 minutes average, but can be up to 40 minutes once a fortnight. In this case they would need to leave at 7:20am each day to prevent being late for work, but on average then have 15 minutes of unproductive time each day.

337. I presented some data that provides examples of the variability that occurs on the Wellington road network in Chapter 5 above.

338. In Chapter 7, I present evidence of the modelled journey times and the time distance graphs that demonstrate that the Project is forecast to reduce the journey times, and also that several of the current bottlenecks are either removed, or substantially reduced in influence. The journeys with the reduced travel times include regional strategic journeys and also most local journeys.

339. As I showed in Chapter 5 travel time variability is strongly correlated to the periods when the average journey times increase through congestion. By removing bottlenecks, and increasing the capacity of the corridor on SH1 through the Project Area, as identified in the journey time graphs in Chapters 5 and 7, I consider this provides a strong evidence base for the Project delivering a improvement in journey time reliability.

Resilience

340. From a transport perspective, the Project provides several features that contribute to the improved resilience not just of SH1 through Wellington, but of access in general.

341. The two new tunnels contribute to an increase in capacity. At the moment the network is at capacity during peak periods and so any incident has a significant effect across a wide area. With the Project, the network will have the ability to 'absorb' some incidents, such as the loss of a single lane through an accident or roadworks. The Project delivers resilience through route choice when the preferred route is compromised. As I discussed above, the resilience in terms of available capacity and duplication of the SH1 route along much of the Project area leads to resilience in journey time reliability as well as the direct resilience of maintaining route availability.

342. Aside from the tunnels, the Project is providing several grade separations which will isolate delays on one route from adversely affecting the grade separated route and removes conflict points that can otherwise experience crash incidents that can affect traffic flows.

343. Finally, the provision of the additional lanes offers the choice of potential management of the road space in the future. Whilst not proposed as part of the Project, the introduction of managed lanes, including but not limited to bus lanes, is enabled as a future opportunity by the Project. That is not an option at present as limiting a lane on most parts of SH1 would significantly reduce capacity below that needed for the basic network functionality, but may be appropriate on the new Sussex Street link between Adelaide Road and Cambridge and Kent Terrace.

344. As such I consider that the Project will add significant resilience to the transport system against future changes in the environment, policy and needs of the City.

Summary of effects

345. A summary of the positive effects noted above, is shown in Table 23.

Table 23: Summary of positive effects

Category	Effect	Effect rating
Efficiency	The Project delivers 4-5 minute average time savings on various journey routes throughout the peak periods in both 2033 and 2053 (10-15% of total journey time) between Johnsonville and the Airport	Substantial benefit
Journey time reliability	By removing bottlenecks and increasing the capacity of the corridor on SH1 through the Project Area, I consider this delivers a substantial improvement in journey time reliability.	Substantial benefit
Resilience	Improved resilience in terms of available capacity and duplication of the SH1 route along much of the Project area leads to resilience in journey time reliability as well as the direct resilience of maintaining route availability during periods of disruption.	Significant benefit

7. ASSESSMENT OF OPERATIONAL EFFECTS

346. I have outlined the overall approach I have taken to assess the effects in Chapter 4 above. In summary I have relied on the transport modelling undertaken by the Wellington Transport Analytics Unit to provide comparable data for a 'Do Minimum' scenario against a 'With Project' scenario. I have also considered the effects on safety and amenity in respect of travel times and distances in order to reach my identified assessment of the operational effects.

Network Level Effects

Traffic volumes

347. Once the Project is operational, SH1 traffic volumes are expected to increase due to the increased route capacity and improved accessibility along the corridor to the CBD and other regional destinations. I expect this increase will occur as a result of a combination of rerouting to the state highway, induced demand (stimulated growth), and mode shift.

    i. The rerouting of traffic refers to the redistribution of existing traffic from local roads onto the state highway as it becomes a more efficient and attractive route. This is a desirable outcome as it consolidates higher traffic volumes on the most regionally significant route designed to accommodate them, as well as reduces traffic, reduces safety risks and environmental impacts, and increases the longevity of local roads

    ii. Induced demand is represented by additional and longer trips that are made, enabled by improved travel conditions and regional access delivered by reduced travel time, increased capacity and improved reliability. While the model used for the assessment does not directly reflect additional trips, increases in journey distance can be attributed to improved access to goods, services, and economic opportunities which were previously constrained by congestion or poor network performance

    iii. Mode shift refers to the changes in travel behaviour where users choose to select private vehicles in response to the improved performance and travel time convenience of the state highway

Traffic volumes for 2033

348. Table 24 presents the anticipated daily 2033 traffic volumes at key locations on SH1. Data for 2053 follows later in this Chapter.

349. The largest increases in 2033 daily traffic volumes are observed on Wellington Road (+28% northbound and +30% southbound) and in the Mt Victoria Tunnel (+39% northbound and +28% southbound). Significant increases are also evident on Ruahine Street (+26% northbound and +22% southbound), Vivian Street (+37% southbound), Kent Terrace (+32% southbound), and in the Terrace Tunnel (+8% northbound and +38% southbound).

350. Moderate increases in daily traffic volumes are predicted along Cobham Drive, particularly west of Troy Street (+15% northbound and +7% southbound), and on Karo Drive (+12% northbound). In contrast, minimal changes are expected on Calabar Road (+2% northbound and +3% southbound), on Cobham Drive east of Troy Street (+4% northbound and +3% southbound), and on SH1 north of Aotea Quay (+2% northbound and +2% southbound), while reductions are observed on the Tinakori Road ramps (-4% northbound and -9% southbound).

Table 24 : SH1 Daily traffic volumes for 2033

Location	Northbound			Southbound		
	Do Minimum	With Project	Difference	Do Minimum	With Project	Difference
Calabar Road	14,800	15,100	+2%	12,900	13,300	+3%
Cobham Drive (East of Troy St)	27,100	28,100	+4%	28,300	29,100	+3%
Cobham Drive (West of Troy St)	20,200	23,300	+15%	19,700	21,100	+7%
Wellington Road	20,800	26,600	+28%	17,400	22,600	+30%
Ruahine Street	19,800	24,900	+26%	18,600	22,600	+22%
Mt Victoria Tunnel	21,100	29,300	+39%	22,900	29,200	+28%
Karo Drive (Cuba St to Victoria St)	27,700	31,000	+12%	n/a	n/a	n/a
Vivian Street (Cuba St to Victoria St)	n/a	n/a	n/a	18,900	25,900	+37%
Kent Terrace (South of Pirie St)	n/a	n/a	n/a	27,100	35,800	+32%
Terrace Tunnel	31,100	33,700	+8%	25,200	34,900	+38%
On (NB) / Off (SB) ramps at Tinakori	5,500	5,300	-4%	5,400	4,900	-9%
SH1 (North of Aotea Quay)	58,200	59,400	+2%	54,400	55,700	+2%

351. Table 25 presents the anticipated AM peak (6 am to 9 am) traffic volumes for 2033.

352. The largest increases in 2033 AM peak traffic volumes are observed in the Mt Victoria Tunnel (+49% northbound and +32% southbound) and on Wellington Road (+37% northbound and +41% southbound). Significant increases are also evident on Ruahine Street (+35% northbound and +28% southbound), Vivian Street (+54% southbound), Kent Terrace (+30% southbound), and in the Terrace Tunnel (+9% northbound and +58% southbound).

353. Moderate increases in AM peak traffic volumes are predicted along Cobham Drive, particularly west of Troy Street (+17% northbound and +12% southbound), and on Karo Drive (+12% northbound). In contrast, minimal changes are expected on Calabar Road (+0% northbound and +9% southbound), on Cobham Drive east of Troy Street (+2% northbound and +4% southbound), and on SH1 north of Aotea Quay (+3% northbound and +1% southbound), while reductions are observed on the Tinakori Road ramps (+0% northbound and -21% southbound).

Table 25: SH1 AM peak traffic volumes for 2033

Location	Northbound			Southbound		
	Do Minimum	With Project	Difference	Do Minimum	With Project	Difference
Calabar Road	2,600	2,600	+0%	2,300	2,500	+9%
Cobham Drive (East of Troy St)	4,800	4,900	+2%	4,700	4,900	+4%
Cobham Drive (West of Troy St)	3,500	4,100	+17%	3,400	3,800	+12%
Wellington Road	3,500	4,800	+37%	2,900	4,100	+41%
Ruahine Street	3,400	4,600	+35%	3,200	4,100	+28%
Mt Victoria Tunnel	3,700	5,500	+49%	3,800	5,000	+32%
Karo Drive (Cuba St to Victoria St)	4,300	4,800	+12%	n/a	n/a	n/a
Vivian Street (Cuba St to Victoria St)	n/a	n/a	n/a	3,500	5,400	+54%
Kent Terrace (South of Pirie St)	n/a	n/a	n/a	4,700	6,100	+30%
Terrace Tunnel	4,600	5,000	+9%	4,800	7,600	+58%
On (NB) / Off (SB) ramps at Tinakori	700	700	+0%	1,400	1,100	-21%
SH1 (North of Aotea Quay)	7,000	7,200	+3%	15,200	15,400	+1%

354. Table 26 presents the anticipated PM peak (3 pm to 6 pm) traffic volumes for 2033.

355. The largest increases in 2033 PM peak traffic volumes are observed in the Mt Victoria Tunnel (+60% northbound and +51% southbound) and on Wellington Road (+37% northbound and +50% southbound). Significant increases are also evident on Ruahine Street (+39% northbound

and +46% southbound), Vivian Street (+58% southbound), Kent Terrace (+42% southbound), and in the Terrace Tunnel (+8% northbound and +52% southbound).

356. Moderate increases in PM peak traffic volumes are predicted along Cobham Drive, particularly west of Troy Street (+9% northbound and +14% southbound) and east of Troy Street (+4% northbound and +5% southbound), and on Karo Drive (+22% northbound). In contrast, minimal changes are expected on Calabar Road (+3% northbound and +4% southbound) and on SH1 north of Aotea Quay (+1% northbound and +3% southbound), while reductions are observed on the Tinakori ramps (-7% northbound and -11% southbound).

Table 26: SH1 PM peak traffic volumes for 2033

Location	Northbound			Southbound		
	Do Minimum	With Project	Difference	Do Minimum	With Project	Difference
Calabar Road	3,200	3,300	+3%	2,500	2,600	+4%
Cobham Drive (East of Troy St)	5,500	5,700	+4%	5,800	6,100	+5%
Cobham Drive (West of Troy St)	4,300	4,700	+9%	3,700	4,200	+14%
Wellington Road	4,100	5,600	+37%	3,400	5,100	+50%
Ruahine Street	3,800	5,300	+39%	3,500	5,100	+46%
Mt Victoria Tunnel	4,000	6,400	+60%	4,300	6,500	+51%
Karo Drive (Cuba St to Victoria St)	5,800	7,100	+22%	n/a	n/a	n/a
Vivian Street (Cuba St to Victoria St)	n/a	n/a	n/a	4,000	6,300	+58%
Kent Terrace (South of Pirie St)	n/a	n/a	n/a	5,700	8,100	+42%
Terrace Tunnel	7,800	8,400	+8%	4,800	7,300	+52%
On (NB) / Off (SB) ramps at Tinakori	1,500	1,400	-7%	900	800	-11%
SH1 (North of Aotea Quay)	15,700	15,900	+1%	9,700	10,000	+3%

357. Table 27 presents the anticipated interpeak IP (9 am to 3 pm) traffic volumes for 2033.

358. The largest increases in 2033 interpeak traffic volumes are observed in the Mt Victoria Tunnel (+41% northbound and +29% southbound) and on Wellington Road (+26% northbound and +54% southbound). Significant increases are also evident on Ruahine Street (+24% northbound and +28% southbound), Vivian Street (+35% southbound), Kent Terrace (+34% southbound), and in the Terrace Tunnel (+10% northbound and +44% southbound).

359. Moderate increases in interpeak traffic volumes are predicted along Cobham Drive, particularly west of Troy Street (+19% northbound and +20% southbound), and on Karo Drive (+20% northbound). In contrast, minimal changes are expected on Calabar Road (+4% northbound and +0% southbound), on Cobham Drive east of Troy Street (+4% northbound and +2% southbound), and on SH1 north of Aotea Quay (+2% northbound and +3% southbound), while negligible or minor reductions are observed on the Tinakori ramps (+0% northbound and -6% southbound).

Table 27: SH1 Interpeak (IP) traffic volumes for 2033

Location	Northbound			Southbound		
	Do Minimum	With Project	Difference	Do Minimum	With Project	Difference
Calabar Road	5,500	5,700	+4%	4,400	4,400	+0%
Cobham Drive (East of Troy St)	9,800	10,200	+4%	9,800	10,000	+2%
Cobham Drive (West of Troy St)	6,700	8,000	+19%	6,100	7,300	+20%
Wellington Road	7,300	9,200	+26%	5,000	7,700	+54%
Ruahine Street	7,000	8,700	+24%	6,000	7,700	+28%
Mt Victoria Tunnel	7,400	10,400	+41%	7,700	9,900	+29%
Karo Drive (Cuba St to Victoria St)	9,000	10,800	+20%	n/a	n/a	n/a

Location	Northbound			Southbound		
	Do Minimum	With Project	Difference	Do Minimum	With Project	Difference
Vivian Street (Cuba St to Victoria St)	n/a	n/a	n/a	6,800	9,200	+35%
Kent Terrace (South of Pirie St)	n/a	n/a	n/a	8,900	11,900	+34%
Terrace Tunnel	10,700	11,800	+10%	8,500	12,200	+44%
On (NB) / Off (SB) ramps at Tinakori	1,900	1,900	+0%	1,700	1,600	-6%
SH1 (North of Aotea Quay)	20,300	20,800	+2%	19,100	19,700	+3%

360. Table 28 presents the anticipated overnight ON (6 pm to 6 am) traffic volumes for 2033.

361. The largest increases in 2033 overnight traffic volumes are observed in the Mt Victoria Tunnel (+17% northbound and +8% southbound) and Wellington Road (+21% northbound and -7% southbound). Significant increases are also evident on Ruahine Street (+15% northbound and -2% southbound), Cobham Drive west of Troy Street (+12% northbound and -12% southbound), and Kent Terrace (+26% southbound), with more modest growth in the Terrace Tunnel (+6% northbound and +11% southbound).

362. Moderate increases in overnight traffic volumes are predicted along Cobham Drive east of Troy Street (+4% northbound and +4% southbound) and on Calabar Road (+3% northbound and +3% southbound). In contrast, minimal changes are expected on SH1 north of Aotea Quay (+2% northbound and +3% southbound) and on the Tinakori ramps (+0% northbound and +0% southbound), while reductions are observed on Karo Drive (-3% northbound) and across several southbound movements, including Cobham Drive west of Troy Street (-12%), Wellington Road (-7%), and Ruahine Street (-2%).

Table 28: SH1 Overnight traffic volumes for 2033

Location	Northbound			Southbound		
	Do Minimum	With Project	Difference	Do Minimum	With Project	Difference
Calabar Road	3,500	3,600	+3%	3,700	3,800	+3%
Cobham Drive (East of Troy St)	7,000	7,300	+4%	7,900	8,200	+4%
Cobham Drive (West of Troy St)	5,800	6,500	+12%	6,600	5,800	-12%
Wellington Road	5,800	7,000	+21%	6,100	5,700	-7%
Ruahine Street	5,500	6,300	+15%	5,800	5,700	-2%
Mt Victoria Tunnel	6,000	7,000	+17%	7,100	7,700	+8%
Karo Drive (Cuba St to Victoria St)	8,600	8,300	-3%	n/a	n/a	n/a
Vivian Street (Cuba St to Victoria St)	n/a	n/a	n/a	4,700	5,000	+6%
Kent Terrace (South of Pirie St)	n/a	n/a	n/a	7,800	9,800	+26%
Terrace Tunnel	8,000	8,500	+6%	7,000	7,800	+11%
On (NB) / Off (SB) ramps at Tinakori	1,400	1,400	+0%	1,400	1,400	+0%
SH1 (North of Aotea Quay)	15,200	15,500	+2%	10,400	10,700	+3%

363. While 2033 traffic volumes typically increase on the state highway, in many cases traffic volumes on the local road network are expected to either remain relatively static or reduce as a result of the Project.

364. Figure 65 to Figure 69 below present a summary of differences in daily, AM peak, PM peak, interpeak (IP), and overnight (ON) traffic volumes in 2033 compared to the Do Minimum. The green lines demonstrate where there is an increase in demand, and the red lines demonstrate where there is a decrease in demand. The thickness of the line and the numbers reflect the scale of difference.

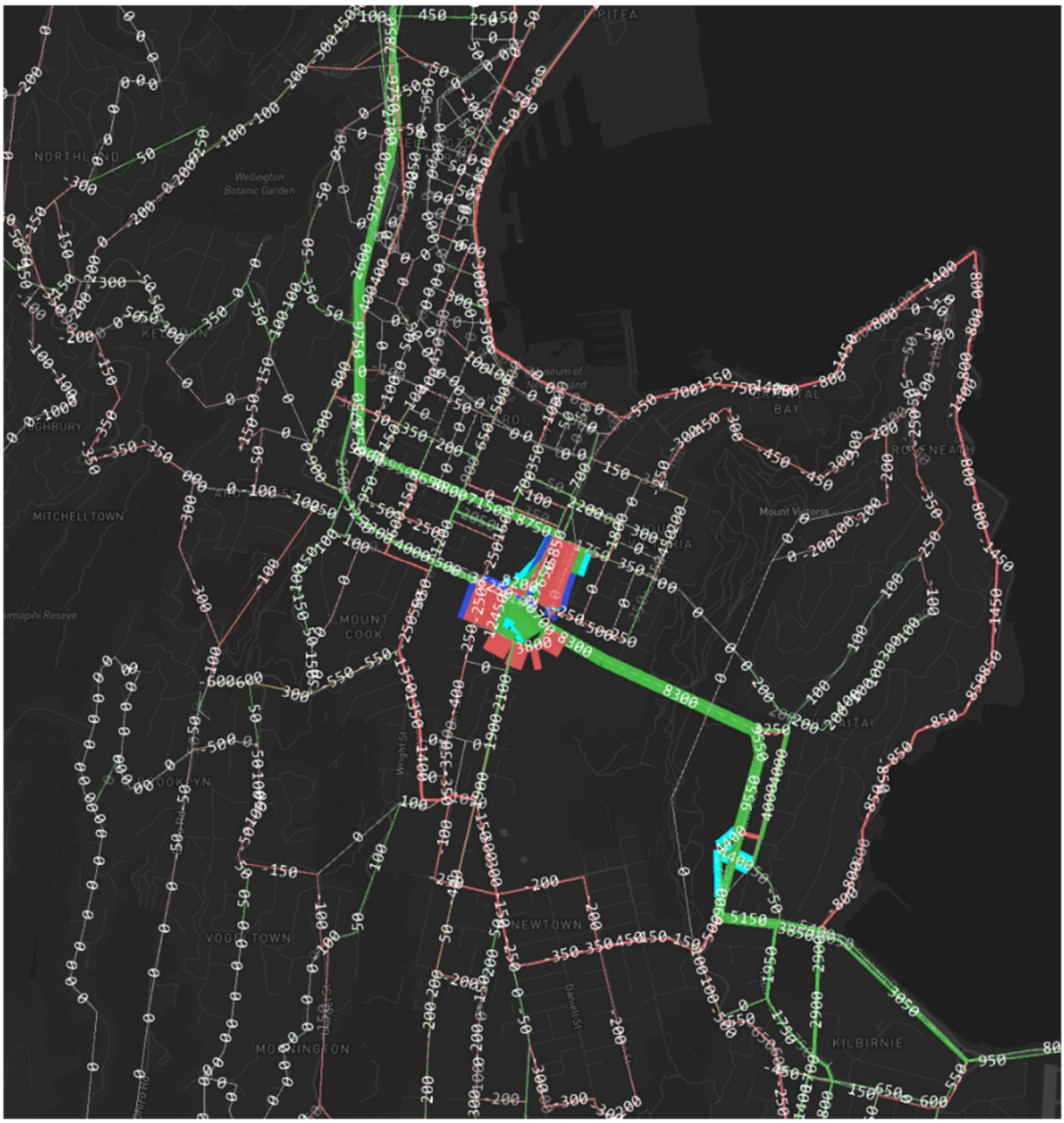


Figure 65 – Daily volume difference plot for 2033



Figure 66 – AM (6 am to 9 am) peak volume difference plot for 2033

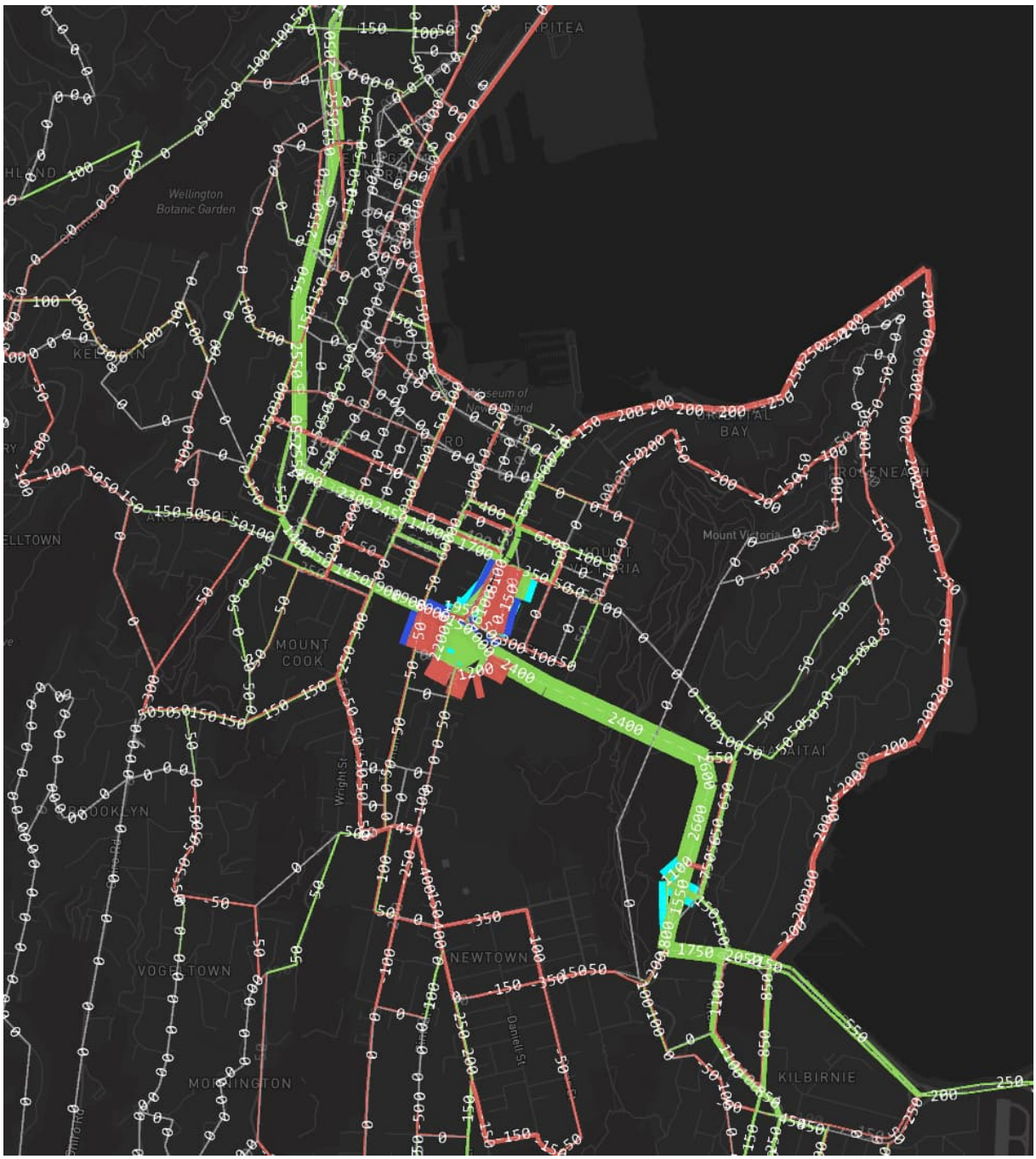


Figure 67 – PM (3 pm to 6pm) peak volume difference plot for 2033

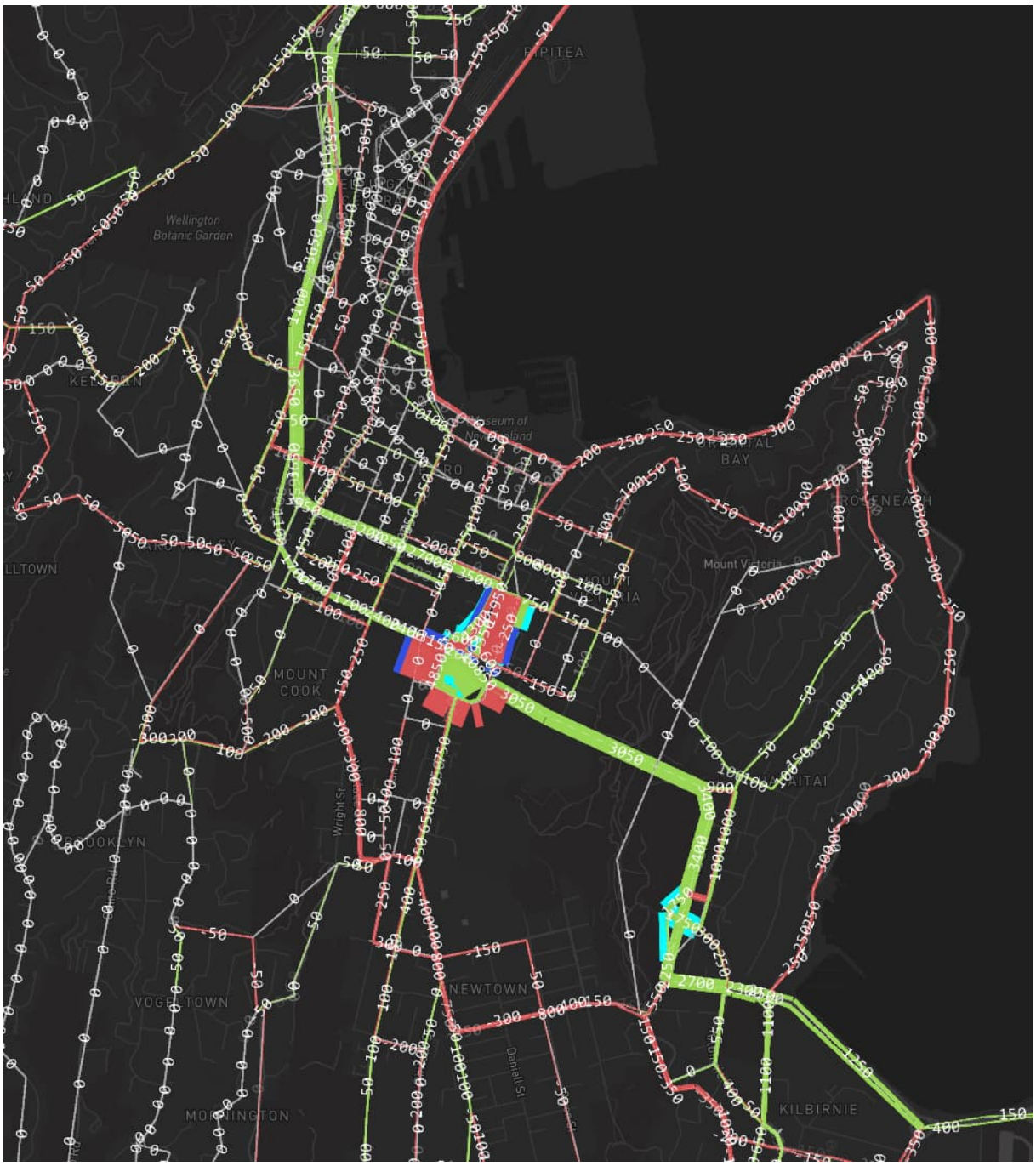


Figure 68 – Interpeak (9 am to 3 pm) volume difference plot for 2033

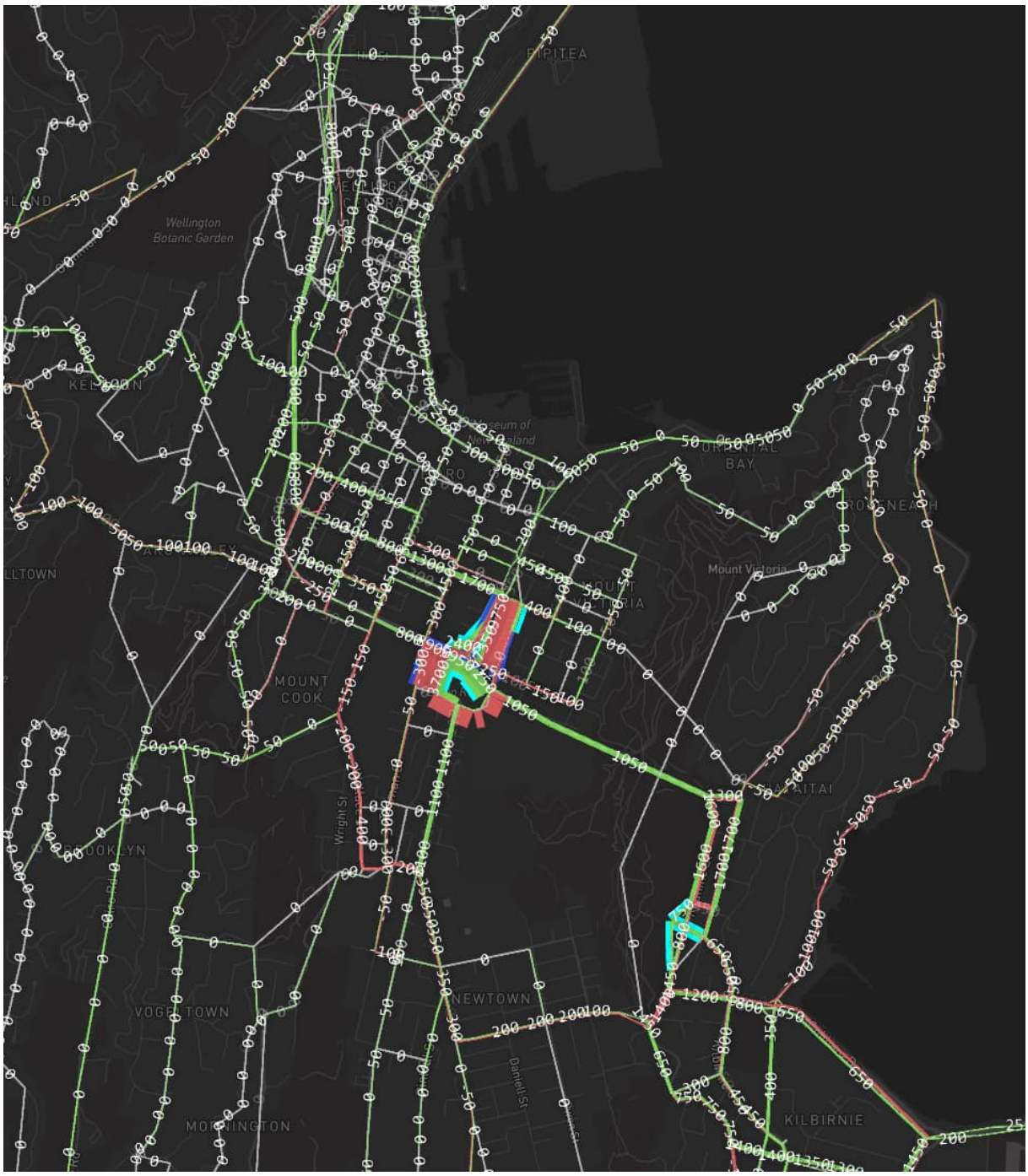


Figure 69 – Overnight (6 pm to 6 am) volume difference plot for 2033

365. The volume difference plots shows that the traffic volume is predicted to increase on the state highway and the immediate approaches to the state highway due to the additional capacity the Project will provide, while the traffic volumes on local roads are expected to remain relatively static or reduce as a result of the Project. This is primarily seen on the southern extents of the Basin Reserve (through Newtown via Constable Street), the Quays, and around the Bays.

366. The local road with the highest percentage anticipated increase in traffic volumes is Moxham Avenue southbound, which is further discussed in the Eastern Connections section of this Chapter.

Traffic volumes for 2053

367. Table 29 presents the anticipated daily 2053 traffic volumes at key locations on SH1. Similarly to the 2033 scenario, traffic volumes are expected to increase broadly in line with where the most additional capacity is being provided.

Table 29: SH1 Daily traffic volumes for 2053

Location	Northbound			Southbound		
	Do Minimum	With Project	Difference	Do Minimum	With Project	Difference
Calabar Road	17,200	17,400	+1%	16400	16600	+1%
Cobham Drive (East of Troy St)	29,800	30,500	+2%	31100	31600	+2%
Cobham Drive (West of Troy St)	22,300	25,300	+13%	21800	22800	+5%
Wellington Road	21,600	28,800	+33%	18500	24800	+34%
Ruahine Street	20,700	27,000	+30%	19500	24800	+27%
Mt Victoria Tunnel	22,200	31,600	+42%	24100	31400	+30%
Karo Drive (Cuba St to Victoria St)	29,000	32,500	+12%	n/a	n/a	n/a
Vivian Street (Cuba St to Victoria St)	n/a	n/a	n/a	19500	26700	+37%
Kent Terrace (South of Pirie St)	n/a	n/a	n/a	28700	38100	+33%
Terrace Tunnel	31,500	34,200	+9%	25300	35200	+39%
On (NB) / Off (SB) ramps at Tinakori	5,400	5,300	-2%	5200	4700	-10%
SH1 (North of Aotea Quay)	58,300	59,400	+2%	54200	55400	+2%

368. The largest increases in 2053 daily traffic volumes are observed in the Mt Victoria Tunnel (+42% northbound and +30% southbound) and on Wellington Road (+33% northbound and +34% southbound). Significant increases are also evident on Ruahine Street (+30% northbound and +27% southbound), Vivian Street (+37% southbound), Kent Terrace (+33% southbound), and in the Terrace Tunnel (+9% northbound and +39% southbound).

369. Moderate increases in daily traffic volumes are predicted along Cobham Drive, particularly west of Troy Street (+13% northbound and +5% southbound), and on Karo Drive (+12% northbound). In contrast, minimal changes are expected on Calabar Road (+1% northbound and +1% southbound), on Cobham Drive east of Troy Street (+2% northbound and +2% southbound), and on SH1 north of Aotea Quay (+2% northbound and +2% southbound), while reductions are observed on the Tinakori ramps (-2% northbound and -10% southbound).

370. Table 30 below presents the anticipated AM peak (6 am to 9 am) traffic volumes for 2053.

Table 30: SH1 AM peak traffic volumes for 2053

Location	Northbound			Southbound		
	Do Minimum	With Project	Difference	Do Minimum	With Project	Difference
Calabar Road	2,700	2,800	+4%	2,900	3,000	+3%
Cobham Drive (East of Troy St)	4,900	5,100	+4%	5,000	5,100	+2%
Cobham Drive (West of Troy St)	3,600	4,200	+17%	3,500	3,900	+11%
Wellington Road	3,600	4,900	+36%	3,000	4,200	+40%
Ruahine Street	3,500	4,800	+37%	3,300	4,200	+27%
Mt Victoria Tunnel	3,700	5,600	+51%	3,800	5,100	+34%
Karo Drive (Cuba St to Victoria St)	4,500	5,000	+11%	n/a	n/a	n/a
Vivian Street (Cuba St to Victoria St)	n/a	n/a	n/a	3,500	5,400	+54%
Kent Terrace (South of Pirie St)	n/a	n/a	n/a	4,800	6,300	+31%
Terrace Tunnel	4,600	5,000	+9%	4,900	7,500	+53%
On (NB) / Off (SB) ramps at Tinakori	600	600	+0%	1,400	1,100	-21%
SH1 (North of Aotea Quay)	6,900	7,100	+3%	15,400	15,600	+1%

371. The largest increases in 2053 AM peak traffic volumes are observed in the Mt Victoria Tunnel (+51% northbound and +34% southbound) and on Wellington Road (+36% northbound and +40% southbound). Significant increases are also evident on Ruahine Street (+37% northbound and +27% southbound), Vivian Street (+54% southbound), Kent Terrace (+31% southbound), and in the Terrace Tunnel (+9% northbound and +53% southbound).

372. Moderate increases in AM peak traffic volumes are predicted along Cobham Drive, particularly west of Troy Street (+17% northbound and +11% southbound), and on Karo Drive (+11% northbound). In contrast, minimal changes are expected on Calabar Road (+4% northbound and +3% southbound), on Cobham Drive east of Troy Street (+4% northbound and +2% southbound), and on SH1 north of Aotea Quay (+3% northbound and +1% southbound), while reductions are observed on the Tinakori ramps (+0% northbound and -21% southbound).

373. Table 31 presents the anticipated PM peak (3 pm to 6 pm) traffic volumes for 2053.

Table 31: SH1 PM peak traffic volumes for 2053

Location	Northbound			Southbound		
	Do Minimum	With Project	Difference	Do Minimum	With Project	Difference
Calabar Road	3,300	3,500	+6%	2,900	3,100	+7%
Cobham Drive (East of Troy St)	5,700	5,900	+4%	6,100	6,300	+3%
Cobham Drive (West of Troy St)	4,400	4,900	+11%	3,900	4,400	+13%
Wellington Road	4,100	5,800	+41%	3,300	5,300	+61%
Ruahine Street	3,800	5,500	+45%	3,500	5,300	+51%
Mt Victoria Tunnel	4,100	6,600	+61%	4,400	6,700	+52%
Karo Drive (Cuba St to Victoria St)	5,800	7,100	+22%	n/a	n/a	n/a
Vivian Street (Cuba St to Victoria St)	n/a	n/a	n/a	4,000	6,300	+58%
Kent Terrace (South of Pirie St)	n/a	n/a	n/a	5,900	8,300	+41%
Terrace Tunnel	7,700	8,300	+8%	4,700	7,200	+53%
On (NB) / Off (SB) ramps at Tinakori	1,700	1,600	-6%	900	800	-11%
SH1 (North of Aotea Quay)	15,800	15,900	+1%	9,400	9,700	+3%

374. The largest increases in 2053 PM peak traffic volumes are observed in the Mt Victoria Tunnel (+61% northbound and +52% southbound) and on Wellington Road (+41% northbound and +61% southbound). Significant increases are also evident on Ruahine Street (+45% northbound and +51% southbound), Vivian Street (+58% southbound), Kent Terrace (+41% southbound), and in the Terrace Tunnel (+8% northbound and +53% southbound).

375. Moderate increases in PM peak traffic volumes are predicted along Cobham Drive, particularly west of Troy Street (+11% northbound and +13% southbound) and east of Troy Street (+4% northbound and +3% southbound), and on Karo Drive (+22% northbound). In contrast, minimal changes are expected on Calabar Road (+6% northbound and +7% southbound) and on SH1 north of Aotea Quay (+1% northbound and +3% southbound), while reductions are observed on the Tinakori ramps (-6% northbound and -11% southbound).

376. Table 32 presents the anticipated interpeak IP (9 am to 3 pm) traffic volumes for 2053.

Table 32 SH1 IP traffic volumes for 2053

Location	Northbound			Southbound		
	Do Minimum	With Project	Difference	Do Minimum	With Project	Difference
Calabar Road	6,400	6,400	+0%	5,700	5,600	-2%
Cobham Drive (East of Troy St)	11,000	11,200	+2%	11,000	11,000	+0%
Cobham Drive (West of Troy St)	7,600	9,000	+18%	6,900	7,900	+14%

Location	Northbound			Southbound		
	Do Minimum	With Project	Difference	Do Minimum	With Project	Difference
Wellington Road	7,300	10,300	+41%	5,300	8,800	+66%
Ruahine Street	7,200	9,700	+35%	6,200	8,800	+42%
Mt Victoria Tunnel	7,500	11,500	+53%	8,000	11,000	+38%
Karo Drive (Cuba St to Victoria St)	9,500	11,400	+20%	n/a	n/a	n/a
Vivian Street (Cuba St to Victoria St)	n/a	n/a	n/a	7,100	9,700	+37%
Kent Terrace (South of Pirie St)	n/a	n/a	n/a	9,500	13,100	+38%
Terrace Tunnel	11,000	12,100	+10%	8,500	12,400	+46%
On (NB) / Off (SB) ramps at Tinakori	1,800	1,800	+0%	1,700	1,600	-6%
SH1 (North of Aotea Quay)	20,300	20,700	+2%	18,900	19,400	+3%

377. The largest increases in 2053 interpeak traffic volumes are observed in the Mt Victoria Tunnel (+53% northbound and +38% southbound) and on Wellington Road (+41% northbound and +66% southbound). Significant increases are also evident on Ruahine Street (+35% northbound and +42% southbound), Vivian Street (+37% southbound), Kent Terrace (+38% southbound), and in the Terrace Tunnel (+10% northbound and +46% southbound).

378. Moderate increases in interpeak traffic volumes are predicted along Cobham Drive, particularly west of Troy Street (+18% northbound and +14% southbound), and on Karo Drive (+20% northbound). In contrast, minimal changes are expected on Calabar Road (+0% northbound and -2% southbound), on Cobham Drive east of Troy Street (+2% northbound and +0% southbound), and on SH1 north of Aotea Quay (+2% northbound and +3% southbound), while negligible or minor reductions are observed on the Tinakori ramps (+0% northbound and -6% southbound).

379. Table 33 resents the anticipated overnight ON (6 pm to 6 am) traffic volumes for 2053.

Table 33 SH1 ON traffic volumes for 2053

Location	Northbound			Southbound		
	Do Minimum	With Project	Difference	Do Minimum	With Project	Difference
Calabar Road	4,700	4,700	+0%	4,900	5,000	+2%
Cobham Drive (East of Troy St)	8,100	8,300	+2%	9,000	9,200	+2%
Cobham Drive (West of Troy St)	6,700	7,200	+7%	7,500	6,600	-12%
Wellington Road	6,600	7,800	+18%	6,900	6,500	-6%
Ruahine Street	6,200	7,100	+15%	6,500	6,500	+0%
Mt Victoria Tunnel	6,900	7,900	+14%	7,900	8,600	+9%
Karo Drive (Cuba St to Victoria St)	9,200	9,000	-2%	n/a	n/a	n/a
Vivian Street (Cuba St to Victoria St)	n/a	n/a	n/a	5,000	5,300	+6%
Kent Terrace (South of Pirie St)	n/a	n/a	n/a	8,500	10,400	+22%
Terrace Tunnel	8,300	8,900	+7%	7,200	8,100	+13%
On (NB) / Off (SB) ramps at Tinakori	1,300	1,300	+0%	1,200	1,200	+0%
SH1 (North of Aotea Quay)	15,300	15,700	+3%	10,400	10,800	+4%

380. The largest increases in 2053 overnight traffic volumes are observed on Wellington Road (+18% northbound and -6% southbound) and in the Mt Victoria Tunnel (+14% northbound and +9% southbound). Notable increases are also evident on Ruahine Street (+15% northbound and +0% southbound), Kent Terrace (+22% southbound), and in the Terrace Tunnel (+7% northbound and +13% southbound).

381. Moderate increases in overnight traffic volumes are predicted along Cobham Drive, particularly west of Troy Street (+7% northbound and -12% southbound), and on SH1 north of Aotea Quay (+3% northbound and +4% southbound). In contrast, minimal changes are expected on Calabar Road (+0% northbound and +2% southbound) and on Cobham Drive east of Troy Street (+2% northbound and +2% southbound), while reductions are observed on Karo Drive (-2% northbound) and on several southbound movements including Cobham Drive west of Troy Street (-12%) and Wellington Road (-6%).

382. While 2053 traffic volumes typically increase on the state highway, in many cases traffic volumes on the local road network are expected to either remain relatively static or reduce as a result of the Project.

383. Figure 70 to Figure 74 below present a summary of differences in daily, AM peak, PM peak, interpeak (IP), and overnight (ON) traffic volumes in 2053 compared to the Do Minimum. The green lines demonstrate where there is an increase in demand, and the red lines demonstrate where there is a decrease in demand. The thickness of the line and the numbers reflect the scale of difference.

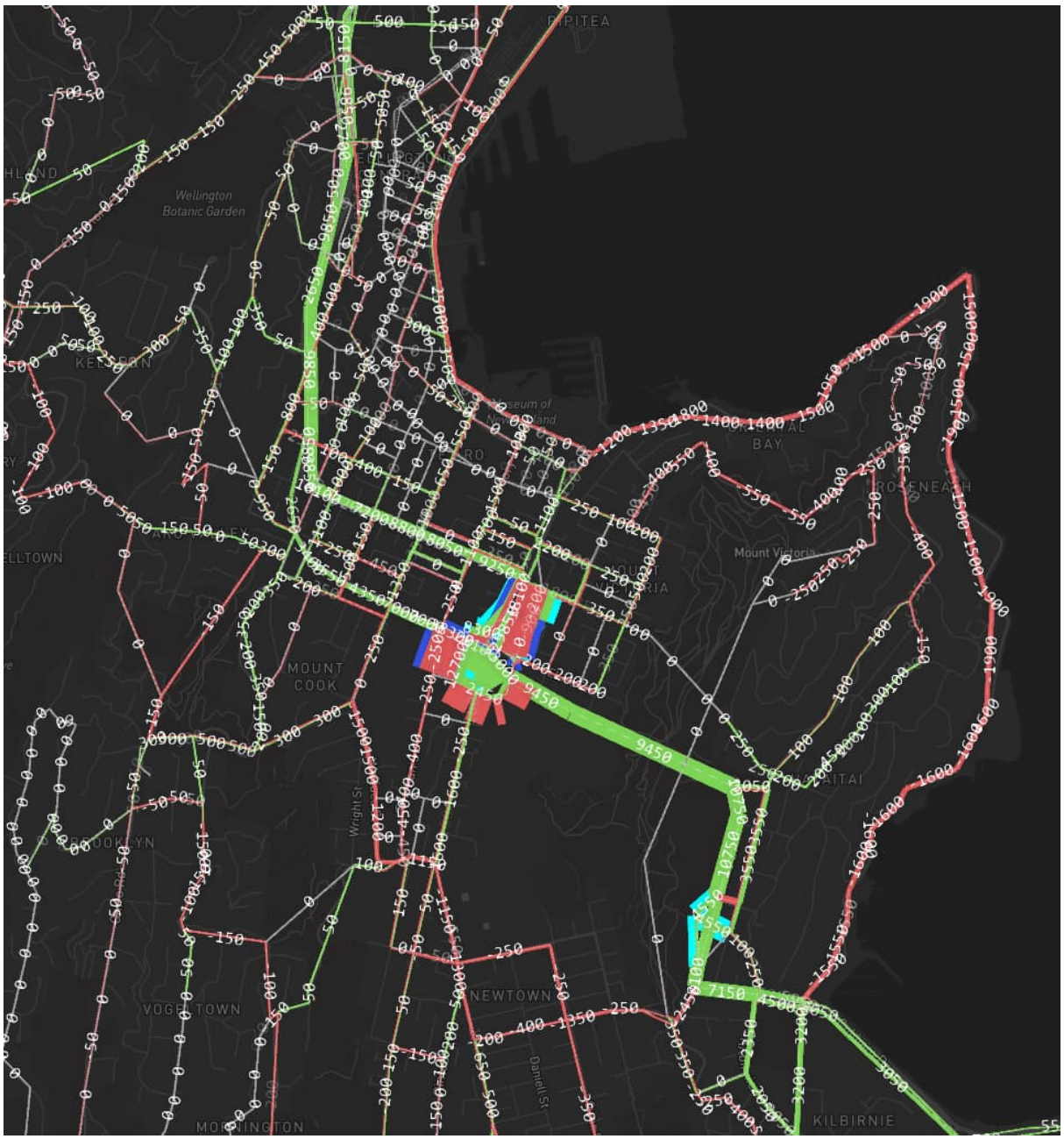


Figure 70 – Daily volume difference plot for 2053

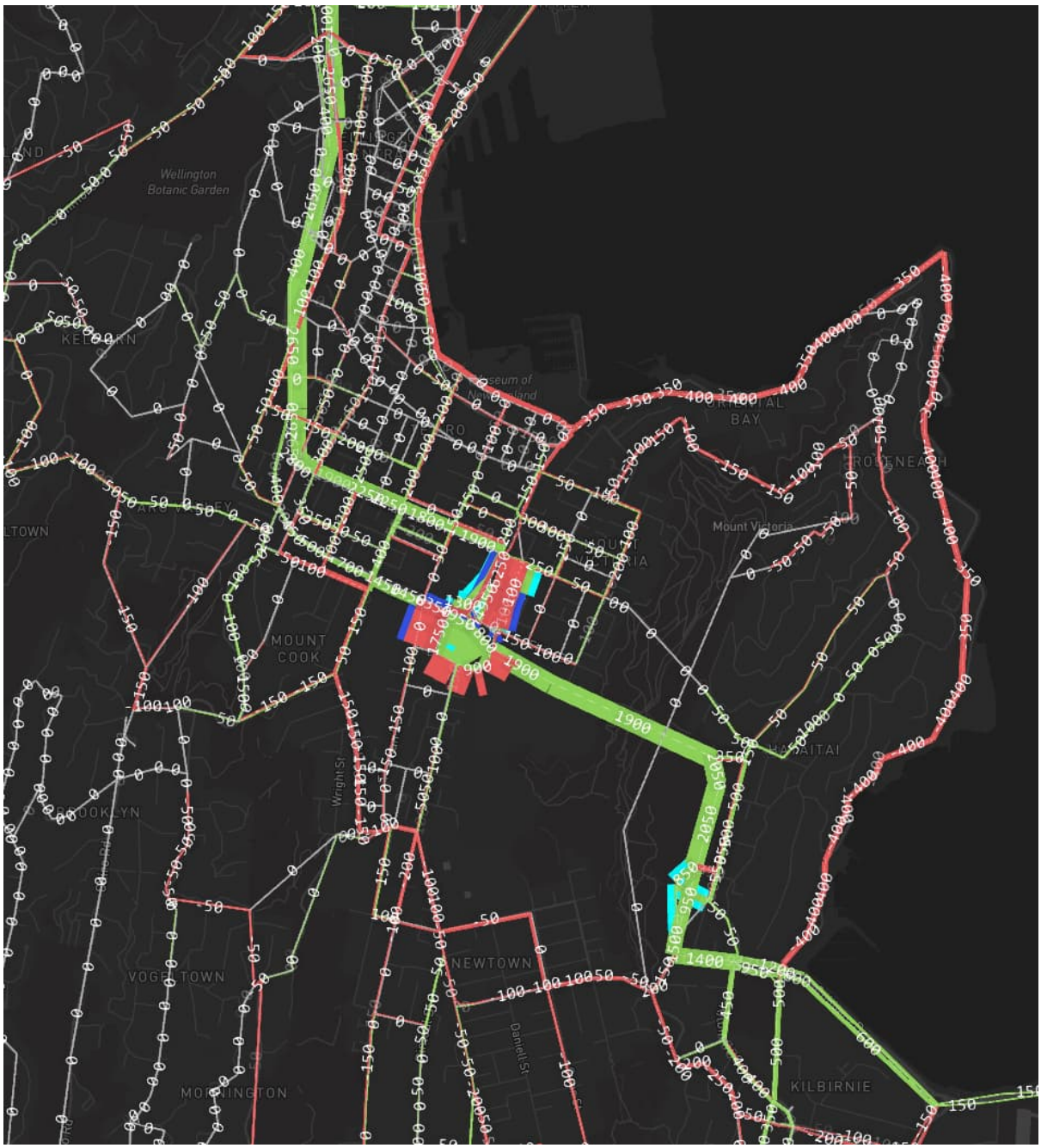


Figure 71 – AM peak (6 am to 9 am) volume difference plot for 2053

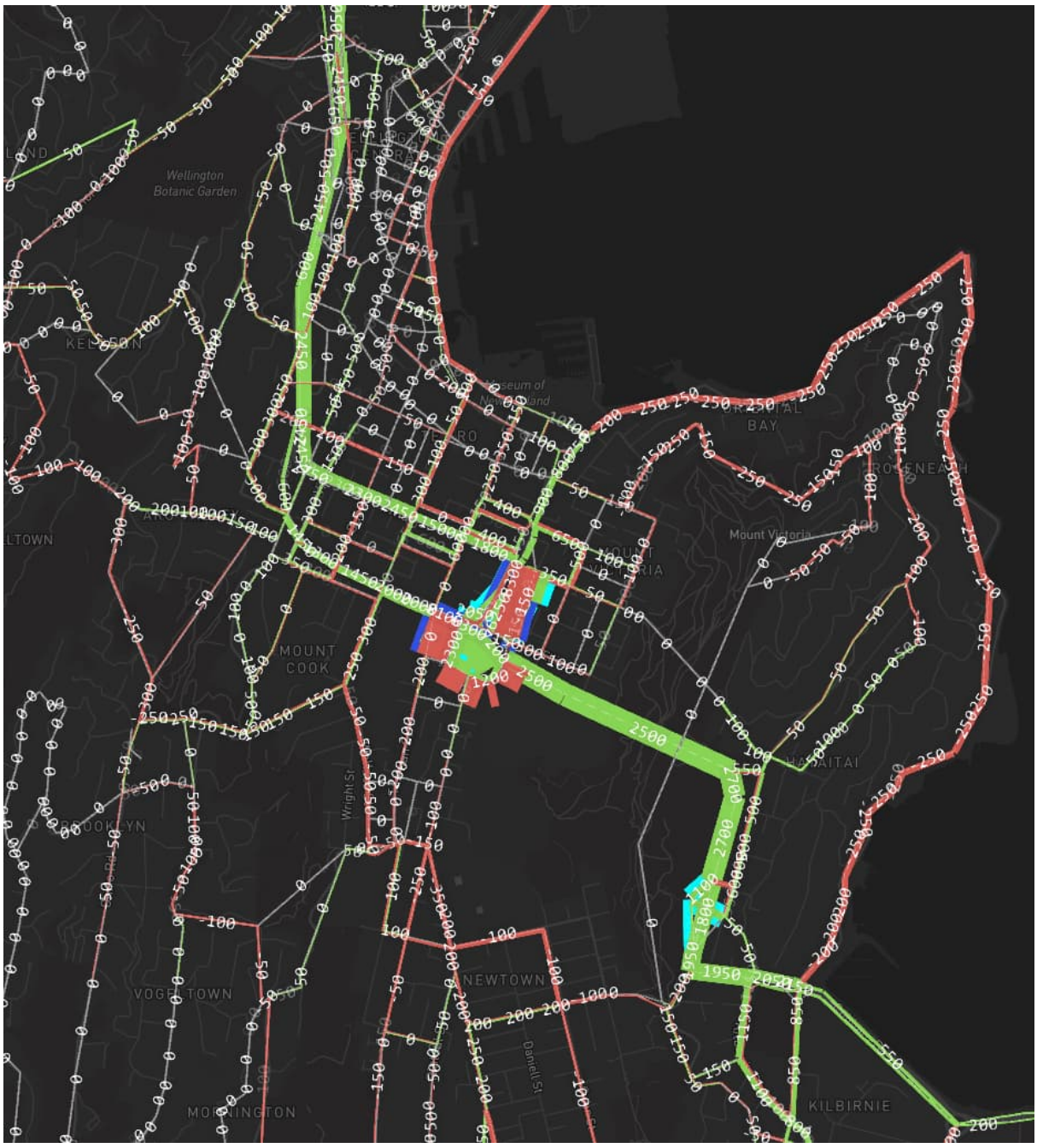


Figure 72 – PM peak (3 pm to 6 pm) volume difference plot for 2053

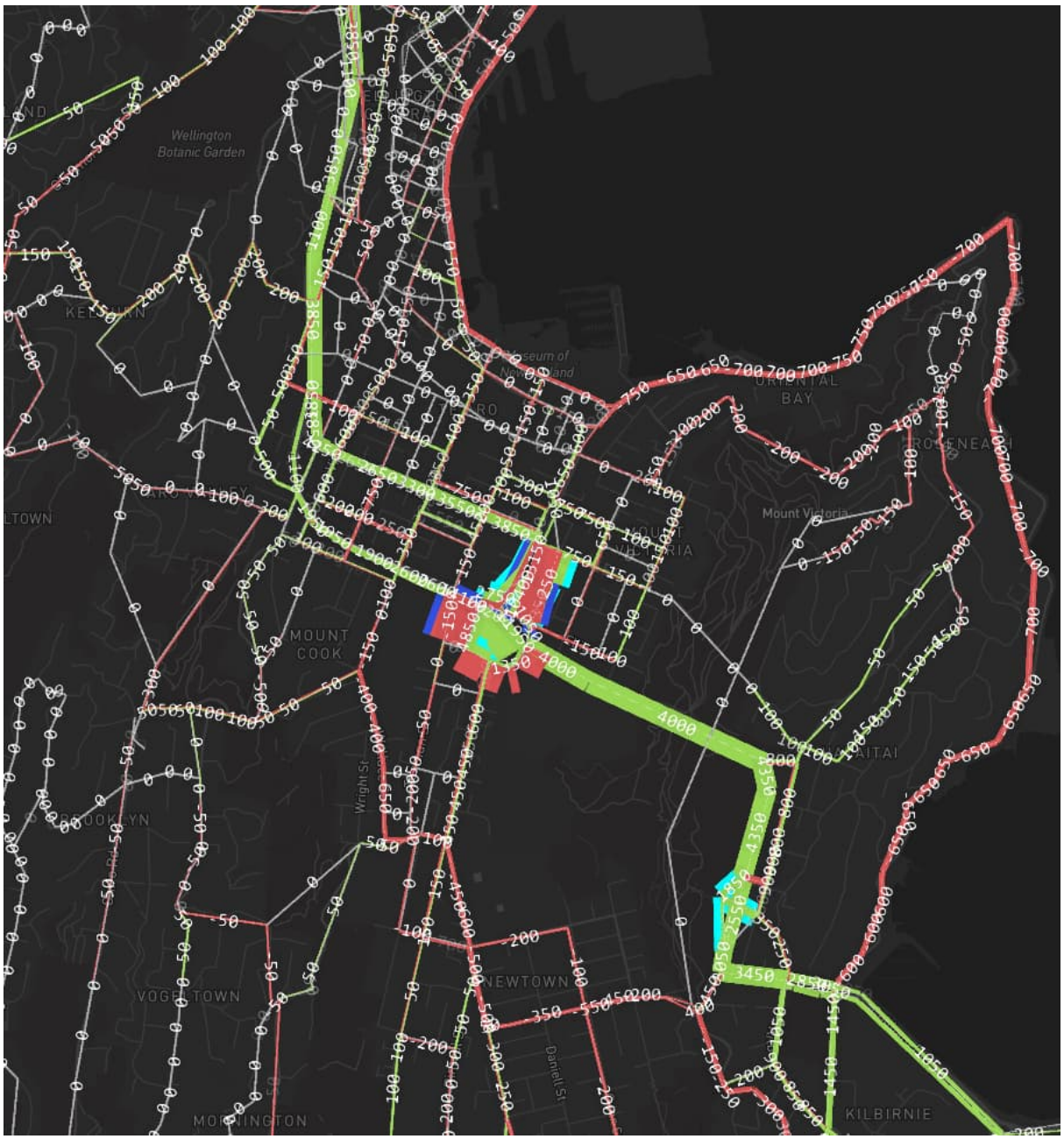


Figure 73 – Interpeak (9 am to 3 pm) volume difference plot for 2053

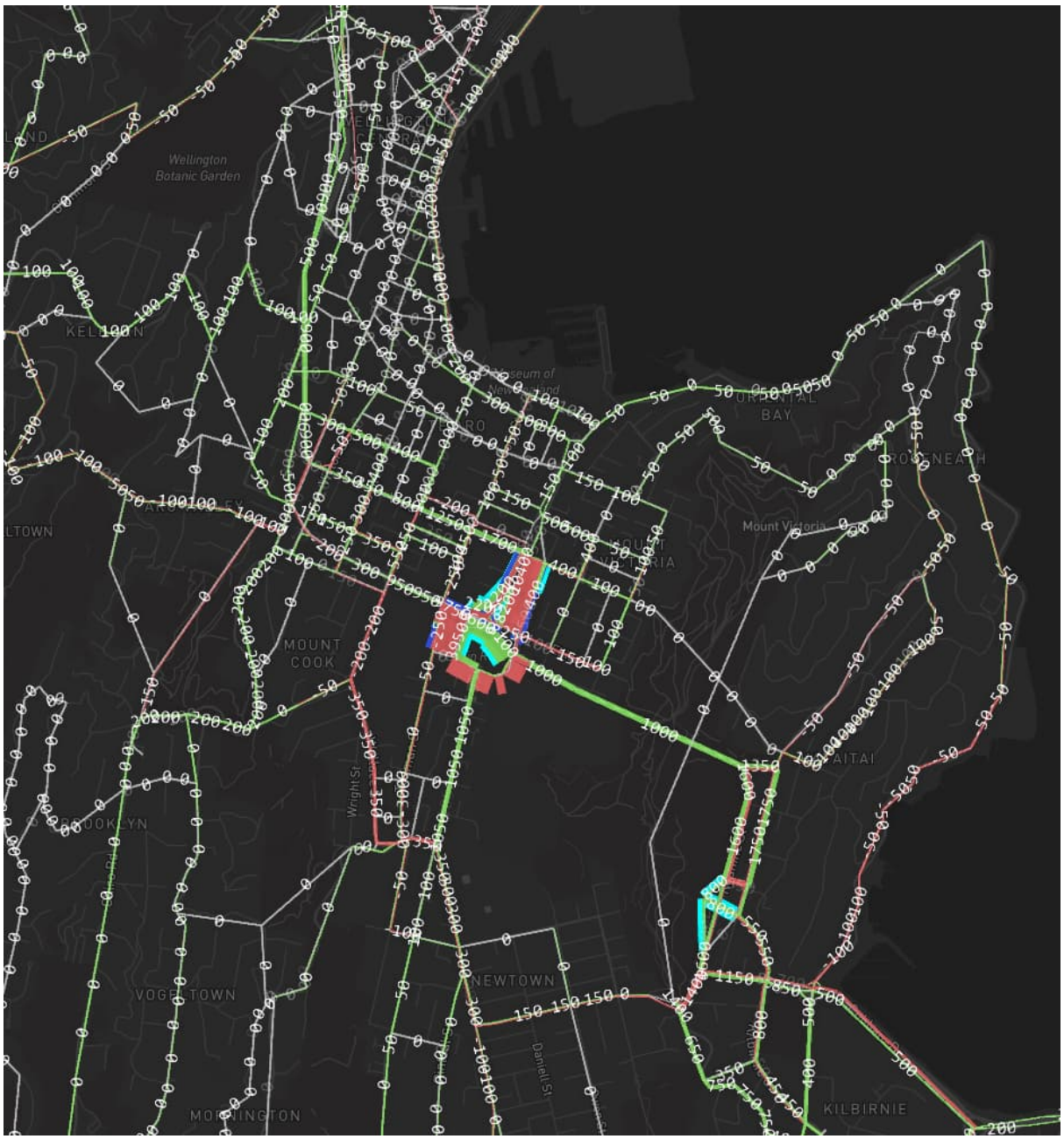


Figure 74 – Overnight (6 pm to 6 am) volume difference plot for 2053

384. Similarly to 2033, the volume difference plots show that while the traffic volume is predicted to increase on the state highway and the immediate approaches to State Highway 1, the traffic volumes on the local roads are expected to remain relatively static or reduce as a result of the Project. This is primarily seen on the southern extents of the Basin, they Quays, and around the Bays.

Mode share

385. In Table 34 to Table 37 below I show the forecasts for the number of daily trips that will be made by each mode for 2033 and 2053 both regionally and to the CBD only.

Table 34: Daily regional trips and mode share for 2033

Mode	Do minimum		With Project		Difference	
	Person Trips	Mode Share	Person Trips	Mode Share	Person Trips	Mode Share
Active	432,436	18%	429,616	18%	-2,820	+0%
Light[21]	1,747,753	75%	1,751,110	75%	+3,356	+0%
Bus	94,653	4%	94,305	4%	-348	+0%
Rail	63,513	3%	63,069	3%	-445	+0%

Table 35: Daily CBD trips and mode share for 2033

Mode	Do minimum		With Project		Difference	
	Person Trips	Mode Share	Person Trips	Mode Share	Person Trips	Mode Share
Active	34,550	19%	34,450	19%	-100	+0%
Light[22]	100,710	55%	102,330	56%	+1,620	+1%
Bus	24,050	13%	24,250	13%	+200	+0%
Rail	22,800	13%	22,550	12%	-250	-1%

Table 36: Daily regional trips and mode share for 2053

Mode	Do minimum		With Project		Difference	
	Person Trips	Mode Share	Person Trips	Mode Share	Person Trips	Mode Share
Active	479,463	19%	476,349	19%	-3,114	+0%
Light[23]	1,864,237	74%	1,867,841	74%	+3,604	+0%
Bus	100,230	4%	99,944	4%	-287	+0%
Rail	71,372	3%	70,914	3%	-458	+0%

Table 37: Daily CBD trips and mode share for 2053

Mode	Do minimum		With Project		Difference	
	Person Trips	Mode Share	Person Trips	Mode Share	Person Trips	Mode Share
Active	35,800	19%	35,700	19%	-100	+0%
Light[24]	103,680	55%	105,435	55%	+1,755	+0%
Bus	24,200	13%	24,150	13%	-50	+0%
Rail	24,950	13%	24,850	13%	-100	-0%

386. Based on the modelling undertaken for the Project, I consider the effect on mode share to be negligible. The changes in person trips in the tables above show that the Project is not anticipated to influence the mode share for any mode in a significant manner.

387. I do note the small reduction in the forecast active mode trips, and consider that is a result of the model primarily factoring in the relative journey time and direct costs of journeys, as opposed to the journey 'amenity' which is much more difficult to accurately model on a region wide scale. In practical terms I view this as 'no change' noting the model accuracy and the specific method the model utilises for calculating short distance trips.

388. As such, the benefits of the segregated shared path through Mt Victoria for example are not factored into the transport modelling but an estimate of additional trips is included in the economic assessment. Noting the current number of users, I consider that even if the Project

[21] Assumes occupancy of 1.35
[22] Assumes occupancy of 1.35
[23] Assumes occupancy of 1.35
[24] Assumes occupancy of 1.35

were to have a large proportional effect on that number, it would not lead to a significant effect on regional mode share, or the validity of the network modelling used for my assessment.

389. The table above also is based on modelling that assumes the public transport network is retained as is. In saying this, it should be noted that the Project may enable operational improvements to the bus network through reduced congestion across local roads used by buses, and by facilitating the introduction of new express services utilising the Mt Victoria Tunnel that would reduce the number of buses along Moxham Ave and through the Hataitai bus tunnel. As such I consider this as an opportunity which would benefit public transport, and therefore lead to potential increases in patronage. However, noting that this is an opportunity that could subsequently be realised, and not part of the Project, I have not factored any benefits from these 'enabled' schemes into my overall assessment.

390. Table 38 shows the change in daily peak vehicle kilometres travelled (VKT), and the corresponding carbon dioxide equivalent (CO2-e) as a result of the project. The table also shows that there is a negligible change in the total vehicle kilometres travelled and, by extension, I consider the effect on vehicle emissions as a result of negligible change in total vehicle kilometres to be negligible.

Table 38: Daily peak VKT and CO2-e (tons)

Daily Peak	2033			2053		
	Do Minimum	With Project	% Change	Do Minimum	With Project	% Change
Vehicle Kilometres Travelled (VKT)	11,742,224	11,823,107	0.7%	12,196,052	12,271,601	0.6%
Carbon Dioxide Equivalent (CO2-e)	2,341	2,349	0.3%	1,098	1,099	0.1%

Journey times

391. Notwithstanding the increases in traffic volumes anticipated on SH1 which I discussed above, journey times are expected to decrease regardless of whether those journeys are on the state highway or local roads. This indicates to me that the network as a whole is faster (more efficient) and that the benefits of the Project on journey time are experienced across the city.

392. The AM and PM peak journey times for 2033 and 2053 are shown in Table 39 and Table 40. The interpeak and overnight journey times have been included in Annexure B.

Table 39: AM and PM journey time savings for 2033

Route	2033 Journey Time (minutes)			
	AM peak		PM peak	
	Do Minimum	With Project	Do Minimum	With Project
Airport to Johnsonville (via SH1)	32	-6	41	-7
Johnsonville to Airport (via SH1)	48	-5	41	-6
Airport to Johnsonville (via Bays)	40	-7	52	-4
Johnsonville to Airport (via Bays)	48	-4	43	-3
Post Office Square to Johnsonville	12	0	25	0
Johnsonville to Post Office Square	28	-1	16	-1
Post Office Square to Airport (via SH1)	20	-3	26	-2
Airport to Post Office Square (via SH1)	28	-6	27	-4
Post Office Square to Airport (via Bays)	20	-1	26	-2
Airport to Post Office Square (via Bays)	26	-2	24	2

Table 40: AM and PM journey time savings for 2053

Route	2053 Journey Time (minutes)			
	AM peak		PM peak	
	Do Minimum	With Project	Do Minimum	With Project
Airport to Johnsonville (via SH1)	35	-7	45	-7
Johnsonville to Airport (via SH1)	56	-7	46	-6
Airport to Johnsonville (via Bays)	45	-7	57	-5
Johnsonville to Airport (via Bays)	57	-5	48	-4
Post Office Square to Johnsonville	12	0	28	0
Johnsonville to Post Office Square	32	-1	17	-2
Post Office Square to Airport (via SH1)	25	-3	31	-2
Airport to Post Office Square (via SH1)	32	-7	29	-5
Post Office Square to Airport (via Bays)	24	-1	30	-3
Airport to Post Office Square (via Bays)	29	-2	26	2

393. Key destinations that benefit from the Project include the Airport, which is expected to be 6-7 minutes faster to reach from Johnsonville in both the morning and evening peak. The Airport to Post Office Square, to take another example, is expected to be 6-7 minutes faster in the morning peak, and 4-5 minutes faster in the evening peak.

394. The journey routes and key points of interest between the Airport and Johnsonville via SH1 and the Bays are shown in Figure 75.



Figure 75 – Journey routes between the Airport and Johnsonville

395. WTSM AM and PM travel time profiles for these journeys are shown in Figure 76 to Figure 77. Annexure B contains the travel time profiles for IP and ON journey times as well as data for further origin destination pairs, giving more evidence of the network level changes created by

the Project. As shown on the graphs below in all cases the journey times decrease (as indicated by being below the corresponding Do Minimum line).

396. I note that the modelling for the Project shows that the journey times in the peaks outside of the Project area increase (slow) which I consider to be a factor of additional traffic volumes attracted to SH1 as a result of the lower overall journey times. However, as a consequence, there are some increases in delays on the unimproved road sections, such as the Cobham Drive roundabout and SH1 north of Aurora Terrace due to the increases in longer distance trips adding to the traffic volumes and the slight reduction in vehicle speeds being cumulative over these longer distances.

397. For Northbound traffic the duplication of lanes on Wellington Road and Ruahine Street leading to the Mt Victoria Tunnel is evident by the shallower line, indicating higher journey speeds resulting from the lack of congestion.

398. In the case of Southbound journeys on SH1 the removal of the Terrace Tunnel merge is evident by the lack of the delay 'ramp' visible on the Do Minimum graphs between Aurora Terrace (overbridge) and Willis Street.

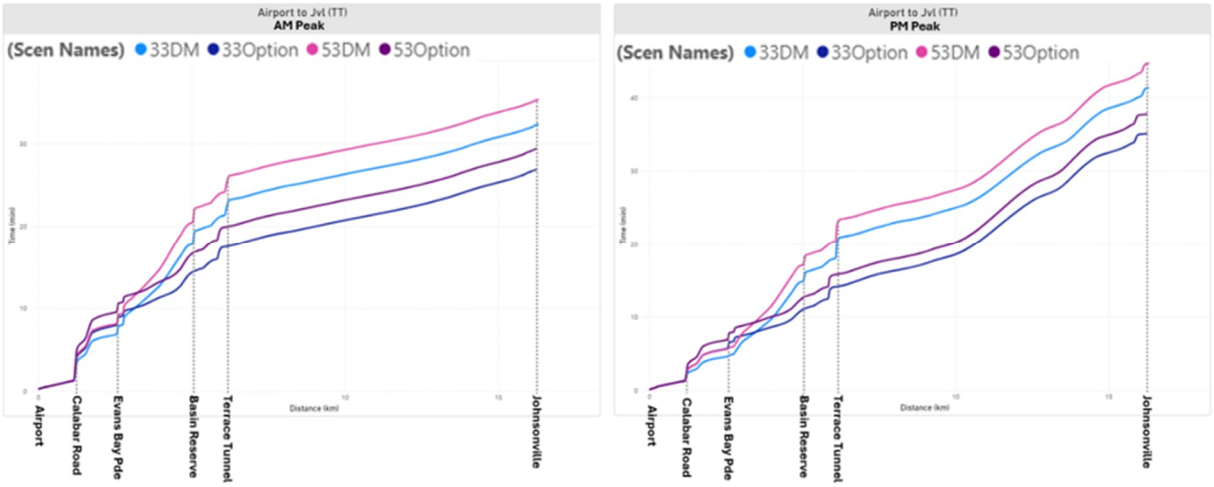


Figure 76 – Travel time profile for Airport to Johnsonville via SH1

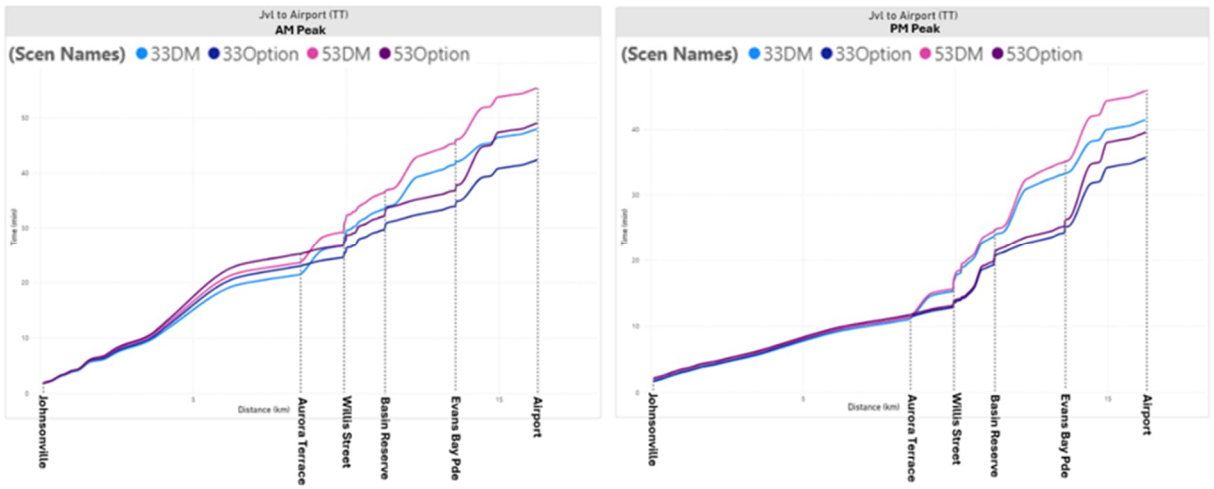


Figure 77 – Travel Time Profile for Johnsonville to Airport via SH1

399. Figure 78 and Figure 79 presents the same travel time profiles, but for movements via the Quays and Bays rather than SH1. Overall, travel times are expected to reduce on the local road compared with the Do Minimum scenario. However, some additional delay is forecast on the

initial section of the route primarily around Cobham Drive as discussed above. In the PM peak, while the Terrace Tunnel already operates with two northbound lanes, the Airport to Johnsonville journey via the Bays experiences approximately a two-minute increase in travel time in the 2033 option relative to the Do Minimum.

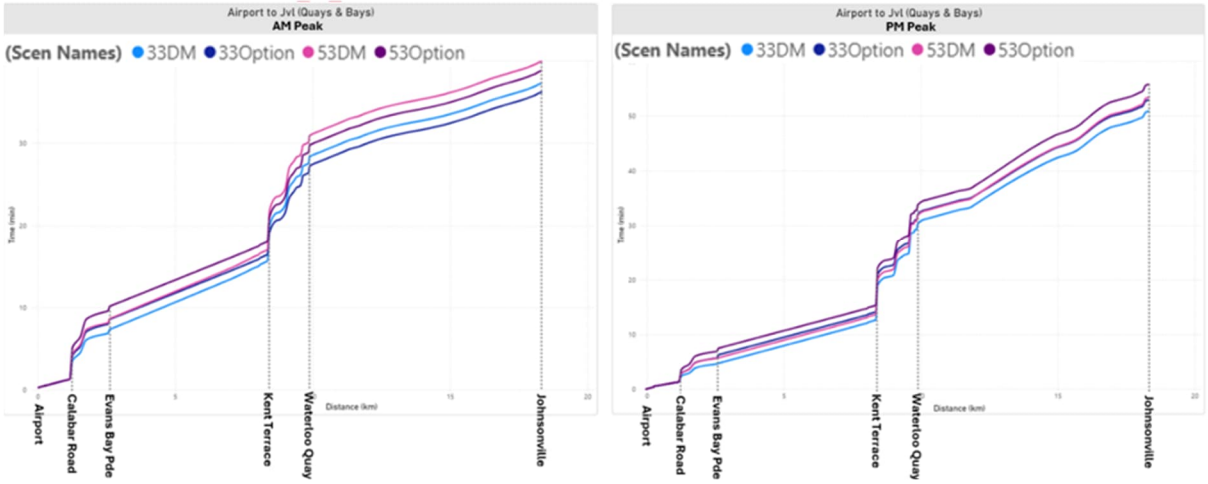


Figure 78 – Travel Time Profile for Airport to Johnsonville (via Bays)

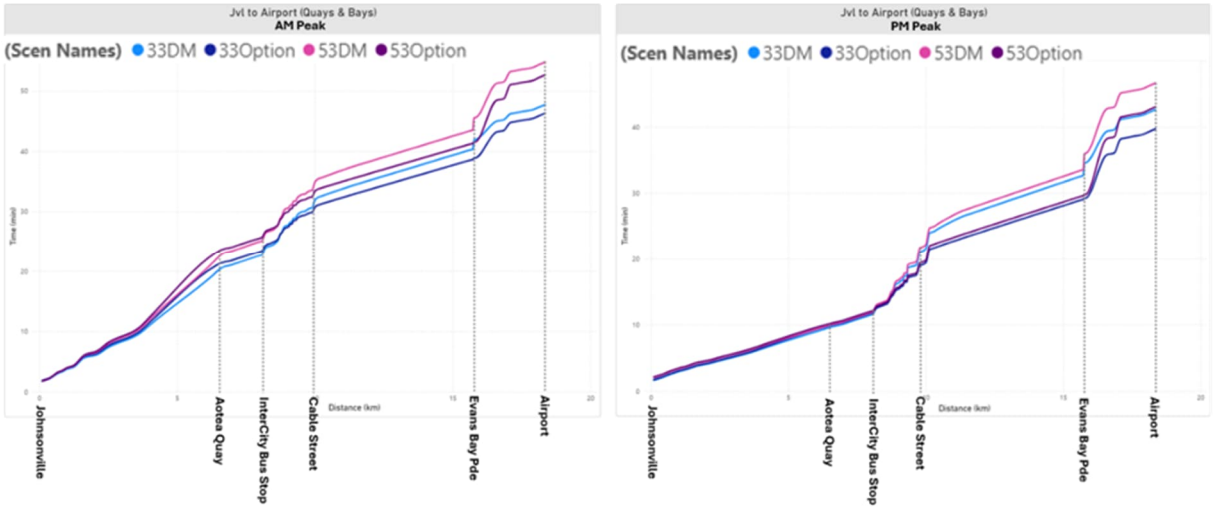


Figure 79 – Travel Time Profile for Johnsonville to Airport (via Bays)

400. The Airport to Hospital (and reverse) scenario has been modelled using two alternative routes. Under the 'Do Minimum' scenario it is assumed that the majority of users travel via Rongotai Road and Constable Street (Newtown). In the 'Project' scenario, however, it is expected that users will instead travel via SH1 through the Mt Victoria Tunnel, as this is anticipated to provide a more direct connection due to the network changes (enabled/restricted turns) in the Eastern Connections area that form part of the Project. The resulting travel times are presented in Table 41 and Table 42.

Table 41: Journey times (Airport to Hospital) for 2033

Route	2033 Journey Time (minutes)					
	AM peak			PM peak		
	Do Min (Newtown)	Do Min (Tunnel)	With Project (Tunnel)	Do Min (Newtown)	Do Min (Tunnel)	With Project (Tunnel)
Airport to Hospital	16	20	17 (-3)	14	17	14 (-3)
Hospital to Airport	14	21	17 (-4)	16	23	19 (-4)

Table 42: Journey times (Airport to Hospital) for 2053

Route	2053 Journey Time (minutes)					
	AM peak			PM peak		
	Do Min (Newtown)	Do Min (Tunnel)	With Project (Tunnel)	Do Min (Newtown)	Do Min (Tunnel)	With Project (Tunnel)
Airport to Hospital	19	23	20 (-3)	16	20	16 (-4)
Hospital to Airport	17	26	21 (-5)	20	27	23 (-4)

401. Table 43 and Table 44 below display the absolute travel time difference (minutes) for the 2033 AM peak and PM peak between sectors in Wellington and adjacent regions as a result of the Project. The sectors represent geographical areas defined to reflect key travel generators which include the Wellington CBD, inner city areas, eastern suburbs, northern suburbs, and wider regional catchments beyond the immediate Project area. A positive number is represented by an increased (slower) travel time, and a negative number is represented by a decreased (improved) travel time. The full travel times between each sector is available in Annexure B.

Table 43: 2033 AM Peak absolute travel time difference (minutes) between sectors

		Destination											
		CBD	Miramar/Airport	Lyall Bay	Hataitai	Newtown	Island Bay	Brooklyn	Karori	Wadestown	Johnsonville	Tawa and North	Petone and North
Origin	CBD	0	-3	-2	-2	-1	-1	-1	0	0	0	0	0
	Miramar/Airport	-3	0	1	2	-2	0	-1	-5	-5	-5	-6	-7
	Lyall Bay	-4	0	0	0	-2	0	-2	-4	-5	-5	-5	-5
	Hataitai	-3	1	1	0	0	1	-2	-4	-4	-4	-4	-4
	Newtown	-1	-1	-1	-1	0	0	0	-1	-1	-1	-1	-1
	Island Bay	0	0	0	0	0	0	0	0	-1	-1	-1	-1
	Brooklyn	0	-1	-1	-1	0	0	0	0	0	0	0	0
	Karori	0	-2	-3	-3	-1	-1	-1	0	0	0	0	0
	Wadestown	0	-4	-4	-4	-3	-2	-2	0	0	0	0	0
	Johnsonville	0	-5	-5	-4	-4	-3	-3	0	0	0	0	0
	Tawa and North	0	-6	-5	-4	-4	-4	-3	0	0	0	0	0
	Petone and North	0	-6	-5	-4	-3	-3	-3	1	1	1	0	0

402. The model indicates the largest decrease in absolute travel time is seven minutes, observed for movements originating from Miramar/Airport to Petone and North. The decrease in travel time is likely to be attributed by the improved efficiency of the upgraded SH1 corridor, with some users choosing this route in preference to alternative local roads, benefiting from a more direct and less uninterrupted travel route. This improved accessibility is a key enabler of further growth in the airport precinct.

403. The largest absolute increase in travel time occurs during the 2033 AM peak for movements originating in Miramar/Airport and concluding at Hataitai at two minutes.

Table 44: 2033 PM Peak absolute travel time difference between sectors

		Destination											
		CBD	Miramar/Airport	Lyall Bay	Hataitai	Newtown	Island Bay	Brooklyn	Karori	Wadestown	Johnsonville	Tawa and North	Petone and North
Origin	CBD	0	-2	-1	-2	0	0	-1	0	0	0	0	1
	Miramar/Airport	-5	0	1	2	-2	0	-2	-6	-7	-6	-7	-7
	Lyall Bay	-5	1	0	1	-2	0	-2	-6	-7	-7	-7	-7
	Hataitai	-3	2	2	0	-1	1	-3	-4	-5	-5	-5	-5
	Newtown	-1	0	0	-1	0	0	0	-1	-2	-1	-1	-1
	Island Bay	0	0	0	0	0	0	0	-1	-1	-1	-1	-1
	Brooklyn	0	0	0	-1	0	0	0	0	-1	0	0	0
	Karori	-1	-1	-2	-3	-1	-1	-1	0	0	0	0	1
	Wadestown	-1	-4	-3	-5	-4	-3	-2	0	0	0	0	1
	Johnsonville	-1	-6	-5	-5	-4	-4	-4	0	0	0	0	0
	Tawa and North	-1	-6	-6	-6	-5	-4	-4	0	0	0	0	0
	Petone and North	-1	-7	-5	-5	-4	-4	-4	1	0	0	0	0

404. The largest absolute increase in travel time during a 2033 PM peak between sectors occurs for movement originating in Miramar/Airport and concluding in Hataitai, with an absolute travel time difference of two minutes. The same increase is expected for trips originating in Hataitai and concluding at Miramar/Airport and Lyall Bay. This arises from the additional traffic on SH1 outside of the Project area increasing journey times. But for trips to Hataitai on the edge of the Project area, there is not the offset of the significant journey time savings the Project delivers through the Mt Victoria Tunnel and through to the Terrace Tunnel, but they still get the small additional delay at Cobham Drive Roundabout through to the intersection at Evans Bay Parade.

405. Similarly seen in the 2033 AM peak, the largest decrease in absolute travel time is observed for movements originating from Miramar/Airport to Wadestown, Tawa and North, and Petone and North, as well as Lyall Bay to Wadestown. Johnsonville, Tawa and North and Petone and North with decreases of up to seven minutes. Again, the decrease in travel time is likely attributed by the improved efficiency of the upgraded SH1 corridor, and users preferring this route to alternative local routes.

406. Table 45 and Table 46 below display the absolute travel time difference of the (minutes) between sectors in the Wellington and adjacent region as a result of the Project in 2053 AM and PM peaks.

Table 45: 2053 Absolute travel time difference between sectors AM Peak

		Destination											
		CBD	Miramar/Airport	Lyall Bay	Hataitai	Newtown	Island Bay	Brooklyn	Karori	Wadestown	Johnsonville	Tawa and North	Petone and North
Origin	CBD	0	-3	-2	-2	-1	-1	-1	0	0	0	0	0
	Miramar/Airport	-2	0	1	2	-1	0	-1	-5	-6	-6	-6	-7
	Lyall Bay	-4	0	0	1	-2	0	-2	-5	-6	-6	-6	-6
	Hataitai	-3	1	1	0	0	1	-2	-4	-4	-4	-4	-4
	Newtown	-1	-1	-1	-1	0	0	0	-1	-1	-1	-1	-1
	Island Bay	0	0	0	0	0	0	0	0	-1	-1	-1	-1
	Brooklyn	0	-1	-1	-1	0	0	0	0	0	0	0	0
	Karori	0	-2	-3	-2	-1	-1	-1	0	0	0	0	0
	Wadestown	0	-5	-4	-4	-3	-2	-2	0	0	0	0	0
	Johnsonville	0	-6	-4	-4	-4	-4	-3	0	0	0	0	0
	Tawa and North	0	-7	-5	-4	-4	-4	-3	0	0	0	0	0
	Petone and North	0	-7	-4	-4	-4	-4	-3	1	1	1	0	0

407. Similarly to the 2033 data, the model indicates that the largest absolute increase in travel time between sectors occurs for movements originating in Miramar/Airport and concluding at Hataitai. Between 2033 and 2053, this increase in travel time remains the same at two minutes.

408. Again, consistent with the 2033 AM peak data, the largest decrease in absolute travel time is observed for movements originating from Miramar/Airport and concluding in Petone and North and for trips originating in Tawa and North and Petone and North, concluding in Miramar/Airport at seven minutes.

Table 46: 2053 Absolute travel time difference between sectors PM Peak

		Destination											
		CBD	Miramar/Airport	Lyall Bay	Hataitai	Newtown	Island Bay	Brooklyn	Karori	Wadestown	Johnsonville	Tawa and North	Petone and North
Origin	CBD	0	-2	0	-2	0	-1	-1	0	0	1	1	1
	Miramar/Airport	-5	0	1	3	-2	0	-2	-6	-7	-7	-7	-8
	Lyall Bay	-5	1	0	1	-2	0	-2	-7	-8	-8	-8	-8
	Hataitai	-3	2	2	0	-1	1	-3	-5	-5	-5	-5	-5
	Newtown	-1	0	-1	-1	0	0	0	-1	-2	-2	-2	-1
	Island Bay	0	0	0	0	0	0	0	-1	-1	-1	-1	0
	Brooklyn	0	0	0	-1	0	0	0	-1	-1	0	0	0
	Karori	-1	-1	-2	-3	-1	-1	-1	0	0	0	0	1
	Wadestown	-1	-5	-3	-5	-4	-3	-3	0	0	0	0	0
	Johnsonville	-1	-6	-5	-6	-5	-5	-4	0	0	0	0	0
	Tawa and North	-1	-7	-5	-6	-5	-5	-4	0	0	0	0	0
	Petone and North	-1	-7	-5	-6	-5	-5	-4	1	0	0	0	0

409. Similarly to the 2033 PM peak, the largest absolute increase in travel time originates in Miramar/Airport and concluding in Hataitai. This is likely attributed to the increase in travel distance and subsequent travel time with the closure of the existing right-hand turn at Hamilton Road.

410. Again in 2053, the largest decrease in absolute travel time is observed in movements originating in Miramar/Airport and Lyall Bay and concluding in northern suburbs.

Public Transport Journey Times

411. The assessment for public transport travel times has been undertaken using the Aimsun model. This has been used to estimate journey times for segments of a number of representative bus routes which interact with the project area and on local roads under both a Do Minimum and Project scenario.

412. The model outputs provide detailed travel time information along each route, enabling a comparison of total journey times, as well as variability in travel times. The following sections present the travel times for each route assessed, including their associated variability to support the impact of the Project. The model outputs, including additional routes developed through engagement with Metlink and GWRC, have also been analysed on a segment-by-segment basis to better understand how specific areas of the Project influences travel times across the route. This summary can be found in Annexure F.

413. Table 47 below displays the travel time and associated variability for a number of routes for inbound and outbound legs of AM and PM peak times.

Table 47: Bus travel time and variability

		Do Minimum				With Project				Difference			
		Travel time (min)		Variability (min)		Travel time (min)		Variability (min)		Travel time (min)		Variability (min)	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Route 1[25]	Inbound	8	10	6	10	8	8	3	3	0	-2	-3	-7
	Outbound	8	8	3	4	9	10	3	4	1	2	0	0
Route 2[26]	Inbound	21	24	8	12	20	20	7	6	-1	-4	-1	-6
	Outbound	30	21	28	10	20	21	5	6	-10	0	-23	-4
Route 3[27]	Inbound	35	30	12	29	25	23	7	6	-10	-7	-5	-23
	Outbound	21	26	6	14	24	25	7	8	+3	-1	+1	-6
Route 7[28]	Inbound	10	12	5	16	11	10	8	4	+1	-2	+3	-12
	Outbound	12	11	7	8	9	9	6	4	-3	-2	-1	-4
Route 14[29]	Inbound	66	67	8	9	64	64	6	5	-2	-3	-2	-4
	Outbound	87	70	14	10	65	66	6	6	-22	-4	-8	-4
Route 18[30]	Inbound	13	12	9	6	12	13	10	6	-1	+1	+1	0
	Outbound	14	15	11	13	13	11	6	6	-1	-4	-5	-7
AX[31]	Inbound	20	23	9	12	19	19	7	6	-1	-4	-2	-6
	Outbound	29	20	28	10	19	20	5	6	-10	0	-23	-4

414. Overall, the results indicate that the Project will improve public transport journey times for the majority of routes that were assessed, these being selected by GWRC as being key corridors for the overall bus network. A minority of routes show a small increase, but these are increases are unlikely to impact an individual's travel choice (mode, time of day, route) and the overall effect is a reduction of journey times for the network.

415. I do note the scale of benefit on routes through Hataitai are potentially overstating the degree of benefits I would expect to see. While the Project reduces traffic demand on these corridors and delivers travel time benefits, some of the larger reported savings may be influenced by model sensitivity under highly congested Do Minimum conditions. These outliers do not materially affect the overall conclusions of my assessment.

416. The model indicates increases in travel time of Route 1 in the outbound direction during both AM and PM peak periods, with no change in travel time in the inbound AM peak period, and a decrease in travel time of two minutes in the inbound PM peak period against a Do Minimum. Both of the inbound AM and PM peak periods show a decrease in time variability, with the PM peak reducing by seven minutes compared to the Do Minimum.

417. The model shows that the outbound direction Route 2 in the AM peak has travel time savings of approximately 10 minutes, with minor or no reductions in time travel for the remaining legs or peaks. The outbound AM peak travel time variability has significantly reduced from 28 minutes under a Do Minimum to five minutes with the Project, signifying a large increase in reliability on this route.

[25] Rintoul Street to Courtenay Place

[26] Miramar Avenue to Courtenay Place via Kilbirnie & Hataitai

[27] Kilbirnie to Manners Street

[28] Brooklyn to Manners Street

[29] Kilbirnie to Wilton

[30] Karori to Miramar

[31] Airport to Courtenay Place via Kilbirnie & Hataitai

418. In conjunction with the segment analysis as seen in Annexure F, six of the 10 minutes of time saving seen in the AM peak outbound leg of Route 2 is as a result of the time saved on travel through Hataitai Bus Tunnel to Taurima Street, then continuing south down Moxham Avenue. The time saving against the Do Minimum is reflective of the bottleneck nature of these legs during peak periods, and suggests that the Project is effective in relieving congestion in targeted areas.

419. All inbound legs of Route 3 show reductions in travel time as well as reduced variability, with the PM peak showing a decrease in variability from 29 minutes under a Do Minimum to six minutes under the Project. In contrast, the outbound leg displays either minor travel time savings or increases in travel time of up to three minutes. The segment-level analysis presented in Annexure F reflects these results, with the increase in travel time primarily attributed to southbound movement along Wallace Street, where travel time increases by approximately one minute.

420. The model indicates that the outbound leg of Route 7 in both the AM and PM peaks display reductions in travel time and variability as a result of the Project. The inbound leg of the AM peak period is the single leg which displays an increase in travel time of one minute and an increase in variation of three minutes. The PM peak period of the inbound leg is suggested to have a decrease in travel time of two minutes, and a reduction in variability of 12 minutes. The segment-level analysis presented in Annexure F largely reflect these results.

421. As shown above, the model indicates that both directions and both peak periods of Route 14 display reductions in travel time and variability. In particular, the outbound AM peak travel time reduces significantly from 87 minutes under a Do Minimum to 65 minutes with the Project. This reduction is accompanied by a decrease in travel time variability from 14 minutes to six minutes. Noting as above, this travel time reduction likely reflects high travel times in the Do Minimum scenario, associated with network segments operating at or near capacity.

422. Both peak periods in the inbound direction of Route 18 show a reduction in travel time compared to the Do Minimum. This reduction is supported by the segment-level analysis presented in Annexure F, where travel time is reduced by approximately six minutes in the inbound PM period. Travel time variability in the inbound direction has also reduced significantly, from approximately 29 minutes to eight minutes, indicating a substantial improvement in the reliability of this route.

423. The inbound direction during both periods of the Airport Express route shows reductions in travel time, including associated decreases in variability compared to the Do Minimum. The most notable reduction occurs in the outbound AM peak, where travel time savings of approximately 10 minutes are observed. As shown in the segment-level analysis in Annexure F, approximately six minutes of this saving occurs on the approach to and departure from the Hataitai Bus Tunnel.

424. This substantial reduction likely reflects improved traffic flow and reduced congestion at the tunnel approaches, where delay can be highly sensitive to small changes in network performance. As a key pinch point on the corridor, improvements to upstream conditions and reduced queuing can result in disproportionately large travel time savings through this section.

425. I also note that the Airport Express journey times assume that the route largely retains the current route via Hataitai. The Project enables, but does not require or propose, the route to use SH1 through the Mt Victoria Tunnel and based on the modelling this would deliver even greater journey time savings. As this isn't part of the Project I have not factored this into my benefits assessment, but it remains an example of the further opportunities enabled by the Project.

Reliability

426. Speaking generally, as traffic flows on a road get close to capacity, the delays at intersections or other bottlenecks on the route tend to increase in a non-linear[32] manner. That is to say that a 1% increase in vehicles may lead to a 5% increase in the delay. Once over capacity, the delays increase even more significantly.

427. It is these delays that I consider to be the primary driver for the current variability in journey times during congested periods. By increasing the capacity of SH1 and therefore increasing a buffer between the future demand and the capacity, there is the ability for the network to better cater for the daily fluctuations in demand that occur within, and for journeys through, the Project area.

428. Under existing conditions, a lane loss anywhere in the network, where limited capacity means demand can quickly exceed supply, results in sharp increases in journey times. With additional lanes in place on SH1, the whole network is better able to accommodate diverted traffic, reducing the severity and duration of congestion and limiting the escalation in journey time variability across the wider network.

429. I also note that there is a strong correlation between resilience and reliability in terms of transport journeys. With a network that has additional route choices generally being able to deliver more consistent route choices as the demands balance journey times across the alternate routes.

430. The specific elements of the scheme that I consider to be most influential in improving the reliability are:

    i. The second Terrace Tunnel which removes the merge to one lane southbound

    ii. The grade separation and removal of the Basin Gyratory, removing the conflict points between local and State Highway Traffic

    iii. The second Mt Victoria Tunnel which provides twice the capacity for SH1 and removes the two to one lane bottlenecks on the western approach from Paterson Street

    iv. The improvements on Wellington Road and Ruahine Street which provide two lanes for traffic in each direction removing the merge to a single lane in the westbound direction towards the Mt Victoria Tunnel

    v. The changes to Vivian Street to increase lanes and enhance the intersection traffic signal timings for greater throughput and efficiency

431. In the case of the changes to Vivian Street, I consider that these are likely to have a lesser impact than the other elements but will still contribute to a tangible improvement. Whilst the intersections remain, the turn restrictions, additional lane and signal enhancements would contribute to more consistent flows, and therefore greater regularity of journey time along Vivian Street.

Road network

432. The key proposed changes to the road network in the Terrace Tunnel section of works are:

    i. The existing Shell Gully overbridge (SH1 between Aurora Terrace and Everton Terrace) is reconfigured to accommodate two traffic lanes in either direction

[32] Standard volume delay theory shows that delays grow exponentially once traffic volumes near road capacity, thereby significantly increasing travel time variability

ii. A new two-lane southbound carriageway is built north of the Terrace Tunnel

iii. The existing northbound carriageway is reconfigured north of the Terrace Tunnel

iv. A second Terrace Tunnel is constructed to accommodate a two-lane southbound carriageway

v. The existing Terrace Tunnel is refurbished and reconfigured to accommodate two northbound traffic lanes

vi. New and reconfigured carriageway is used to tie both Terrace Tunnels into the Vivian Street approach and ICB, respectively

433. The collective changes described above have the result of providing two traffic lanes in either direction through the complete Terrace Tunnel section and removes the two to one lane bottleneck in the southbound direction.

Parking

434. There are approximately 450 off-street car parking spaces as part of the Clifton Street Car Park, and 77 off-street car parking spaces as part of the Upper Willis Street Car Park within the Terrace Tunnel section. Approximately 17 of the Clifton Street Car Park spaces (Kumutoto area) will be removed. These car parking spaces are reserved for long-term parking.

435. As shown in Figure 80 there are two multi storey car parking buildings within close proximity to the Clifton Street Car Park and multiple on street parking options within a 100 m walk therefore I consider this a negligible effect.



Figure 80 – Terrace Tunnel parking changes

Property access

436. There are no effects on property access within the Terrace Tunnel section.

Public transport network

437. No scheduled or school bus routes operate on the state highway in this section so there is no direct impact to the operation of these bus services, however the Project is, overall, anticipated

to attract traffic currently using the local road network which would reduce delays and improve journey times for buses which is of a scale in this location I consider to result in a **low** benefit to public transport users, although facilitates operational changes and enhancements outside of the Project that could deliver greater benefits.

Active transport network

438. The Project involves the permanent removal of the path leading from MacDonald Crescent to Willis Street, as described in paragraph 108. Without this path, users will need to detour via MacDonald Crescent and Willis Street. This increases the walking distance from approximately 160 m to 300 m, resulting in an additional walking time of around two minutes of walking.

439. Users travelling from The Terrace or Te Herenga Waka – Victoria University of Wellington Campus to Willis Street may alternatively use Ghuznee Street, which does not result in any additional walking distance. Given that the available detour routes do not add a significant amount of walking distance or time, I consider the effect to be negligible.

Safety

440. Given the proposed changes to the road network here involve fully separating northbound and southbound traffic onto separate carriageways, I would expect overall safety to improve with the elimination of head on collision risks.

441. Given the additional capacity, at the southern end of this section there may be some risk associated with faster moving traffic approaching the back of queued vehicles at the Willis Street intersection. However I note the geometric design allows sufficient visibility for drivers to react and slow and the speed limit is 50 km/hr on this approach, so I consider that this risk is negligible as an effect of the project.

442. Overall, I consider that there will be a moderate safety improvement overall in this section.

Summary of effects

443. A summary of the effects that have been rated above negligible, is shown below in Table 48.

Table 48: Summary of effects for the Terrace Tunnel section

Category	Effect	Effect rating
Public transport network	Reduced delays and improved journey times for buses using the local network as a result of the Project attracting traffic onto the state highway network and away from the local road network.	Low benefit
Safety	Reduced head-on collision risk as a result of separating northbound and southbound traffic. In my opinion this is likely to lead to reduced risk of DSI crashes. Increased risk with faster moving traffic approaching to the back of traffic queues at the intersection of Willis Street and SH1 Vivian Street as a result of the additional capacity on the network. I consider this is a slight increase that would be managed through the detail design and future pre and post construction Safety Audits.	Moderate benefit

Te Aro

Road network

444. The SH1 corridor through central Wellington operates as a one-way pair, with eastbound traffic using Vivian Street and westbound traffic using Karo Drive. Karo Drive already operates with three through lanes as part of the Do Minimum scenario, including the improvements associated with the Inner-City Bypass. The corridor proposals therefore focus primarily on reconfiguring

Vivian Street to provide three through lanes for state highway traffic along its length, although some sections are shared with turning movements at intersections. The proposals also include changes to intersections and approach lanes, the removal of on-street parking throughout the corridor, and further signal optimisation along the Karo Drive corridor to improve traffic flow and corridor performance.As a result the effective throughput of Vivian Street increases, and whilst not three free flowing lanes, is designed to support a more consistent and reliable journey for through traffic, with the impact of blocking from turning vehicles reduced. I have explored the changes in more detail below.

445. The key proposed changes to the road network at the SH1 / Willis Street intersection are:

    i. Removal of the slip-lane and give-way left turn from SH1 Vivian Street into Willis Street northbound

    ii. The introduction of three through lanes through the junction for SH1 Vivian Street

    iii. Removal of kerb build-outs on north side of Vivian Street

446. The key proposed changes to the road network at the SH1 Vivian Street / Victoria Street intersection are:

    i. Resealing and remarking of the SH1 Vivian Street eastbound approach to provide three through lanes and a dedicated right-turn lane into Victoria Street southbound

    ii. Resealing and remarking of the Victoria Street southbound approach to provide an additional left-turn lane, for a total of two, from Victoria Street to SH1 Vivian Street eastbound. This will result in the loss of a straight ahead lane (from three to two lanes) from this southbound approach

    iii. Relocating the conflicting cycle lane to the outside of the traffic lanes

447. As I noted above, in relation to Victoria Street, there is a reduction in the southbound lanes on Victoria Street from three lanes to two at the approach to SH1 Vivian Street. However, I also note that Victoria Street is only two lanes in total some 60m north of the stop line, and when considering the effective capacity of the stop line I have also considered the extent of the queue to turn left into Vivian Street that triggered the need to provide two left turn lanes alongside two southbound (straight ahead) lanes.

448. I have also assessed the modelling undertaken for the Project at the SH1 Vivian Street and Victoria Street intersection specifically to assess the effect of the lane reductions on travel time, and found that the travel time through the intersection for Victoria Street traffic is reduced by approximately one minute in the AM peak and 45 seconds in the PM peak compared to the Do Minimum.

449. The expected travel time effects at SH1 Vivian Street and Victoria Street has a potential effect on the local road network, however I am of the opinion that this is a relatively small adverse effect. I have already assessed the effects of this in the wider assessment on journey times for public transport and general traffic earlier in this section and so will not apply a rating again to avoid double counting of benefits.

450. The key proposed changes to the road network at the SH1 Vivian Street / Cuba Street intersection are:

    i. Resealing and remarking of the SH1 Vivian Street eastbound approach to provide three through lanes and removing turning movements into Cuba Street northbound and southbound

ii. Kerb build-outs on Cuba Street north and south at the junction to remove surplus road space

iii. Removal of kerb build-outs on north side of Vivian Street

451. Road users who currently access Cuba Street via this junction will be required to divert via either Victoria Street or Taranaki Street and then use Abel Smith Street to gain access, which is shown in Figure 81. This diversion is a moderate disbenefit due to the increased journey length.

452. While the Aimsun modelling indicates an increase in traffic volumes along Abel Smith Street in the peak hours as a result of this diversion, the absolute increase in vehicle numbers is relatively low at 46 additional vehicles in the AM peak and 42 in the PM peak. In context, this means an increase of less than one vehicle per minute, which I consider to be negligible.



Figure 81 – Increase in peak hourly flows on the detour routes from SH1 Vivian Street to Cuba Street

453. The key proposed change to the road network at the SH1 Vivian Street / Taranaki Street intersection is:

i. Resealing and remarking of the SH1 Vivian Street eastbound approach to provide one left/through lane, one through lane, and one through/right lane

ii. Removal of kerb build-outs on east side of Vivian Street

454. The key proposed change to the road network at the SH1 Vivian Street / Tory Street intersection is:

i. Resealing and remarking of the SH1 Vivian Street eastbound approach to provide one left/through lane, one through lane, and one through/right lane

ii. Removal of kerb build-outs on east side of Vivian Street

455. The key proposed changes to the road network at the SH1 Vivian Street / Kent and Cambridge Terraces intersection are:

i. Resealing and remarking of the SH1 Vivian Street eastbound approach to provide one left/through/right lane and two right-turn lanes

ii. Making Pirie Street entry only at this junction

456. The closure of the exit from Pirie Street will require vehicles to reroute either via Elizabeth Street to the north or via Ellice Street to the south. However, routing via Ellice Street will only give access to SH1 eastbound through the Mt Victoria Tunnel. Elizabeth Street is a key bus corridor for buses going via the Hataitai Bus Tunnel and increased traffic on here may lead to increases on bus journey times and decrease in reliability.

457. The modelling shows that the daily increases on Brougham Street and Elizabeth Street are expected to be in the region of 2,100 vehicles per day which I consider will be a low adverse effect noting the other changes to the network that will deliver journey time savings.

458. For the westbound journeys from the Arras Tunnel there are no changes proposed at SH1 / Taranaki Street intersection. The key proposed change to the road network is at the SH1 Arthur Street / Cuba Street intersection is:

i. Removal of the turning movements from SH1 Arthur Street westbound approach into Cuba Street northbound and southbound

459. Road users who currently access Cuba Street via this junction will be required to divert via either Taranaki Street or Victoria Street and then use either Abel Smith Street or Webb Street to gain access (Figure 82). The Aimsun modelling indicates a small increase in traffic volumes along Abel Smith Street and Webb Street during peak hours as a result of this diversion\. Traffic volumes along Abel Smith Street are expected to increase by 86 vehicles in the AM peak and 53 in the PM peak. The largest traffic volume increases expected along Webb Street are 87 vehicles in the AM peak and 115 in the PM peak. I consider the effect of these to be negligible in practice.



Figure 82 – Increase in peak hourly flows on the detour routes from SH1 Arthur Street to Cuba Street

460. All these changes provide increased capacity for Vivian Street provided through the additional lane. As a result, the throughput on SH1 can be accommodated without increasing delay for cross movements on the local network. The additional through lane on Vivian Street combined with the simplified phasing at some intersections allows more time to the side roads, and as a result, I consider the Project to be highly beneficial to vehicle movements.

461. The physical changes for Arthur Street are relatively minor, but proposed changes at Cuba Street do serve to remove potential bottlenecks that otherwise could contribute to congestion and journey time unreliability. At present, the Basin limits flows to this location, and the changes serve to prevent issues that would arise in the future as the Project enables greater traffic flows, rather than directly delivering benefits to existing issues. As such I assess the effect as a Low positive benefit.

Parking

462. There are currently 76 time restricted on-street car parking spaces on SH1 Vivian Street, all of which will be removed as part of these works. There are no mobility parking spaces or loading bays affected. The 5-space taxi stand located immediately east of the Vivian Street / Cuba Street intersection will also be removed as part of these works.

463. One parking space on Cuba Street approximately midway between Vivian Street and Abel Smith Street and one parking space on Cuba Street at the intersection with Vivian Street will be removed because of the one-way re-configuration. Due to the large number of retained parking spaces on Cuba Street, the loss of these two parking spaces will have a negligible effect.

464. Later in this report I recommend that some side road parking bays are converted to loading bays to mitigate the lack of loading bays on Vivian Street. In order to fully capture the effects of the Project I have assessed the parking on the basis that my recommendation is given effect to, and so my assessment now also considers the reduction of parking associated with these bays in addition to the bays removed on Vivian Street. The locations of these are as follows:

i. Two spaces on Walter Street

ii. Two spaces on Bute Street

iii. One space on Cuba Street (south of Vivian Street)

iv. Two spaces on Marion Street

v. Two spaces on Tory Street (south of Vivian Street)

vi. One space on Jessie Street (optional)

vii. One space on College Street (optional)

465. As shown in Figure 83 and Figure 84, these proposed changes leave a total of 170 time restricted on-street parking spaces within a 100 m walking distance of the SH1 Vivian Street corridor, as well as a greater number of off-street parking facilities.

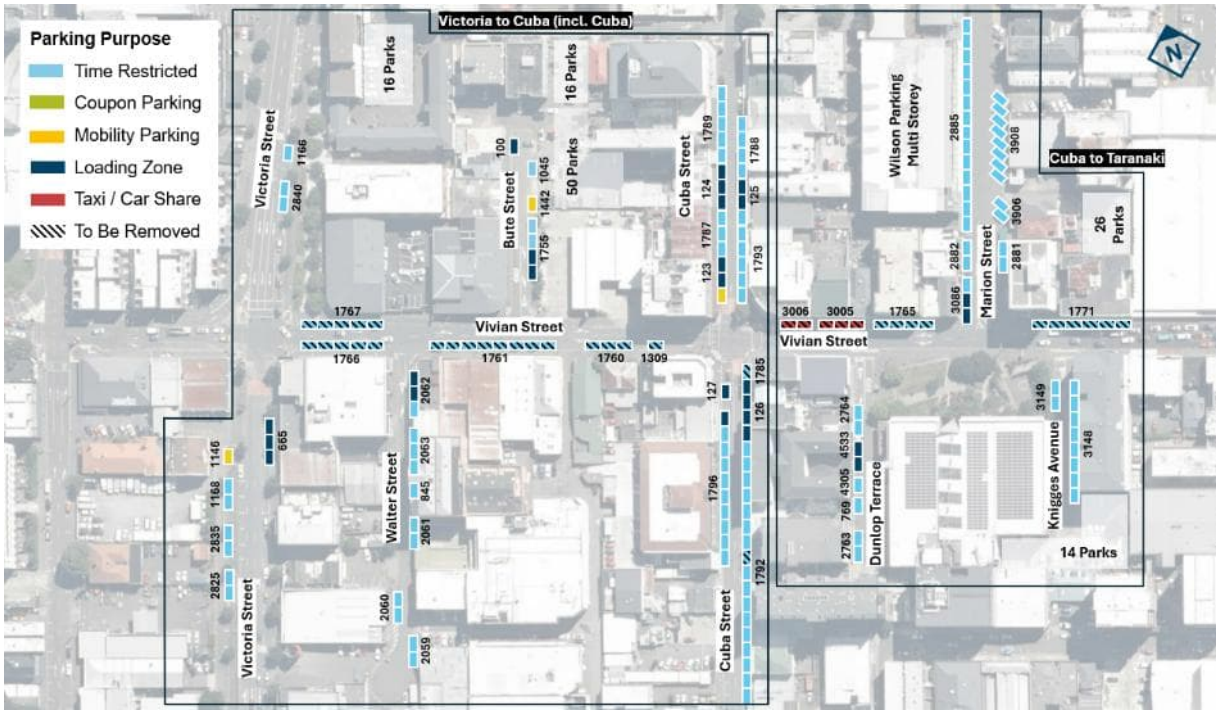


Figure 83 – Proposed parking overview (Victoria Street to Taranaki Street)

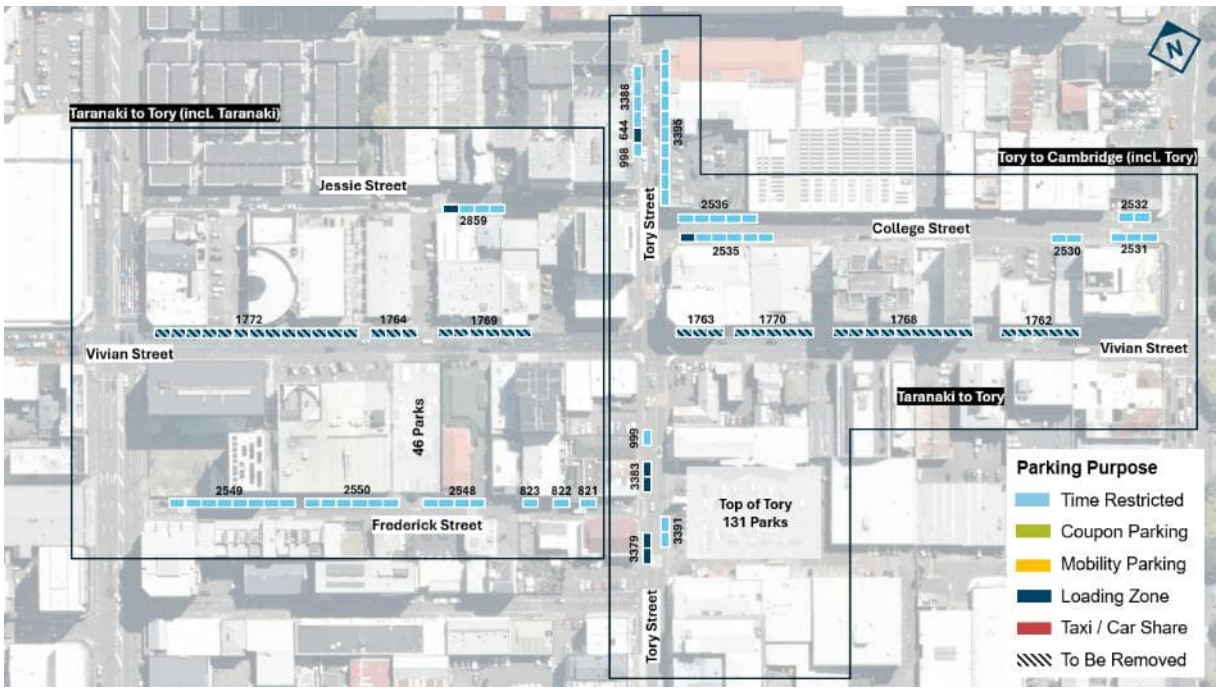


Figure 84 – Proposed parking overview (Taranaki Street to Cambridge Terrace)

466. A parking survey was undertaken by WCC and I have used the data collected to assess the potential effects of removing on-street parking along Vivian Street and displacing the vehicles onto surrounding streets. Existing parking occupancy on Vivian Street and on surrounding streets was analysed across three time periods (7:00 am - 9:00 am, 12:00 pm - 2:00 pm, and 5:00 pm - 7:00 pm). I understand WCC typically targets 85% occupancy to avoid traffic circulating trying to find an available parking space.

467. During the 7:00 am - 9:00 am period, the surrounding street network demonstrates sufficient capacity to accommodate the displacement of parking from Vivian Street. The combined analysis in Table 49 to Table 51 shows that most road sections retain available capacity, with only the Taranaki to Tory section reaching full capacity during weekdays (four vehicles over capacity). However there are adjacent streets with more than sufficient capacity for the demand.

Table 49: Vivian Street Parking Occupancy (7:00 am - 9:00 am)

Section Extents	No. Spaces	Weekday				Weekend			
		Occupied Parks		Available Parks		Occupied Parks		Available Parks	
Victoria to Cuba	22	2	9%	20	91%	4	18%	18	82%
Cuba to Taranaki	10	1	10%	9	90%	2	20%	8	80%
Taranaki to Tory	22	11	50%	11	50%	8	36%	14	64%
Tory to Cambridge	22	7	32%	15	68%	7	32%	15	68%

Table 50: Local Road Parking Occupancy (7:00 am - 9:00 am)

Section Extents	No. Spaces	Weekday				Weekend			
		Occupied Parks		Available Parks		Occupied Parks		Available Parks	
Victoria to Cuba	73	52	71%	21	29%	49	67%	24	33%
Cuba to Taranaki	47	32	68%	15	32%	26	55%	21	45%
Taranaki to Tory	25	17	68%	8	32%	14	56%	11	44%
Tory to Cambridge	38	24	63%	14	37%	26	68%	12	32%

Table 51: Forecast Occupancy with Project (7:00 am - 9:00 am)

Section Extents	No. Spaces	Weekday				Weekend			
		Occupied Parks		Available Parks		Occupied Parks		Available Parks	
Victoria to Cuba	66	54	82%	12	18%	53	80%	13	20%
Cuba to Taranaki	45	33	73%	12	27%	28	62%	17	38%
Taranaki to Tory	24	28	117%	-4	-17%	22	92%	2	8%
Tory to Cambridge	35	31	89%	4	11%	33	94%	2	6%

468. During the 12:00 pm - 2:00 pm period, the surrounding street network again demonstrates sufficient capacity to accommodate the displacement of parking from Vivian Street. The combined analysis in Table 52 to Table 54 shows that most road sections retain positive available capacity, with only the Taranaki to Tory section reaching full capacity during both weekdays (one vehicle over capacity) and weekends (three vehicles over capacity).

Table 52: Vivian Street Parking Occupancy (12:00 pm - 2:00 pm)

Section Extents	No. Spaces	Weekday				Weekend			
		Occupied Parks		Available Parks		Occupied Parks		Available Parks	
Victoria to Cuba	22	11	50%	11	50%	18	82%	4	18%
Cuba to Taranaki	10	8	80%	2	20%	10	100%	0	0%
Taranaki to Tory	22	13	59%	9	41%	15	68%	7	32%
Tory to Cambridge	22	10	45%	12	55%	10	45%	12	55%

Table 53: Vivian Street Surrounding Parking Occupancy (12:00 pm - 2:00 pm)

Section Extents	No. Spaces	Weekday				Weekend			
		Occupied Parks		Available Parks		Occupied Parks		Available Parks	
Victoria to Cuba	73	21	29%	52	71%	18	25%	55	75%
Cuba to Taranaki	47	12	26%	35	74%	4	9%	43	91%
Taranaki to Tory	25	12	48%	13	52%	12	48%	13	52%
Tory to Cambridge	38	15	39%	23	61%	11	29%	27	71%

Table 54: Vivian Street Surrounding Parking Occupancy with Project (12:00 pm - 2:00 pm)

Section Extents	No. Spaces	Weekday				Weekend			
		Occupied Parks		Available Parks		Occupied Parks		Available Parks	
Victoria to Cuba	66	32	48%	34	52%	36	55%	30	45%
Cuba to Taranaki	45	20	44%	25	56%	14	31%	31	69%
Taranaki to Tory	24	25	104%	-1	-4%	27	113%	-3	-13%
Tory to Cambridge	35	25	71%	10	29%	21	60%	14	40%

469. During the 5:00 pm - 7:00 pm period, the surrounding street network again demonstrates sufficient capacity to accommodate the displacement of parking from Vivian Street. The combined analysis in Table 55 to Table 57 shows that most road sections retain positive available capacity, with only the Taranaki to Tory and the Tory to Cambridge sections reaching full capacity during weekdays (two vehicles and four vehicles over capacity).

Table 55: Vivian Street Parking Occupancy (5:00 pm - 7:00 pm)

Section Extents	No. Spaces	Weekday				Weekend			
		Occupied Parks		Available Parks		Occupied Parks		Available Parks	
Victoria to Cuba	22	10	45%	12	55%	14	64%	8	36%
Cuba to Taranaki	10	7	70%	3	30%	6	60%	4	40%
Taranaki to Tory	22	9	41%	13	59%	8	36%	14	64%
Tory to Cambridge	22	14	64%	8	36%	8	36%	14	64%

Table 56: Vivian Street Surrounding Parking Occupancy (5:00 pm - 7:00 pm)

Section Extents	No. Spaces	Weekday				Weekend			
		Occupied Parks		Available Parks		Occupied Parks		Available Parks	
Victoria to Cuba	73	29	40%	44	60%	24	33%	49	67%
Cuba to Taranaki	47	15	32%	32	68%	7	15%	40	85%
Taranaki to Tory	25	17	68%	8	32%	12	48%	13	52%
Tory to Cambridge	38	25	66%	13	34%	23	61%	15	39%

Table 57: Vivian Street Surrounding Parking Occupancy with Project (5:00 pm - 7:00 pm)

Section Extents	No. Spaces	Weekday				Weekend			
		Occupied Parks		Available Parks		Occupied Parks		Available Parks	
Victoria to Cuba	73	39	59%	27	41%	38	58%	28	42%
Cuba to Taranaki	47	22	49%	23	51%	13	29%	32	71%
Taranaki to Tory	25	26	108%	-2	-8%	20	83%	4	17%
Tory to Cambridge	38	39	111%	-4	-11%	31	89%	4	11%

470. In summary, most road sections maintain positive residual capacity, with only minor and isolated instances of slight exceedance. As previously mentioned, I believe the proximity of the road sections enables users to utilise nearby streets with available parking, effectively balancing demand across the network. Overall, this indicates to me that all periods operate within manageable limits, with sufficient flexibility in parking supply to absorb the changes related to the Project.

471. I am aware that delivery and goods vehicles use the parking on Vivian Street when dropping off or picking up items. To alleviate stress on delivery vehicles and businesses, I have considered the potential to reallocate 10 parking spaces on nearby streets as loading bays. The current nearby parking and loading bays and the potential locations to be considered for new loading bays are shown in Figure 85 to Figure 88.

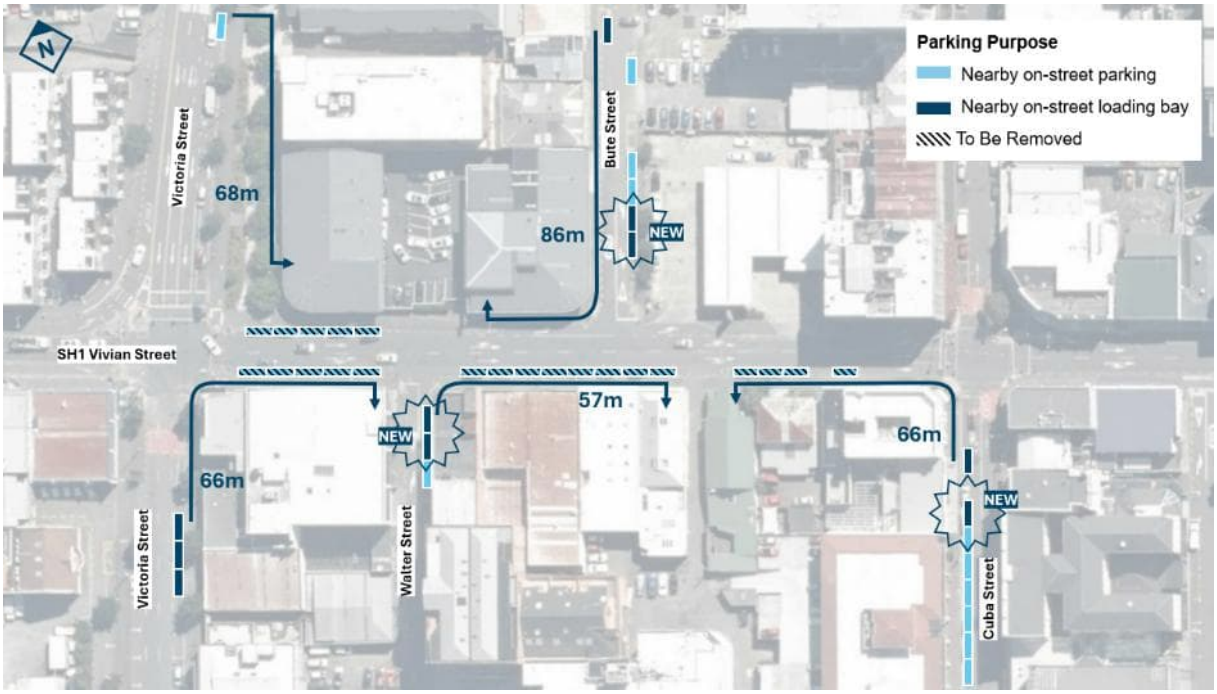


Figure 85 – On-street parking for delivery and goods vehicles (Victoria St to Cuba St)

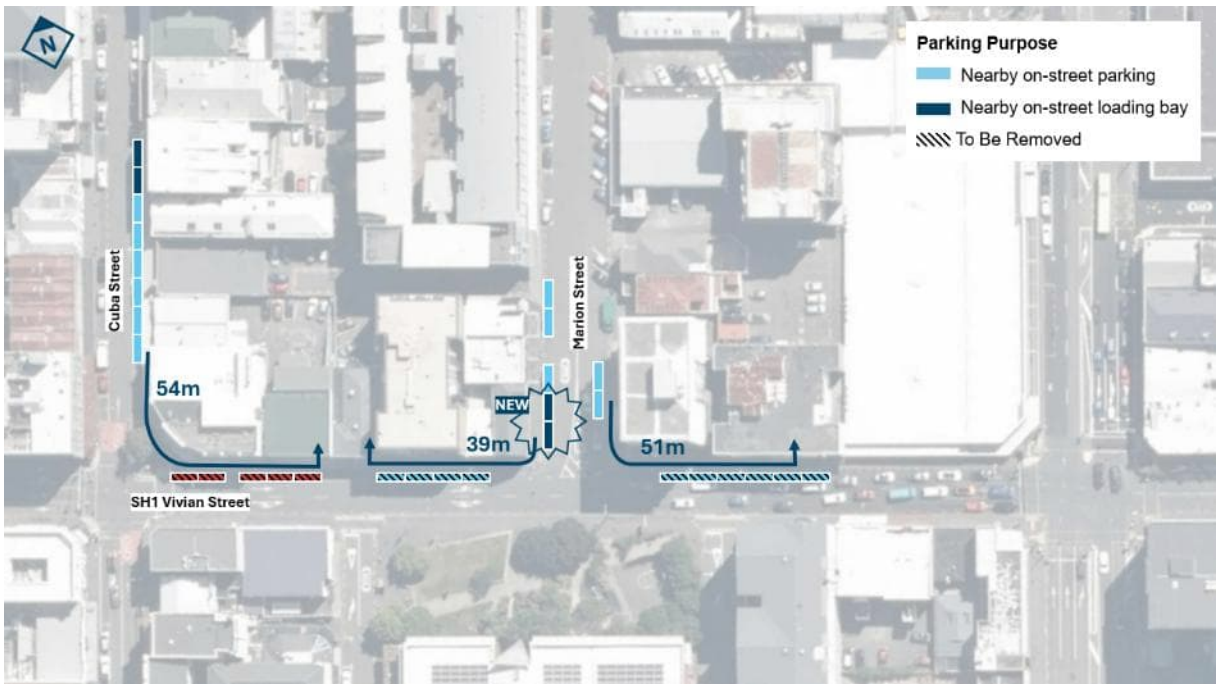


Figure 86 – On-street parking for delivery and goods vehicles (Cuba St and Marion St)

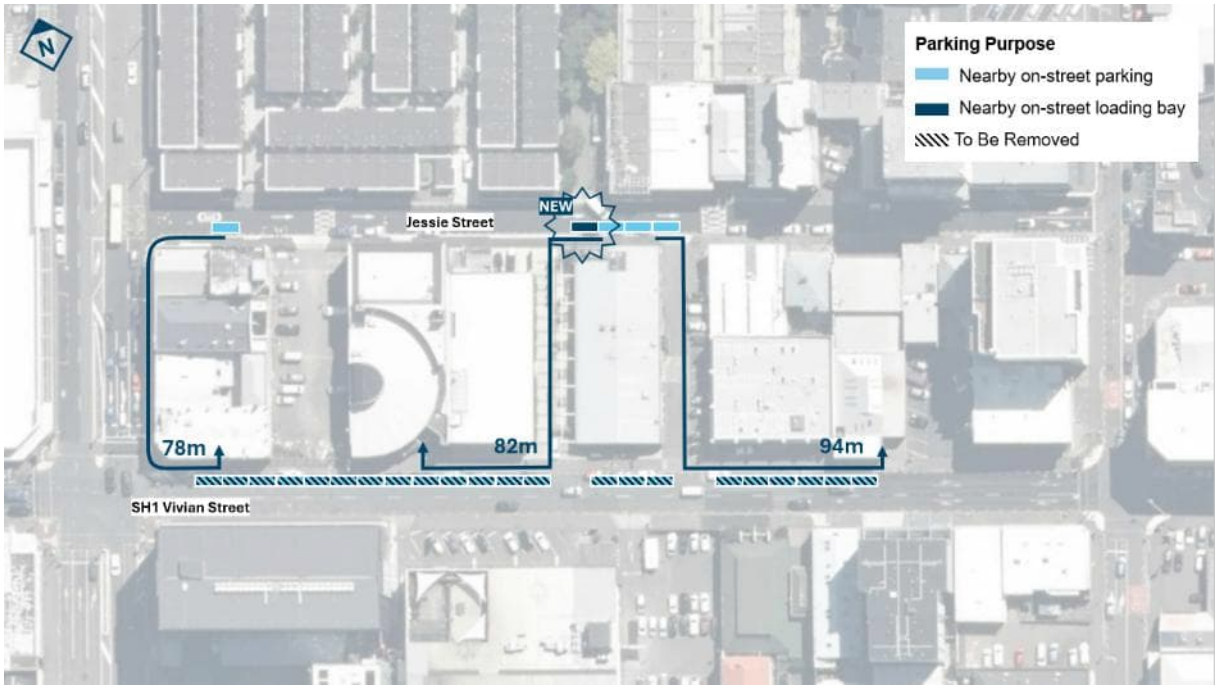


Figure 87 – On-street parking for delivery and goods vehicles (Jessie St)



Figure 88 – On-street loading bays for delivery and goods vehicles (College St)

472. I have considered the parking in the context of potential distance required to walk but note that parking on Vivian Street does not necessarily imply a destination on Vivian Street. Parking on side streets may be closer to the destination, but access to the car park by car may be further. Mindful of the nature of the SH1 Vivian Street corridor and the availability of alternative car parking nearby, I consider this to be a low adverse effect.

473. I consider the availability of loading bays a separate issue. Whilst there are no loading bays on Vivian Street, I have observed the use of parking bays for loading activities. This included large items, that required the use of trolleys to carry into frontage properties. My concern with the loss of parking opportunities for loading purposes is both on the ability for businesses to operate efficiently, and that illegal/informal loading activity occurs and diminishes the effectiveness of the Project.

474. The ability to convert some parking on side streets to loading bays may assist some businesses, although I note that access to the bays on Cuba Street is not possible from Vivian Street directly in the Project.

475. I consider there is a high adverse effect for loading as a result of the Project, and therefore consideration of some form of mitigation is recommended. I have identified above some locations where consideration could be given to providing this on the roads adjoining SH1, whilst appreciating that this is subject to the approval of WCC.

476. Alternatively, I note that there are locations in Wellington where loading bays are provided for use overnight, and this would offer a different form of mitigation that may suit some businesses. I understand that NZTA have some concerns that if a bay is marked on Vivian Street for overnight use, it could 'encourage' illegal use during other times, resulting in restriction to the flow through SH1 Vivian Street.

477. Given that the provision of off peak loading on Vivian Street could be achieved with relatively limited physical works, and there may be some changes in the nature of businesses between now and the implementation, I consider that some period of monitoring of the effects of the Project would be appropriate ahead of any decisions to incorporate off peak loading on the state

highway. This is in order to identify the specific needs, to balance the operational efficiency of the state highway with the needs of frontage business.

478. In my experience, by providing legal loading at off peak times, this gives a workable solution for business and couriers. The alternative if loading is not legal at any time, some element of illegal loading will occur at all times, including the peak periods.

479. Noting that both of the mitigations I have described require either some further distance to access the bays or the frontage premises from the bay, or a restriction in the time of access then I rate the effect as moderate adverse with either of these mitigations in place.

Property access

480. No restrictions or alterations to property accesses are proposed as part of these works. However given the increased number of traffic lanes and narrower lanes, it may become more difficult to turn in and out of some property accesses along SH1 Vivian Street. I consider this to be a **low** adverse effect.

Public transport network

481. Although no public bus services operate along the SH1 corridor, three bus routes cross the corridor at Willis Street, Victoria Street and Taranaki Street junctions. Known public transport issues along these corridors during peak hours, as recognised by the GWRC Draft Bus Priority Action Plan 2025 are shown in Figure 89.

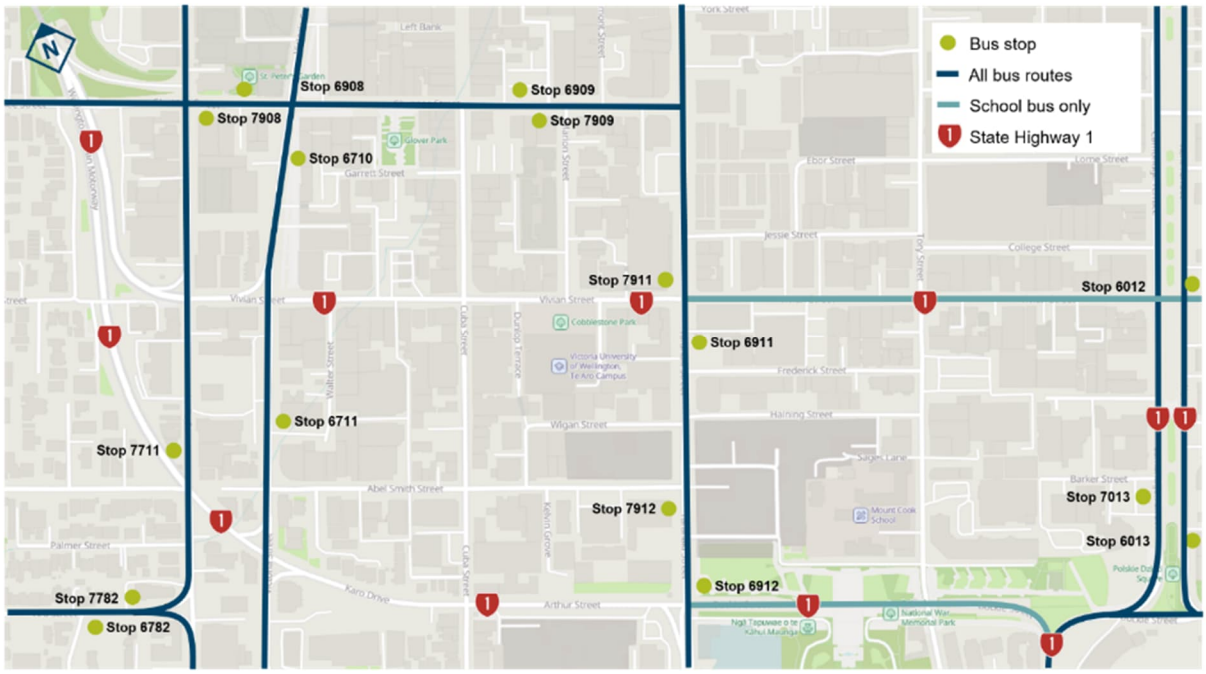


Figure 89 – Known issues along bus corridors within the Te Aro (Vivian Street) section

482. Along Willis Street, Victoria Street and Taranaki Street, buses are currently experiencing delays during the red light phase at the SH1 Vivian Street intersections. During the morning peak, from 8:00 am to 9:00 am, Taranaki Street and Willis Street experience delays of more than 3 minutes, and similarly during the evening peak, from 5pm to 6pm, buses on Victoria Street experience delays of a similar scale.

483. Route 7 travels northbound on Willis Street and southbound on Victoria Street, and Route 3 travels bi-directional on Taranaki Street. The average bus travel times for Route 7 (between

Brooklyn Road at Nairn Street and Willis Street at Lambton Quay) and Route 3 (between Wellington Hospital and Manners Street at Cuba Street) are shown in Table 58.

Table 58: Average bus travel times (minutes)

	Route	Do Minimum (2033)	With Project (2033)	Difference
AM Peak	Route 7	6.1	6.2	+2%
	Route 3	11.5	11.1	-3%
PM Peak	Route 7	8.5	8.2	-4%
	Route 3	12.5	12.8	+2%

484. There is a very minor difference in average bus travel times between the Do Minimum and With Project scenarios which I classify as a negligible effect on the performance of these services.

485. School bus services use the state highway corridor and therefore the added capacity on the corridor will benefit these services through reduced journey times. I consider this to be a moderate benefit accounting for the number of people and limited times of day that the services run.

Active transport network

486. I have assessed that there a number of relevant adverse and positive effects concerning active transport in the Te Aro section to be considered.

487. The removal of traffic turning movements into Cuba Street at the SH1 Vivian Street / Cuba Street intersection and kerb amendments leads to fully protected pedestrian crossings and reduced crossing distances of Cuba Street, which I consider to be a low benefit to pedestrians walking along Vivian Street.

488. The removal of the left turn slip from SH1 into Willis Street and associated zebra crossing at SH1 / Willis Street junction with a longer crossing distance for pedestrians on the west side of the intersection, however the cycle time and number of phases remains consistent with the existing arrangement, therefore I consider this to be a low adverse effect.

489. The proposed design includes retaining the cycle lane on Victoria Street southbound approach to the junction with SH1 Vivian Street which will allow straight ahead movement for cyclists, while the conflicting traffic movement is held. However the design adjusts the southbound traffic lanes to be two through lanes and two left lanes. Noting the existing queues of vehicles extending from the single turning lane during peaks, and the commencement on this cycle lane prior to the flaring of the turn lanes, I consider that cyclists will be able to enter the lane safely, and be less likely to be impeded by turning vehicles which I consider to be a low benefit to cyclists.

490. In preparing this assessment I became aware of investigations that WCC are making into the future provision of a bi-directional cycleway on the western side of Victoria Street. I understand this would remove the need for the on-road cycleway on the eastern side of the carriageway as shown above. I note that at this time there is no confirmation of when or if the proposed scheme would be implemented, but I have noted this for context.

491. However, I understand that the design team of the Project have assessed the intersection performance with the potential future cycle lane and that this results in slightly better intersection performance. As such I have concluded that the Project would not preclude WCC's potential scheme if they chose to progress with this in the future.

492. Along Vivian Street, the removal of on-street parking reduces buffer between the live carriageway and footpaths, which is a potential adverse effect on safety. However, I consider

this effect to be a negligible adverse effect in the context of an urban environment and with the lane widths proposed.

493. The removal of traffic turning movements into Cuba Street at the SH1 Karo Drive / Cuba Street intersection leads to fully protected pedestrian crossings of Cuba Street which I consider to be a low benefit to pedestrians.

494. While cyclists will not be exempt from the turn restrictions along Vivian Street as outlined above, I anticipate the few cyclists using Vivian Street would re-route to quieter parallel side streets that are identified as cycle routes and which then have access to cross Vivian Street and Karo Drive perpendicularly. I note the cycleway along Karo Drive will be retained with the Project.

495. I consider the other elements of the proposed scheme to have no relevant impact on either walking or cycling.

Safety

496. As noted in the earlier crash history review and safety audit, the crashes which resulted in serious injuries through this area all involved vulnerable road users. Without supporting measures such as safe and appropriate speed limits and signal timings, higher speeds due to increased capacity along SH1 Vivian Street could make crashes more likely due to reduced reaction times and increase resulting harm through increased collision speeds.

497. The removed turns at the intersections of SH1 Vivian Street / Cuba Street and SH1 Arthur Street / Cuba Street will increase traffic through the four-way stop junction of Abel Smith Street / Cuba Street due to rerouting traffic and limited alternative routes.

498. Given the increase in capacity for the primary movement through this corridor namely SH1 eastbound traffic, the changes to remove the conflicts with pedestrians are important to mitigate potential adverse safety effects.

499. Overall, I consider the effects on safety are likely to be moderate adverse based on the physical layouts alone. However, I do note that there is the potential to configure the traffic signals along Vivian Street in a manner that keeps operating speed below the posted 50 km/hr and could mitigate these effects whilst maintaining the peak time efficiency and journey time benefits. This was raised in the Safe Systems Audit, and remains an opportunity going forward. My assessment as moderate is to conservatively reflect the uncertainty of the final design.

Summary of effects

500. A summary of the effects that have been rated above negligible, is shown below in Table 59.

Table 59: Summary of effects for the Te Aro section

Category	Effect	Effect rating
Road network	Road users who currently access Cuba Street (south of Vivian Street) via Vivian Street will experience increased journey times as they will now be required to divert via either Victoria Street or Taranaki Street and then use Abel Smith Street to gain access. Alternatively, users will need to turn left into either Victoria Street or Marion Street and then turn onto Ghuznee Street to access Cuba Street and head south.	Moderate adverse effect
Road network	Increase in vehicle traffic on Brougham Street and Elizabeth Street.	Low adverse effect
Road network	Increase in capacity on SH1 Vivian Street without increasing delay for cross movements on the network.	High benefit
Road network	Reduced delay and improved journey times on Arthur Street and Karo Drive.	Low benefit
Parking	The removal of 75 car parking spaces and taxi rank on SH1 Vivian Street.	Low adverse effect
Parking	The loss of ability to undertake loading activities on Vivian Street.	High adverse effect

Category	Effect	Effect rating
Property access	Increased difficulty with turning in and out of property accesses along SH1 Vivian Street due to increased number of traffic lanes and narrower lanes.	Low adverse effect
Public transport network	Reduced journey times for the school bus services using the state highway corridor as a result of the added capacity on the corridor.	Moderate benefit
Active transport network	Fully protected pedestrian crossings and reduced crossing distances as a result of the removal of traffic turning movements into Cuba Street from SH1 Vivian Street.	Low benefit
Active transport network	Increased crossing distance for pedestrians on the west side of the SH1 Vivian Street and Willis Street intersection due to the removal of the left turn slip lane.	Low adverse effect
Active transport network	Dedicated straight ahead movement for cyclists heading southbound at the intersection of SH1 Vivian Street and Victoria Street as a result of the cycle lane introduced.	Low benefit
Active transport network	At the intersection between Cuba Street and Karo Drive, there will be fully protected pedestrian crossings as a result of the removal of turning movements into Cuba Street.	Low benefit
Safety	Increased vulnerable road user crash risk as a result of higher speeds and increased capacity on SH1 Vivian Street.	Moderate adverse effect

Basin Reserve

Road network

501. The Basin Reserve road network is significantly altered under the proposed scheme. The proposals seek to provide separation between state highway traffic and other traffic while providing two through lanes in either direction for the state highway.

502. Key changes are:

    i. Reconfiguration of westbound SH1 traffic to travel around the northern side of the Basin Reserve

    ii. Grade separating SH1 westbound traffic from local north-south traffic; SH1 (Buckle Street) will pass over an extended Sussex Street that ties into Cambridge Terrace south of Barker Street

    iii. Part of Sussex Street will be placed in a trenched section

503. SH1 eastbound retains broadly the existing route.

504. Access to Ellice Street is maintained by way of a left-in left-out arrangement, however vehicles turning out from Ellice Street will only be able to travel towards the Mt Victoria Tunnel, with movements towards Adelaide Road and SH1 northbound being via Kent Terrace. Whilst conditions in the current network would suggest this detour would be congested and therefore add several minutes journey time during peak periods, with the Project, Kent Terrace is forecast to be relatively free flowing. As such, whilst the distance would increase for some journeys, I would anticipate the journey time in peaks to be overall less than current due to the improvements across the Project area, as shown on the Journey Time matrices earlier in this chapter. As such I consider the network changes to be neutral overall in this location.

505. The south-eastern side of the Basin Reserve continues to be used to facilitate school bus stops and school pick-up and drop-off arrangements and access to the existing properties including Government House, although in the reverse direction to present, with access via the Adelaide Road intersection and egress to the north at SH1.

506. The Hania Street access from SH1 will be closed. To access Hania Street, vehicles will have to either continue straight from Vivian Street onto Pirie Street or turn left at the Basin onto Ellice

Street and use Brougham Street and Pirie Street. Vehicles egressing Hania Street will no longer be able to do so from the south, or via Pirie Street given the closure as part of the Te Aro section of works and need to reroute via Elizabeth Street onto Kent Terrace.

507. The changes reduce the degree of conflict between the state highway and local road traffic, which is demonstrated by the reduced journey times shown earlier.

508. I also note that the Basin is a route used for Over-Dimension Vehicles travelling north - south. In this context the vehicles could be over length, width or height, and generally would have travelled from, or be travelling to the port along the waterfront to reach the Basin under some form of escort and often moving overnight. The Project would still allow vehicles that were over width, and over length to travel along the route used by standard traffic between Kent Terrace and Adelaide Street, and Adelaide Street and Cambridge Terrace via the western side of the Basin.

509. However the grade separation means that this route would not be suitable for over-height vehicles. In my experience this is a matter that can, and would be considered at the detailed design stage, where the viability of alternate routes, such as Taranaki Street and Wallace Street, or alternatives such as escorted travel via Dufferin Street if the street furniture (eg traffic lights, signs) were demountable. As such I consider that the effect would be negligible.

510. Finally, I am aware that the current layout of SH1 at the Basin allows for a U-turn movement for all vehicles, but specifically for coaches that have used the layover bay on Kent Terrace. Whilst the Basin no longer operates as a gyratory, the ability to undertake the manoeuvre from Kent Terrace and back to Cambridge Terrace, or towards Arthur Street, is still available, albeit done via an anticlockwise ‘circuit’ of the Basin. I also consider the effect of this would be negligible.

Local access journey times

511. For people living in, or travelling to and from Mt Victoria, the Project removes direct access between SH1 and the local road network at Pirie Street (onto SH1 only) and Hania Street. As a result, traffic currently using these access points will be redistributed through the Mt Victoria local street network. This will require some users to travel slightly longer routes and consolidates traffic onto a smaller number of entry and exit points to SH1, such as Elizabeth Street.

512. For users travelling from Mt Victoria through to the Mt Victoria Tunnel, access to SH1 is retained via Ellice Street, and Aimsun modelling indicated that journey times in the 2033 Option scenario are comparable to, or slightly improved, relative to the 2033 Do Minimum. This assessment is further detailed in Annexure E. Similarly, travel times to Cambridge Terrace and Wakefield Street improve. Therefore, the Project has negligible effect on those accessing the Mt Victoria tunnel and Cambridge Terrace.

513. Users travelling towards Adelaide Road will likely be required to reroute through the local network and will be diverted around the western side of the basin, via the improved Sussex Street, which I expect to result in a concentration of movements at the intersection of Elizabeth Street and Kent Terrace. While this leads to minor increases in delays, the resulting travel time changes are generally limited (up to approximately three minutes), indicating a low adverse effect for these users.

514. For users travelling inbound to Mt Victoria from the Mt Victoria Tunnel, they will now need to travel along Cambridge Terrace and gain access via Elizabeth Street, which slightly increases the length of their route and their travel time, however this is generally limited to approximately two additional minutes. Similarly, travelling from Adelaide Road will require the same diversion

via Cambridge Terrace and Elizabeth Street, with journey times between Adelaide Road and Mt Victoria to increase by approximately three minutes.

515. Travelling from Kent Terrace and Cable Street, access will be the same as the Do Minimum, and the Aimsun modelling indicates the changes in journey time are negligible.

Parking

516. There are currently 43 on-street coupon parking spaces and 10 on-street time restricted parking spaces around the Basin Reserve which will be removed as part of these works. There are no mobility parking spaces or taxi stands affected.

517. Six parking spaces which act as a drop off/pick up zone during school hours and time restricted parking at other times will also be removed as part of the Project. However, an additional 13 drop off/pick up parking spaces which double as restricted parking outside school times will be added on Dufferin Street as part of the Project resulting in a net gain of six spaces.

518. As shown in Figure 91 there are a further 63 on-street coupon parking spaces and 2 on-street time restricted parking spaces within 100 m walking distance from the Basin Reserve. There may also be an additional two parking spaces added on Hania Street as a result of the proposed cul-de-sac.

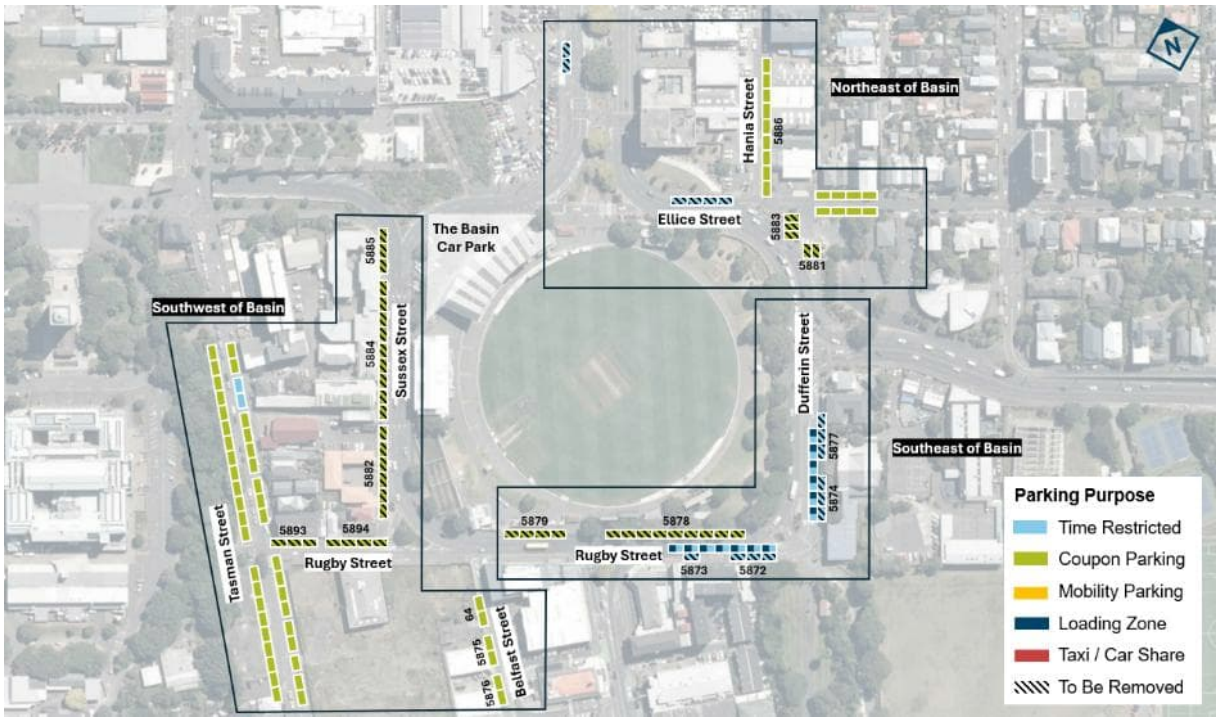


Figure 90 – Proposed parking overview (The Basin)

519. A parking assessment has been undertaken to understand the potential effects of removing on-street parking around the Basin Reserve. Existing parking occupancy around the Basin Reserve was analysed across three time periods (7:00 am - 9:00 am, 12:00 pm - 2:00 pm, and 5:00 pm - 7:00 pm).

520. This data indicates that, demand within the Basin Reserve area is generally moderate, with a consistent proportion of spaces remaining available across all time periods. While some sections experience higher utilisation, particularly on weekends, overall occupancy levels do not suggest that parking is operating under significant stress.

521. During the 7:00 am - 9:00 am period, parking occupancy around the Basin Reserve is generally moderate, with a good proportion of spaces remaining available across all sections. On

weekdays, occupancy ranges from around 20% to 60%, with 40–80% availability retained. Weekend demand is slightly higher, particularly along the southwest of the Basin Reserve (up to 76% occupancy), though availability remains across all sections. The data for the 7:00 am - 9:00 am period is shown Table 60.

Table 60: Basin Reserve Parking Occupancy (7:00 am - 9:00 am)

Section Extents	No. Spaces	Weekday				Weekend			
		Occupied Parks		Available Parks		Occupied Parks		Available Parks	
Northeast of Basin	5	1	20%	4	80%	1	20%	4	80%
Southeast of Basin	17	9	53%	8	47%	7	41%	10	59%
Southwest of Basin	25	15	60%	10	40%	19	76%	6	24%

522. During the 12:00 pm - 2:00 pm period, occupancy levels are relatively low to moderate on weekdays, with most sections retaining over 50% available parking. The northeast of the Basin Reserve remains largely underutilised, with up to 100% availability observed. On weekends, demand increases, particularly in the southwest section, where occupancy reaches approximately 72%, reducing available capacity to around 28%. The data for the 12:00 pm – 2:00 pm period is shown in Table 61.

Table 61: Basin Reserve Parking Occupancy (12:00 pm - 2:00 pm)

Section Extents	No. Spaces	Weekday				Weekend			
		Occupied Parks		Available Parks		Occupied Parks		Available Parks	
Northeast of Basin	5	0	0%	5	100%	1	20%	4	80%
Southeast of Basin	17	7	41%	10	59%	7	41%	10	59%
Southwest of Basin	25	11	44%	14	56%	18	72%	7	28%

523. During the 5:00 pm - 7:00 pm period, parking demand remains moderate across the Basin Reserve area. Weekday occupancy generally ranges between approximately 20% and 47%, with more than half of the parking supply available in most areas. Weekend occupancy increases again along the southwest of the basin (around 72%), though other areas continue to retain reasonable availability. The data for the 5:00 pm - 7:00 pm period is shown in Table 62.

Table 62: Basin Reserve Parking Occupancy (5:00 pm - 7:00 pm)

Section Extents	No. Spaces	Weekday				Weekend			
		Occupied Parks		Available Parks		Occupied Parks		Available Parks	
Northeast of Basin	5	1	20%	4	80%	1	20%	4	80%
Southeast of Basin	17	8	47%	9	53%	9	53%	8	47%
Southwest of Basin	25	11	44%	14	56%	18	72%	7	28%

524. In summary, a reasonable proportion of spaces remain available within the Basin Reserve area, across all time periods. Nearby streets such as Tasman Street provide a substantial amount of additional parking within a short and walkable distance of the Basin Reserve and it is reasonably expected that parking demand will redistribute to these areas.

525. In total there will be a reduction of 73 parks along SH1 and a net reduction of 14 from the local roads surrounding the Basin. This is approximately half of the existing total parking available in this area.

526. In addition, the number of available car parking spaces will be increased as a result of the proposal to remove some of the properties which are likely making use of this on-street parking capacity. Therefore, I consider this to be a low adverse effect.

Property access

527. Pedestrian access to Basin Reserve Cricket Ground will continue to be available to the north and the south from the existing gates. Access to the south will now be facilitated by two shared signalised pedestrian and cyclist crossings giving access to the western and eastern sides of Adelaide Road respectively. I consider this to be a negligible effect compared to the existing arrangements to the south.

528. Pedestrian and cyclist access to the north will be by way of a new signalised pedestrian and cyclist crossing of the westbound SH1 lanes before using crossings to Kent or Cambridge Terraces as existing, or using the central reserve of these terraces. Given the existing crossing point is a zebra crossing with a much lower conflicting traffic movement, I consider this change in access to be a moderate adverse effect of the scheme during normal levels of pedestrian and cyclist activity. I reached this opinion due to the increased volume of conflicting traffic and potential increased wait for the signal controlled crossing phase but partially mitigated by the wide width of the crossing and the added protection pedestrians receive from a signalled crossing.

529. I am aware that for Basin Reserve events there are currently specific arrangements put in place, including the closure of the road where the current zebra crossing is located. And whilst I do not expect that a similar closure would be possible with the Project, the need for that is reduced with the wider crossing and increased space for pedestrians in that location. I anticipate that an alternative event specific plan would be prepared for the future scenario to facilitate the same accessibility to the Basin Reserve. I view this as having negligible effect as the current road layout does not provide access for high pedestrian numbers, requiring temporary traffic management to accommodate that. And so in the future I consider the Project provides somewhat improved capacity for pedestrians, but potentially may still need some degree of event specific traffic and crowd management.

530. Access to the Basin Reserve Cricket Ground car parking will be retained, however the current access and egress points will have to be reversed which may have implications for the internal parking layout. In addition, access to the ground has to be made approaching westbound on the new road to the north of the Basin. Whilst access can be gained from all directions, this in most cases relies on circumnavigating the Basin. On egress a similar circuitous route is needed. Given the relatively low number of vehicles impacted by this, I consider this to be a low adverse effect for Basin vehicular accessibility.

531. A second more minor direct access to the Basin Reserve Cricket Ground for maintenance and other purposes, is currently provided via a vehicle crossover on the southwestern side of the gyratory. The carriageway outside this access will change to two-way under the proposals, with the direction of traffic flow directly adjacent to the access reversed from the existing. I consider that there are negligible effects from the Project for this access.

532. I am aware of a future aspiration that the Basin Reserve Cricket Ground has for improvements in the south-eastern corner of the ground which would need some degree of vehicular access to support broadcasting facilities. I understand that the Project Design Team has engaged with the Basin Reserve Cricket Ground who have stated an intention to utilise an area in the south-east corner for broadcast facilities in the future. I understand that the Project Design Team has considered how access could be provided to this new facility, and the Project does not preclude this. As such I consider the Project will have a negligible effect on access to this future development.

Public transport network

533. Figure 91 shows the priority bus corridors near the Basin Reserve and any relevant identified issues recognised by the GWRC Draft Bus Priority Action Plan 2025.

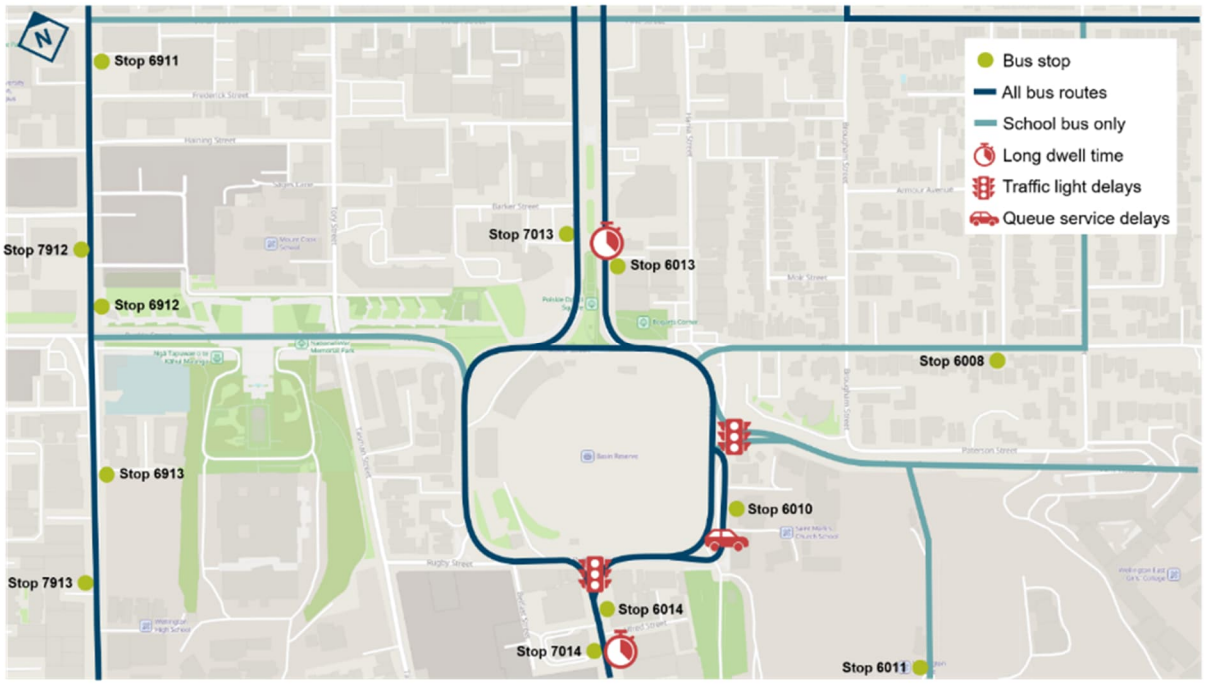


Figure 91 – Known issues along priority bus corridors within the Basin Reserve section

534. In the morning peak, bus stop 7014 experiences long dwell times, meaning buses are stopping for longer than normal period to allow passengers to get on and off, normally indicative as a key interchange or destination. There are also delays at the intersection with Adelaide Road and the SH1 Rugby Street meaning buses are further delayed during the red phase at traffic lights.

535. In the afternoon peak, bus stop 6013 experiences long dwell times. Both the intersection between Adelaide Road and SH1 Rugby Street and the intersection between Dufferin Street and SH1 Paterson Street experience traffic light delays, creating queues and midblock congestion for buses between the two intersections. At this time, passengers are experiencing operating time delays greater than 3 minutes per kilometre.

536. The existing scheduled bus routes which use the Basin Reserve gyratory operate north-south along a Kent and Cambridge Terraces to Adelaide Road axis. These movements will be grade separated from the primary conflicting traffic flow from the westbound state highway and therefore congestion affecting these routes should decrease with an improved journey times and journey time reliability. Therefore, I consider the effect of the proposals for the scheduled bus services to have a high beneficial effect.

537. The provision of school bus stops is increased on the southeastern side of the Basin Reserve with improved stopping and loading arrangements as compared to the existing. While some more circuitous manoeuvres around the Basin Reserve may be required to access these bus stops, given the proposed road layout, they can be accessed from all directions and egress is also possible in all directions, therefore I consider the effect of the proposals for the school bus services to be, on balance, a low positive effect.

Active transport network

538. Improved segregated walking/cycling facilities are proposed throughout this section, upgrading the existing narrow eastern footpath to a shared use path. Where crossing facilities currently

exist, these have been included in the proposal. The consistency of network is improved with additional segregation between pedestrian and cyclist facilities.

539. The quality of the cycling and walking tie-in to Mt Victoria Tunnel approach is improved, with a clear segregated facility provided from Ellice Street through to the Kent and Cambridge Terraces, with priority over the side road junction with Ellice Street. Hania Street vehicle access is closed, however bike access is provided on Hania Street and the segregated facility that traverses the north east corner of the Basin.

540. I now focus specifically on the design of facilities in the south-western corner between Adelaide Road and Vivian Street (via Tasman or Sussex).

541. I note that the current facility serves only northbound cyclists, although observations show southbound cyclists have been seen to use the footpath to do the reverse journey indicating there is currently a desire line in that direction. I consider the desire line to be related to origins and destination unaffected by the project and so unlikely to change in the future. As such, I have considered the effect of the Project with reference to the existing cycle facilities as the baseline.

542. In the southbound direction I understand that the shared path to Adelaide Road will allow a cyclist travelling from Tasman Street to Adelaide Road via the south west corner. This is a modest improvement to serves a currently unmet demand, and therefore has a negligible effect of the Project.

543. The current legally available southbound cycling facilities are via the Basin Reserve Commonwealth Walkway. The Project replicates this movement with negligible adverse effect. I do note there is a permanently available cycle route around the eastern side of the Basin Reserve to be provided by the Project which I expect to be used when the Basin is inaccessible to cyclists due to events which adds resilience to the cycle facilities.

544. In terms of the northbound, at present cyclists are afforded a protected on-road cycleway from Adelaide Road to Rugby Street where it turns into a local road, and then a standard on-road cycle way with a painted flush divider. This cycle lane is relatively narrow, and does not have the width to allow passing. Once at Tasman Street cyclists ride on-road with traffic and no facilities. As such there is only a partial journey route provided albeit noting that Tasman Street is identified as a ‘quiet route’ on the current Wellington City Cycle Map.

545. As shown in the General Arrangement Drawings (Sheet 122) , a shared path provided a connection between Rugby Street and Adelaide Road. The changes are therefore a much longer protected route which offers higher amenity than the current facility which is one-way only. I note that the width of the shared path between Belfast Street and Adelaide Road is narrow at 3.0m, and this has a potential for collisions between cyclists, or cyclists and pedestrians. However, I do not consider this adverse compared to the current environment where due to the one way nature of the facility I have observed cyclists riding on the footpath, and with signing and appropriate detailed design I believe this risk can be substantially mitigated.

546. In weighing up the effect to cyclists, I have also considered that the route through the Basin Reserve provides an alternate route for those that desire a segregated facility, and this connects into the Kent/Cambridge two way cycle facility and from there further cycle network connections.

547. As a result, overall I consider that the effects of the Project on cyclists in relation to this location are moderate benefit noting the current baseline and the changes to the traffic flows after the Project.

548. Overall, I consider the proposals to have a moderate positive effect for active transport.

Safety

549. Vehicles from Adelaide Road northbound entering the Mt Victoria Tunnel would route via Dufferin Street on the southeast of the Basin Reserve. This would bring traffic through an area being used for school pick-ups and drop-offs, as well as where school children are required to cross the road via a zebra crossing to access school bus services.

550. While these activities occur here at present, they are segregated from through traffic by way of a physical barrier. My concern with this is shared by the Safe Systems Audit, and though the direction of traffic flows through this part of the network has been altered and traffic volumes are much lower, I consider it to be a similar concern in scale and effect. I have engaged with the design team in relation to this, and there have been several layout changes incorporated to mitigate this risk, including the positioning of the crossing and separation of drop off areas for school buses and private vehicles.

551. Further to this, I expect that as part of the implementation there would be a reduced or variable low speed zone past the school which would align with treatments in place for other schools locally and nationally, and as such I don't believe this needs a specific recommendation or condition, rather that it would be managed through the detailed design process and engagement with WCC associated with that.

552. The Basin Reserve Cricket Ground hosts regular events and post-event crowds to the north side of Basin Reserve will need to cross the westbound state highway lanes before dispersing across the network, which is a significant change in the road environment immediately outside the northern gate compared to the existing. The capacity of the pedestrian crossing here has been designed to specifically cater for the high demands on event days.

553. However, the current road network layout is complex and is likely to be confusing for road users who are not familiar with the layout, or who are making unfamiliar journeys. Sudden braking and last-minute manoeuvres may result, increasing the crash risk. Whilst these crashes tend to be non-injury or minor, they do contribute to reduced journey time reliability. The proposed layout delivers a more familiar driving environment for most routes, and through the grade separation reduces potential conflicts in general.

554. Overall I consider that the Project will deliver low improvements to the safety of the Basin area across all road users.

Summary of effects

555. A summary of the effects that have been rated above negligible, is shown below in Table 63.

Table 63: Summary of effects for the Basin Reserve section

Category	Effect	Effect rating
Road network	Increased journey times for road users accessing and egressing Hania Street, as a result of the closure of the access from SH1, and from Pirie Street onto Kent Terrace.	Low adverse effect
Parking	Reduced number of available car parking spaces.	Low adverse effect
Property access	Access to the north of the Basin Reserve will be by way of signalised crossing with a much higher conflicting traffic movement than the existing. At peak times, this may be inadequate for the pedestrian demand.	Moderate adverse effect
Property access	Vehicle access to the Basin Reserve car parking from most directions will require travelling additional distance.	Low adverse effect
Public transport network	Existing scheduled bus services that operate north-south will experience less congestion, improved journey times and journey time reliability, as a result of being grade separated from the primary conflicting traffic flow.	High benefit

Category	Effect	Effect rating
Public transport network	Increased provision of school bus stops on the southeastern side of the Basin Reserve with improved stopping and loading arrangements.	Low benefit
Active Transport Network	Consistency of the active transport network will improve with additional segregation between pedestrian and cyclist facilities Quality of the walking and cycling tie-in to Mt Victoria Tunnel is improved.	Moderate benefit
Safety	Simplified layout and grade separation removes conflicts. Increased traffic though Dufferin Street, an area the school uses for pick-up/drop-off due to vehicles from Adelaide Road travelling towards the Mt Victoria Tunnel.	Low benefit

Mt Victoria Tunnel

Road network

556. The key proposed changes to the road network in the Mt Victoria Tunnel section of works are:

    i. The approach from Basin Reserve is reconfigured to accommodate two traffic lanes in either direction

    ii. A second Mt Victoria Tunnel is constructed to accommodate a two-lane eastbound carriageway, thereby removing the two to one lane bottleneck that exists currently

    iii. A wider two way Shared Use Path separated from traffic in the new tunnel

    iv. The existing tunnel is refurbished and reconfigured to accommodate two westbound traffic lanes and remove the current shared use path

    v. The approach from Ruahine Street is reconfigured to accommodate two traffic lanes in either direction

557. The collective changes described above have the result of providing two traffic lanes in either direction through the complete Mt Victoria Tunnel section of works.

558. Paterson Street will reopen following construction as one way eastbound only, restoring full access to Wellington East Girls' College. Therefore, I consider there to be no effect.

Parking

559. There are currently 22 on-street parking spaces on Paterson Street, all of which will be removed as part of the scheme. There are also 10 parking spaces on Austin Street and 16 parking spaces on Brougham Street, two and four will be removed from these locations respectively. Figure 92 shows the on-street parking context for Paterson Street and surroundings.



Figure 92 – Paterson Street parking changes

560. Mindful of the above, I consider these changes to be a **negligible** effect.

Property access

561. Following the completion of works and the restoration of Paterson Street in a new one-way format, access to Wellington East Girls' College will be as existing. Therefore I consider there to be no effect.

Public transport network

562. At present no scheduled bus services, other than school bus services use Mt Victoria Tunnel. Given the significant increase in available capacity through the tunnel and the anticipated resultant impact on journey times, it is likely that these bus services will have reduced journey times and I consider this to be a moderate positive effect.

563. School bus services associated with Wellington East Girls' College will continue to use the existing school bus stops, however given the changes to access from Ellice Street into the Basin Reserve, there will be implications for how buses serve both Wellington East Girls' College bus stops and Wellington College bus stops in both directions. This will increase some school bus journey times and I consider this to be a low adverse effect.

Active transport network

564. The new tunnel includes a 3.6m wide shared path for pedestrians and cyclists, isolated from the vehicular lanes and tied into upgraded active mode facilities at either end. This is a significant upgrade on the existing provision given the improvement in space available and separation from the vehicle lanes leading to an improvement in both noise and air pollution levels. Therefore, I consider this to be a **high** positive effect.

Safety

565. Given the proposed changes to the road network here involve fully separating westbound and eastbound traffic onto separate carriageways, I expect overall safety to improve with the elimination of head on collision risks.

566. The provision of a wider shared path through the tunnel compared to the existing should reduce conflict between cyclists and pedestrians, as should the improved connections from the tunnel into the wider active transport networks. I have assumed appropriate cycle speeds through the tunnel, which may require monitoring and management.

567. Noting the relatively low incidence of recorded crashes over the preceding five years, I have considered this to be of a **low** benefit.

Flows outside schools

568. Traffic flows on Elizabeth Street show a clear directional shift, with substantial increases in westbound movements and corresponding reductions in eastbound flows during both the AM (8-9am) and PM (5-6pm) peak periods. The increase in westbound demand is consistent with changes to network access, as vehicles are no longer able to turn out of Pirie Street and Hania Street and are likely diverting to Elizabeth Street instead.

Table 64: Summary of flow changes outside schools during peak periods (Mt Victoria Tunnel)

School	Road	AM Peak		PM Peak	
		Westbound	Eastbound	Westbound	Eastbound
Clyde Quay School	Elizabeth Street	**+213%** +168 veh	**-82%** -47 veh	**+118%** +200 veh	**-48%** -154 veh

Summary of effects

569. A summary of the effects that have been rated above negligible, is shown below in Table 65.

Table 65: Summary of effects for the Mt Victoria Tunnel section

Category	Effect	Effect rating
Public transport network	Reduced journey times for school buses through the Mt Victoria Tunnel, as a result of the increased capacity through the tunnel.	Moderate benefit
Public transport network	Increased school bus journey times for Wellington East Girls' College and Wellington College, as a result of changes to access from Ellice Street into the Basin Reserve and implications for serving the bus stops.	Low adverse effect
Active transport network	Significant upgrade on existing provision, with an improvement in both noise and air pollution levels, as a result of the new shared path through the tunnel, which is isolated from the vehicular lanes.	High benefit
Safety	Elimination of head-on collision risks, as a result of separating westbound and eastbound traffic. Reduction of conflict between cyclists and pedestrians with the provision of the wider shared path through the tunnel, as well as improved connections into the wider active transport networks.	Low benefit

Eastern Connections

Road network

570. Ruahine Street and Wellington Road are to be reconfigured as dual carriageways with a minimum of two lanes in both directions for the entire Project extents. A separated service lane is also provided from Moxham Avenue, parallel to Wellington Road to maintain property access, including a connection with Walkers Street.

571. The key proposed changes to the road network at the SH1 Ruahine Street / Taurima Street intersection are:

i. The existing junction of Ruahine Street and Taurima Street will be reconfigured to allow eastbound traffic only[33], with road users from Hataitai westbound routing via the new Hataitai Connection bridge and northbound onramp to Ruahine Street

ii. Vehicles who currently use the left turn exit to travel towards the airport or Newtown will now use the Hamilton Road and Wellington Road intersection via Moxham Avenue and Kupe Street.

572. Additionally, while the Hamilton Road and Wellington Road intersection provides a suitable alternative for vehicles travelling towards the airport, this intersection does not provide a right-turn movement back onto SH1 Wellington Road for vehicles wanting to travel towards Newtown. As a result, vehicles making this movement will need to continue straight through the intersection and reroute via the local road network to access Newtown, with some people likely to divert via Kilbirnie Town Centre or use residential streets such as Duncan Terrace or Childers Terrace to connect to Crawford Road. This will redistribute traffic onto intersections and routes that do not currently experience higher traffic volumes and are more residential in nature. This change therefore contributes to a low adverse effect, particularly for residential streets accommodating this redistributed traffic.

573. A new one-way service lane is proposed south of Tapiri Street, extending westbound from Moxham Avenue and running parallel to Ruahine Street, connecting with Goa Street. I have considered how vehicles accessing adjacent driveways from the service lane may affect the northbound cycleway. Vehicle tracking indicates that some movements will encroach into the cycleway when vehicles are entering or exiting driveways. However, given the low-speed nature of these manoeuvres and the good visibility available, I consider the safety risk to cyclists to be low. Targeted mitigation measures such as signage can support safe operation by alerting cyclists that they are leaving a protected environment and reminding drivers to check for cyclists when crossing the cycleway.

574. The key proposed changes to the road network at the SH1 Ruahine Street / Goa Street / Hataitai Park intersection are:

i. Goa Street at the existing SH1 intersection is to be reconfigured as a cul-de-sac. Vehicles which currently use this intersection to travel through into Hataitai Park or right towards the city centre will now use the new Hataitai Connection overbridge provided to the south

ii. Vehicles who currently use the left-hand turn to travel towards the airport will now use the Hamilton Road and Wellington Road intersection via Kupe Street

575. These proposed changes to the road network will improve the ease of vehicular access between Hataitai Park and Hataitai, and merging onto SH1 Ruahine Street northbound will be a considerably easier manoeuvre than the current arrangement of right turns from Taurima Street towards the Mt Victoria Tunnel. Therefore, I consider this to be a moderate positive effect.

576. The key proposed changes to the road network at the proposed grade separated SH1 Ruahine Street / Hataitai Park overbridge and interchange are:

i. Hataitai Park Access at the existing SH1 intersection is to be reconfigured further south and away from the state highway

[33] Thereby removing the difficult and potentially unsafe right turn from Taurima St towards the Mt Victoria Tunnel.

ii. Access from Moxham Avenue will be provided from the new Hataitai Connection bridge and access from the SH1 northbound carriageway will be from a slip lane both off and onto the SH

iii. Vehicles will no longer be able to turn right into the Hataitai Park Access from the SH1 Ruahine Street southbound and will most likely be required to exit from SH1 onto Taurima Street and access the park via Moxham Avenue and the grade separated interchange

577. The key proposed changes to the road network at the SH1 Ruahine Street / Wellington Road intersection are:

i. Left-in left-out movements only to and from Newtown via Constable Street

578. This removes the difficult and potentially unsafe right turns, noting that emergency services will be able to make a right turn during emergencies. Other road users using this route from Newtown to go eastbound towards the airport will need to reroute either via the Mt Victoria Tunnel or via Kilbirnie or via the new overbridge and then Kupe Street and back onto Wellington Road. I expect given the local road network the majority will travel via Kilbirnie and that is what the transport model shows. As well as requiring road users travelling from Hataitai to Newtown, who currently turn right from the state highway into this junction to reroute via Kilbirnie. These routes are shown in Figure 93. Given the impact on journey times for these road uses, I consider this to be a moderate adverse effect.

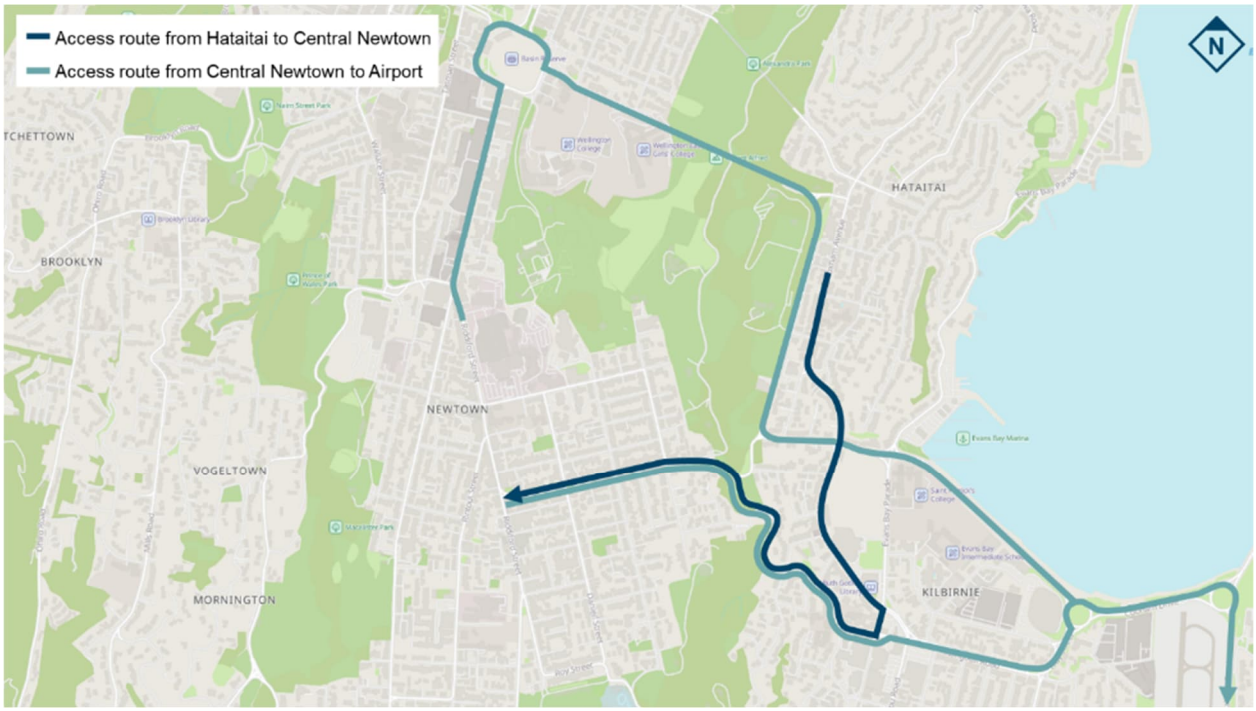


Figure 93 – Alternative routes between Hataitai, Newtown, and the airport

579. The key proposed changes to the road network at the SH1 Wellington Road / Hamilton Road / Kilbirnie Crescent intersection are:

i. Three approach lanes for SH1 Wellington Road eastbound

ii. All the right-turn movements at the intersection will be removed

iii. The existing give way left-turn slips at Kilbirnie Crescent will be removed with the movements integrated into the traffic signals operation

580. Road users who currently use this junction to turn right from Wellington Road towards Hataitai will most likely use the grade separate junction instead, with road users who currently use this junction to turn right from SH1 towards Kilbirnie will be expected to use the SH1 Wellington Road / Evans Bay Parade intersection to turn right instead, where the capacity of the right turn movement is to be increased.

581. The key proposed changes to the road network at the SH1 Wellington Road / Evans Bay Parade intersection are:

    i. An additional right-turn lane from SH1 Wellington Road eastbound into Evans Bay Parade south. This will be to accommodate the additional right-turn volumes where movements at other junctions have been restricted

    ii. Two of the three existing left-turn give-way slips will be removed; one to accommodate a frontage road to the north and another to accommodate the one-way service lane and contra flow bike lane. The remaining slip lane on Evans Bay Parade will be signalised which will allow signal-controlled pedestrian crossings

    iii. Right turns from Evans Bay onto SH1 will be removed

582. While this intersection will be used to accommodate right-turn volumes where movements at other junctions have been restricted and will maintain through capacity for the state highway, the removal of right-turn movements from the north via Evans Bay Parade onto SH1 will result in a localised loss of access. I note that the right turn from the north via Evans Bay Parade is currently a low demand and therefore this will effect only a small number of people.

583. Vehicles approaching from the northern leg of Evans Bay Parade will need to continue through the intersection and loop back to SH1 via Kilbirnie Crescent or potentially undertake U-turn manoeuvres on the southern leg of Evans Bay Parade to access SH1. This introduces a risk, and I consider this to have a low adverse effect.

584. From the south traffic would detour via Rongatai Road which would have a negligible effect on their journey.

Local access journey times

585. For movements through Kilbirnie via the local road network, the Project is expected to shift a greater proportion of this existing traffic onto SH1, reducing reliance on local streets for these movements. However, changes to access restrictions, such as removing the right-turn movement out of Hamilton Road, will result in additional traffic entering and circulating within Kilbirnie that were not previously present.

586. While there is some redistribution of traffic within the local network, when comparing the Aimsun 2033 Do Minimum and 2033 Option scenario, journey times through Kilbirnie remain broadly consistent. In some instances, as shown in Table 66, there are minor improvements, particularly when heading northbound on Crawford Road, and some instances there are small increases in delay associated with localised rerouting.

587. Further detail on this assessment, including details of the routes detailed are provided in Annexure E. These changes reflect a redistribution of traffic, which the local network continues to accommodate. Based on the evidence from the modelling, I consider that the effects are overall positive. Where there are specific routes with an increased journey time, these are of scale to result in a low adverse effect.

Table 66: Local access journey times differences through Kilbirnie

Peak	Direction	Location	Mode	Do Minimum JT (minutes)	Option JT (minutes)	Difference (minutes)
AM Peak	NB	Kilbirnie Village	Car	5.4	4.4	-1.0
			Bus	6.7	5.1	-1.6
		Crawford Road	Car	9.3	1.5	-7.8
			Bus	11.7	3.2	-8.5
	SB	Crawford Road	Car	2.0	2.2	+0.2
			Bus	3.4	2.9	-0.5
		Kilbirnie Village	Car	3.2	3.3	+0.1
			Bus	4.7	4.0	-0.7
PM Peak	NB	Kilbirnie Village	Car	4.5	3.8	-0.7
			Bus	6	4.4	-1.6
		Crawford Road	Car	6.2	1.2	-5
			Bus	8.3	2.3	-6
	SB	Crawford Road	Car	2.7	2.3	-0.4
			Bus	4.2	4.1	-0.1
		Kilbirnie Village	Car	3.6	4.0	+0.4
			Bus	5.4	6.2	+0.8

Parking

588. Figure 94 to Figure 97 shows the parking spaces that are removed, retained and gained as a result of this section of works. It also notes the existing available parking spaces within a 100 m walk.

589. There are currently 12 on-street time restricted parking spaces and five on-street unrestricted parking spaces on Taurima Street, all of which will be removed as part of this section of works. There are no mobility parking spaces affected, nor are there any loading bays affected. Vehicles who currently use these parking spaces will be required to use the existing parking spaces available within a 100 m walk on Moxham Avenue and Waitoa Road. I consider this parking loss to have a low adverse effect on the parking environment.



Figure 94 – Eastern Connections parking overview (Waitoa Road to Tapiri Street)

590. There are currently 32 on-street unrestricted parking spaces on SH1 Ruahine Street, all of which will be removed as part of this section of works. The proposed service lane will also remove a further one park near #74 Moxham Avenue. It is noted the visitor parking area on the new service lane will provide an additional six spaces which can be utilised by the nearby properties, bringing the net loss to 26. There are no mobility parking spaces affected, nor are there any loading bays affected.

591. While I note that Park Mews residents use the carparking on SH1 Ruahine Street, I am mindful of the nature of the corridor and the availability of 43 alternative car parks nearby on Moxham Avenue and Tapiri Street. I therefore consider this parking loss to have a low adverse effect.



Figure 95 – Eastern Connections parking overview (Tapiri Street to pedestrian crossing)

592. I note that WCC and GWRC's proposal to relocate the bus stops are proposed to occur independently and ahead of the Project. The changes are compatible with the Project, and whilst there are some reductions in parking spaces associated with the works, these are not an effect of the Project.

593. Due to the proposed new Hataitai Connection bridge connecting Moxham Avenue to SH1 Ruahine Street, 17 of the on-street unrestricted car parking spaces on Moxham Avenue will be removed. There are no mobility parking spaces or loading bays affected by these works. Because of the removal of residential housing at this location, and the ample car parking spaces available within a 100 m walk, I consider these changes to result in a negligible adverse effect.

594. Due to the proposed kerb build outs on the corner of Goa Street and Moxham Avenue, one on-street time restricted parking space and one on-street unrestricted parking space will be removed. Because of the additional parking spaces added on Moxham Avenue, and the eight existing parking spaces on Goa Street, I consider this to be a negligible adverse effect.



Figure 96 – Eastern Connections parking overview (pedestrian crossing to Kupe Street)

595. There are currently 24 on-street unrestricted car parking spaces on SH1 Wellington Road, all of which will be removed as part of this section of works. Due to the location and size of the proposed slip lanes and the potential for further parking to be added if needed, I consider the loss of these car parking spaces to have a low adverse effect.

596. Due to the intersection upgrades on Evans Bay Parade and Kilbirnie Crescent, fifteen of the car parking spaces on Evans Bay Parade (south of SH1 Wellington Road) and one of the car parking spaces on Kilbirnie Crescent will be removed. Whilst there are a large number of car parking spaces available within a 100 m walk, there are also several key destinations that attract significant parking at certain times. And so on balance I consider this to be a low adverse effect.



Figure 97 – Eastern Connections parking overview (Moxham Avenue to Evans Bay Parade)

597. There are currently 41 car parking spaces within the south-eastern Kilbirnie Park car park. After the reconfiguration of this car park the total spaces available will be 29, making the net car parking loss 12 car parking spaces. There are no mobility parking spaces affected, nor are there any loading bays affected. It is noted that this is just one of many car parking facilities within Hataitai Park, so I consider this to be a negligible adverse effect.

598. There are 17 parking bays on the northern kerb of SH1 Wellington Road between Hamilton Road and Evans Bay Parade. These bays will be removed by the Project and a service lane will provide access to private off road parking/garages. No parking will be available on the service lane with the narrow width not allowing for this to be accommodated. Whilst all of the frontage properties in this location do have some parking, I note that the on-road parking is generally well used through some combination of amenity or lack of capacity off-street.

599. I have assumed that for those visitors or residents seeking alternate on-street parking, Evans Bay Parade would be the most logical location. That would result in a walk of up to 250m between the parking and the properties closest to Hamilton Road. As such I consider that this would be a low adverse effect, noting the availability of private off-street parking.

Property access

600. Direct property access onto SH1 from properties throughout the Eastern Connections section will be removed by way of new service roads connecting to the local road network, or by removal of the relevant properties.

601. I have considered the access road for the properties between Hamilton Road and Evans Bay Parade. Access is only available from Hamilton Road, which as I discussed cannot be directly accessed by traffic approaching from the Airport/Miramar. On exit for the majority of the properties egress is only possible onto Evans Bay Parade turning left, and therefore not allowing access to the Airport/Miramar or Kilbirnie without a U-turn.

602. Whilst limited to 12 properties, I consider the effect of this to be moderate adverse. I am also mindful of the combined impact of the parking effect in combination with the access changes in reaching this rating.

603. For the remaining properties, those west of Hamilton Road, given the comparative ease of egressing onto a service road compared to egressing onto SH1, I consider this to be negligible effect when I balance the ease of access to the road against the potential detour required.

Public transport network

604. Figure 98 shows the priority bus corridors within the Eastern Connections section and the relevant identified issues recognised by the GWRC Draft Bus Priority Action Plan 2025.

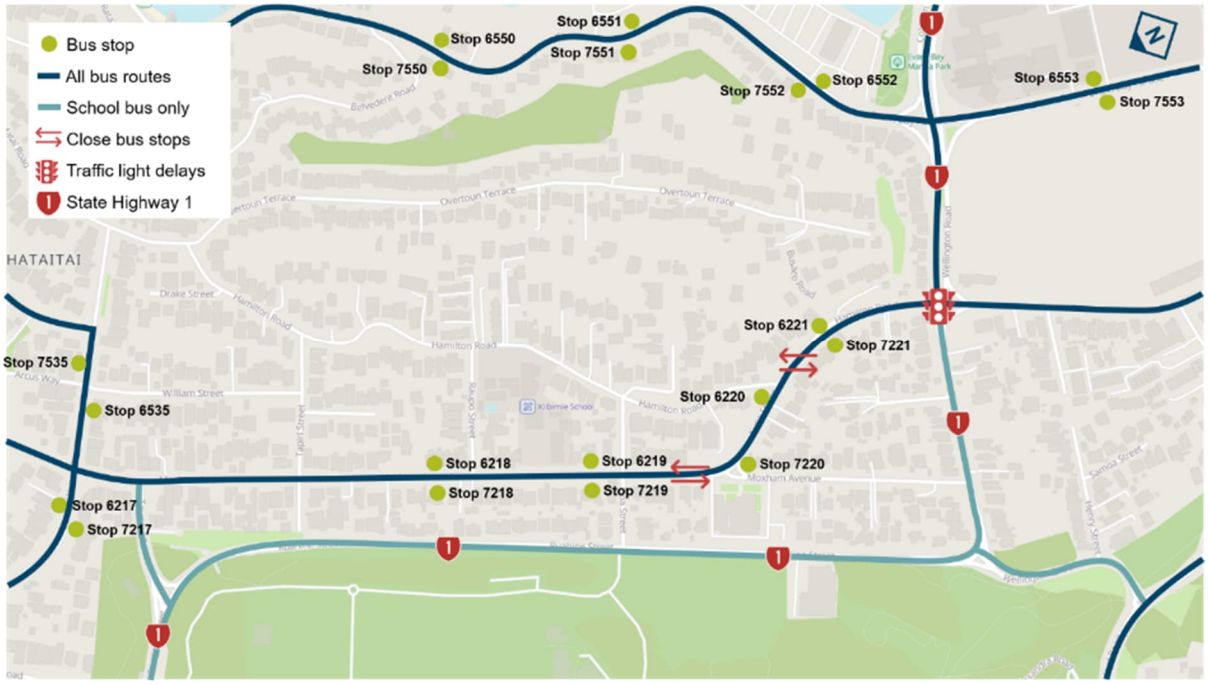


Figure 98 – Known issues along bus corridors within the Eastern Connections section

605. In both the morning peak and the evening peak buses are being delayed at the traffic signals at the intersection of Hamilton Road and SH1 Wellington Road. In the evening peak, buses are experiencing congestion at Bus Stop 6221.

606. The changes to the road network in this area will have the effect of making Moxham Avenue busier, however as noted below travel times are expected to significantly improve in the AM peak and negligible change is expected in the PM peak. I therefore consider the Project to have no adverse effects on bus travel times.

607. The Project does remove the ability to turn right from SH1 into Hamilton Road (leading to Moxham Avenue). This results in some express services needing to detour via Kilbirnie and then enter Hamilton Rad as an ahead movement from Kilbirnie Crescent. I discussed this when I presented the impact on bus travel times earlier in this chapter. I also note that the Project will change the access route for some school bus services, however I consider that these changes will have a negligible effect given the alternate routes are similar distance and will have reduced delays for the part of the journey undertaken on SH1.

Active transport network

608. This section includes a replacement pedestrian/cycling bridge to Hataitai Park and a new connection for pedestrians and cyclists to the park by way of the new Hataitai Connection bridge. The overbridge also provides access to a footpath on the westside of Ruahine Street to provide a connection towards Crawford Street and Newtown. Cyclists are also provided for within the service lane on the north side of SH1 Wellington Road. Given the safety and convenience benefits, I consider this to be a moderate positive effect.

609. The Project fills a missing link in Wellington's active mode network, connecting Mt Victoria with the Evans Bay Parade and Cobham Drive shared path facilities. This connection will provide a continuous active mode facility from the Mt Victoria Tunnel to Miramar. In my opinion this is a considerable improvement on the existing provision with network level implications and is therefore a high positive effect.

Safety

610. The median separation of SH1 through this section should reduce the potential for head-on collisions, improving the safety of the state highway, furthermore, removing the right turn from Hataitai into Mt Victoria Tunnel, and reducing the number of right turn movements throughout this section will reduce the likelihood of associated crashes. As noted in the earlier chapter, several intersections in this section have had a high rate of crashes over the last five years, including Taurima Street, Goa Street and Wellington Road (with Ruahine Street).

611. The requirement to re-route and use the local road network to complete some of these journeys may come with some increased safety risk on these roads, offsetting these benefits to a degree.

612. The grade separation of the access to Hataitai Park, the closure of the badminton centre access and the removal of on-street parking on SH1 Ruahine Street will also improve safety. In this location the Safe Systems Audit has yet to be undertaken and so I have based my assessment on my view of the Project with the expectation of detailed input into the design focussed on identifying and addressing safety concerns, as would be the normal process.

613. The improved pedestrian and cyclist facilities through this section will improve safety for these road users, however this may be slightly offset by the potential interaction with vehicles on the frontage roads provided.

614. As I note above there is an increase in traffic on Moxham Avenue, and specifically in the section adjacent to Kilbirnie School. I note that the Project includes works on Moxham Avenue which will improve safety for all modes, but particularly pedestrians with narrower crossings at intersections and more clearly marked crossing at the school. Cyclists will benefit from the shared use path on Ruahine / Wellington as an alternative route to Moxham Avenue along with changes at intersections on Moxham to remove potential ‘pinch’ points when cars attempt to overtake as a cyclist approaches cars parked on the exit from the intersection.

615. A new shared path is also proposed adjacent to the new overbridge that will connect Moxham Avenue and the Ruahine Street shared path.

616. I consider that these measures, along with the intersection modifications at Goa Street and Kupe Street will mitigate the effects of the increased flows.

617. Overall I consider that the changes lead to a high benefit with respect to safety as a result of the historic records and the removal of several key conflict points.

Flows outside schools

618. Traffic flows on Evans Bay Parade show increases during the AM peak in both directions, particularly in the southbound direction. The increase in southbound demand across both peak periods is consistent with network constraints at the SH1 intersection, where vehicles travelling south are unable to turn right and are likely redistributed along this route. During the AM peak, the increase in northbound flows likely reflects greater demand for access to SH1.

619. Crawford Road exhibits consistent reductions in traffic flows in both directions during the AM and PM peaks. The most substantial decreases occur in the AM peak, particularly in the southbound direction, while smaller reductions are evident in the PM period. These patterns suggest a general decline in demand along Crawford Road, which is likely attributed to traffic rerouting to SH1.

620. Traffic flows on Moxham Avenue show a clear directional shift, with increased southbound movements and reduced northbound flows in both peak periods. The increase in southbound traffic is consistent with vehicles travelling toward the Hataitai Connection Bridge to get onto SH1, indicating a redistribution of demand toward this strategic connection. Conversely, the

reduction in northbound flows likely reflects vehicles diverting onto the bridge and SH1 before reaching the school corridor.

Table 67: Summary of flow changes outside schools (Eastern Connections)

School	Road	AM Peak		PM Peak	
		Northbound	Southbound	Northbound	Southbound
St Patrick;s College / Evans Bay Intermediate	Evans Bay Parade	**+143%** +60 veh	**+102%** +122 veh	**-22%** -26 veh	**+237%** +280 veh
St. Patrick's Primary	Crawford Road	**-15%** -86 veh	**-45%** -408 veh	**-5%** -22 veh	**-5%** -31 veh
St. Catherine's College	Crawford Road	**-15%** -86 veh	**-45%** -408 veh	**-5%** -22 veh	**-5%** -31 veh
Kilbirnie School	Moxham Avenue	**-18%** -28 veh	**+4%** +18 veh	**-25%** -46 veh	**+71%** +225 veh

Summary of effects

621. A summary of the effects that have been rated above negligible, is shown below in Table 68.

Table 68: Summary of effects for the Eastern Connections section

Category	Effect	Effect rating
Road network	Redistribution of traffic onto intersections and routes that are more residential in nature, as a result of right-turn restrictions at the Hamilton Road / SH1 Wellington Road intersection.	Low adverse effect
Road network	Improved vehicular access to Hataitai Park from Hataitai, and merging onto SH1 Ruahine Street northbound will be a considerable easier manoeuvre, as a result of the upgrades proposed at the SH1 Ruahine Street / Goa Street / Hataitai Park intersection.	Moderate benefit
Road network	Increase in journey times for travelling from Newtown to the airport or those travelling from Hataitai to Newtown, as a result of the left-in left-out movements to and from Newtown via Constable Street.	Moderate adverse effect
Road network	Introduced risk from increased U-turn movements on Evans Bay Parade, as a result of right-turn restrictions at the Evans Bay Parade / SH1 intersection.	Low adverse effect
Road network	Increased journey time through Kilbirnie, as a result of localised rerouting.	Low adverse effect
Parking	Loss of 12 car parking spaces on Taurima Street	Low adverse effect
Parking	Net loss of 26 car parking spaces on SH1 Ruahine Street	Low adverse effect
Parking	Loss of 24 car parking spaces on SH1 Wellington Road	Low adverse effect
Parking	Loss of 17 car parking spaces on Moxham Avenue	Low adverse effect
Property Access	Service lane access between Hamilton Road and Evans Bay Parade	Moderate adverse effect
Active transport effect	Increased safety and convenience benefits, as a result of the replacement pedestrian/cycling bridge to Hataitai Park, and a new connection for pedestrians and cyclists to the park by way of new grade separated junction to the south of Goa Street.	Moderate benefit
Active transport effect	Enhanced active transport provision from Mt Victoria Tunnel towards the airport.	High benefit
Safety	Reduced risk of head on and right-turn collisions with the introduction of the median separation on SH1 Ruahine Street. Increased safety from the grade separation of access to Hataitai Park, closure of the badminton centre, and removal of on-street parking on Sh1 Ruahine Street. Increased safety for pedestrians and cyclists.	High benefit

Tolled Scenario

Introduction

622. NZTA has been asked to investigate tolling as a potential user pays funding source for the Project. While no decision to implement has yet been made, this alternative operating state has the potential to change traffic patterns and therefore effects of the Project. In this section of my assessment I cover an alternative Project scenario where there is tolling the state highway, compared to the same Do Minimum scenario above, without tolling. I note that the Project I have assessed is identical in form to that in the Project Option above, with the only change being the assessment of transport impacts of toll charges for vehicles driving through Terrace Tunnel and / or Mt Victoria Tunnel.

623. As described in Annexure C, it is my opinion that the assessed tolled and un-tolled scenarios represent the bounds of the extent to which tolling, or other charging approaches would influence the transport network associated with the Project, and therefore the effects of the Project. The annexure also contains full details of the flows, travel times and other related data that corresponds to that shown earlier on this chapter, but for the tolled scenario.

Traffic volumes

624. Generally, SH1 daily traffic volumes are expected to increase due to the increased route capacity and travel time improvements provided by the Project, although this increase is tempered by application of tolling. While flows on SH1 under the tolled scenario are generally higher than the Do Minimum, they are not as high as the un-tolled Project Option described previously.

625. I consider overall, the daily flow data presented demonstrates that there is a High benefit for efficiency of SH1 and the local road network during the AM and PM peaks, and further for the safety of the local road network for the tolled scenario compared to the Do-min as a result in the reduction in the HCV flows on the local road network.

Travel times

626. The tolled option improves travel times on SH1, with journey time savings of up to nine minutes on key routes. However, as shown in Table 69 and Table 70 below, journey times on some local roads increase slightly, particularly for the PM peak where the journey time increases by up to 3 minutes (12%). These increases reflect higher traffic volumes on local roads as some trips divert from SH1. The largest impacts occur on routes to Post Office Square via Harbour Quays, where the introduction of bus lanes reduces general traffic capacity and contributes to longer travel times. Details of these are shown in Annexure C.

Table 69: AM and PM journey time savings for 2033

Route	2033 Journey Time (minutes)					
	AM peak			PM peak		
	Do Minimum	With Project (Non-Tolled)	With Project (Tolled)	Do Minimum	With Project (Non-Tolled)	With Project (Tolled)
Airport to Johnsonville (via SH1)	32	-6	-8	41	-7	-8
Johnsonville to Airport (via SH1)	48	-5	-9	41	-6	-9
Airport to Johnsonville (via Bays)	40	-7	-6	52	-4	-3
Johnsonville to Airport (via Bays)	48	-4	-5	43	-3	-4

Route	2033 Journey Time (minutes)					
	AM peak			PM peak		
	Do Minimum	With Project (Non-Tolled)	With Project (Tolled)	Do Minimum	With Project (Non-Tolled)	With Project (Tolled)
Post Office Square to Johnsonville	12	0	0	25	0	2
Johnsonville to Post Office Square	28	-1	2	16	-1	3
Post Office Square to Airport (via SH1)	20	-3	-2	26	-2	-2
Airport to Post Office Square (via SH1)	28	-6	-2	27	-4	0
Post Office Square to Airport (via Bays)	20	-1	0	26	-2	1
Airport to Post Office Square (via Bays)	26	-2	1	24	2	3

Table 70: AM and PM journey time savings for 2053

Route	2053 Journey Time (minutes)					
	AM peak			PM peak		
	Do Minimum	With Project (Non-Tolled)	With Project (Tolled)	Do Minimum	With Project (Non-Tolled)	With Project (Tolled)
Airport to Johnsonville (SH1)	35	-7	-9	45	-7	-9
Johnsonville to Airport (SH1)	56	-7	-9	46	-6	-9
Airport to Johnsonville (via Bays)	45	-7	-8	57	-5	-5
Johnsonville to Airport (via Bays)	57	-5	-5	48	-4	-5
Post Office Square to Johnsonville	12	0	0	28	0	1
Johnsonville to Post Office Square	32	-1	-1	17	-2	-1
Post Office Square to Airport (via SH1)	25	-3	-4	31	-2	-4
Airport to Post Office Square (via SH1)	32	-7	-8	29	-5	-6
Post Office Square to Airport (via Bays)	24	-1	-1	30	-3	-1
Airport to Post Office Square (via Bays)	29	-2	-1	26	2	2

Public Transport Journey Times

627. Table 71 below presents a comparison of the change in travel time and associated variability of the Project compared to the Do Minimum, and the change in travel time and associated variability of the Project (Tolled) compared to the Do Minimum, for both inbound and outbound movements during the AM and PM peak periods.

628. As with the main assessment of the Project, the overall picture shown is that the majority of public transport journeys have reduced (improved) journey times and what I would consider to be significant improvements to journey time reliability.

Table 71: Bus route travel time and Variability Do Minimum compared to Tolled Scenario

		2033 Do Minimum				Do Minimum versus Project (Tolled)			
		Travel time (min)		Variability (mins)		Travel time (min)		Variability (min)	
		AM	PM	AM	PM	AM	PM	AM	PM
Route 1[26]	Inbound	8	10	6	10	0	-2	-3	-7
	Outbound	8	8	3	4	1	3	0	2
Route 2[27]	Inbound	21	24	8	12	-1	-3	0	-5
	Outbound	30	21	28	10	-10	0	-23	-4
Route 3[28]	Inbound	27	29	12	29	-3	-5	-3	-21
	Outbound	20	25	6	14	3	0	1	-5
Route 7[29]	Inbound	10	12	5	16	2	-2	4	-11
	Outbound	12	11	7	8	-2	-2	0	-4
Route 14[30]	Inbound	66	67	8	9	-2	-3	-1	-1
	Outbound	87	70	14	10	-21	-4	-6	-3
Route 18[31]	Inbound	67	67	15	29	-4	-5	-4	-19
	Outbound	59	62	13	17	3	0	-2	-3
AX[32]	Inbound	20	23	9	12	0	-3	-1	-5
	Outbound	29	20	28	10	-10	0	-23	-4

Reliability

629. As noted in the untolled scenario, by increasing the capacity of SH1, and therefore increasing a buffer between the future demand and the capacity, there is the ability for the network to better cater for the daily fluctuations in demand that occur within, and for journeys through, the Project Area, as with any other urban network.

630. The resilience and reliability benefits broadly remain with the tolled scenario, as those are functions of the infrastructure. I consider that in some ways the reliability for the tolled scenario is potentially even more beneficial, as for critical travel journeys people who normally elect not to pay a toll have the option to use the tolled route for that specific journey, or in occasions when there is an incident on the local road network. I also consider that the reliability of the tolled route is particularly beneficial for the goods vehicles using that route.

631. As such I consider the reliability benefits to be as per the main assessment.

Network connectivity

632. The physical network connectivity remains the same as assessed above. However, I do note that the introduction of tolls would impact the options available for those Hataitai residents who are impacted by the turn restrictions.

633. Whilst the option to travel to Newtown via the Hataitai Connection Overbridge and Mt Victoria Tunnel is a broadly comparative alternative to the currently available, but removed in the Project option, this would now be tolled. I consider that this is the main direct connectivity impact of the tolled scenario, and is a moderate adverse effect for the Hataitai community.

Summary of changes to assessment for tolling scenario

634. In my opinion the effects of the tolled scenario compared to the Do Minimum and the Project compared to the Do Minimum are unchanged from my earlier assessment of the Project (untolled) with the following exceptions:

i. The efficiency benefits are slightly reduced as a result of fewer users experiencing the benefits, and some small increases in journey time on the local road network

ii. There is a Moderate adverse effect on connectivity from Hataitai due to the introduction of the tolling in combination with the turn restrictions that require a longer route to access Constable Street

iii. There are increases in the local road flows, particularly in the inter peak and overnight periods as a result of some traffic diverting off SH1 when there is minimal congestion on parallel routes. I consider this is a Low adverse effect as the local roads are shown to have the capacity to accommodate flows that are higher at other times of the day

8. ASSESSMENT OF CONSTRUCTION EFFECTS

635. In this Chapter, I consider the overall construction effects at a high level across the city, and then consider the detours required during key phases of construction. I assess the specific effects on parts of the network that are most affected by diverted traffic, including the additional vehicles and travel time impacts associated with the construction activities. I also consider the ways in which access is maintained to properties fronting the Project construction works.

636. To enable an assessment of the potential effects of the Project on the environment, I've assumed a construction programme of 6-8 years duration. I have then based the assessment for each phase of construction on the 2033 conditions and modelling. Whilst some phases could, and indeed would occur before or after this, I consider that this is the best estimate at this time, and provides a framework for the assessment of effects that would equally apply to a construction period several years either side of this assumption.

637. Detailed Traffic modelling has been undertaken using the Aimsun model, which provides a detailed representation of local network behaviour and response to capacity constraints. Several different construction scenarios have been modelled, and are outlined in Annexure G. These construction scenarios are assessed relative to a Do Minimum, and results are interpreted as indicators of relative effects rather than precise forecasts.

638. The model outputs have been used to assess the effects of construction of the Project on general traffic and public transport, and to inform mitigation measures and further design development. The assessment considers a range of construction scenarios, including lane reductions, temporary closures, speed restrictions and cumulative construction impacts.

639. The modelling demonstrates that impacts vary depending on the extent to which network capacity is constrained. Localised activities generally result in minor and contained effects, while works on key parts of the SH1 corridor, particularly around the Terrace Tunnel and Basin Reserve, result in larger impacts. These include increased congestion, travel time delays on strategic routes, and redistribution of traffic onto parallel corridors such as inner-city streets.

640. The results also show that movements reliant on the SH1 corridor are most sensitive to disruption. In more constrained scenarios, diversion alone is insufficient to accommodate displaced demand, indicating that maintaining network performance will require intervention, including travel demand management and increased use of public transport. The works are divided into the five main sections as used throughout this report, namely the second Terrace Tunnel, Te Aro Improvements, Basin Reserve Improvements, second Mt Victoria Tunnel, and Eastern Connections. Each section has its own assumed sequence of works and localised impacts.

641. The Constructability Report states that the intent is for the works to be staged to maintain the function of SH1 and key local roads as much as possible. However, I expect the scale and complexity of the Project will result in adverse effects due to road closures to enable construction, construction compounds, changes to traffic volumes arising from lane reductions and closures, and temporary loss of parking and access.

642. From that report, I understand that construction activities will range from enabling works and site establishment, through to major earthworks, tunnelling, bridge and road construction, and extensive utility relocations.

643. I understand there is the intention to form a 'Network Planning Group' (NPG), involving NZTA, WCC and GWRC, who would co-ordinate forward work programmes and both short and long term operational plans for the Project area in order to facilitate safe and efficient operation of the combined State Highway and Local Road network. Engagement with the Utility providers would

be through the established working practices of WCC who would form the link to wider work programmes.

644. I understand that the NPG would focus on matters such as the timing of the intersection traffic signals, co-ordination of the Project construction works with other events or works on the network to minimise the cumulative effects.

645. I understand from discussions with those who are currently establishing the NPG that the scope would also include identifying other initiatives to promote the use of public transport as an alternative and where public transport services could or should be adjusted during construction. In my experience this is a common approach for works of this scale, is generally effective, and I have made my assessment on the basis that the NPG (or equivalent) is formed and operational prior to the commencement of construction.

Compound locations

646. The proposed compound locations are shown in Mr David Hoffman's Constructability report in Figures 2 to 6. Table 72 summarises the likely roads which provide access to the yards, which are then shown in Figure 99 to Figure 103.

Table 72: Construction yard access and routes

Construction yard	Likely access road(s)	Likely vehicle route	Notes
TT-SC001 Northern Portal Yard	Slip lane via SH1 off ramp to The Terrace, through the Clifton car park, and over temporary cable car bridge. Corner of Everton Terrace and The Terrace. Kumutoto Lane off Boulcott Street. Slip lane for long or oversized vehicle access off SH1 near the tunnel portal.	From Kumutoto Lane to Boulcott Street, Clifton Terrace, SH1 northbound	Primary tunnelling support yard operating 24/7 during tunnel mining, with continuous spoil handling and heavy truck movements associated with tunnel excavation.
TT-SC002 Clifton Carpark Access	Slip lane via SH1 off ramp to The Terrace, through the Clifton car park, and over temporary cable car bridge. Kumutoto Lane off Boulcott Street. Slip lane for long or oversized vehicle access off SH1 near the tunnel portal. Shell Lane, Dalmuir Lane, Rosina Fell Lane.	From Kumutoto Lane to Boulcott Street, Clifton Terrace, SH1 northbound	Will require temporary bridge over cable car tracks to provide continuous access. I understand there will be no effect on cable car operations as works are proposed to be undertaken when the cable car is not operational.
TT-SC003 Southern Portal & Ghuznee St	Corner of Ghuznee Street and Willis Street. Western side of Ghuznee Street Bridge. MacDonald Crescent. Lane between buildings on Willis Street.	Willis Street or Victoria Street onto SH1	Supports southern portal works and Ghuznee Street bridge construction, resulting in intermittent heavy vehicle activity.

Construction yard	Likely access road(s)	Likely vehicle route	Notes
TA-SC001 Willis St Yard	Corner of Ghuznee Street and Willis Street.	Willis Street or Victoria Street onto SH1	
TA-SC002 Martin Sq Yard	Taranaki Street	Taranaki Street onto SH1	
BR-SC001 Cambridge Tce Yard	Slip lane for long and oversize vehicles off Sussex Street Cambridge Terrace Barker Street	From Cambridge Terrace to Wakefield Street and onto the Quays.	
BR-SC002 Sussex St Yard	Cambridge Terrace Tasman Street Rugby Street (local)	From Tasman Street to Rugby Street and onto SH1.	
BR-SC003 Ellice St Yard	Ellice Street Hania Street	From Ellice street to Hania Street, Pirie Street and onto SH1 Kent Terrace.	
BR-SC004 Rugby St Yard	Rugby Street Adelaide Road	SH1 Rugby Street	
MV-SC001 Western Portal	Brougham Street Austin Street Slip lane via SH1 Southbound	Slip lane off SH1 or from Brougham Street to Elizabeth Street onto Kent Terrace.	Major tunnelling yard operating 24/7, supporting tunnel mining, spoil handling, groundwater treatment, and heavy vehicle movements.
MV-SC002 Eastern Portal	Slip lane off SH1 Taurima Street	SH1 Ruahine Street or from Taurima Street to Moxham Avenue, Goa Street onto SH1 Ruahine Street or continuing along to the signals at SH1 Wellington Road.	Supports portal excavation and early tunnel works, with concentrated heavy vehicle activity during excavation and breakthrough phases.
MV-SC003 Taurima St	Slip lane off SH1 Taurima Street	SH1 Ruahine Street or from Taurima Street to Moxham Avenue, Goa Street onto SH1 Ruahine Street or continuing along to the signals at SH1 Wellington Road.	
EC-SC001 Badminton Yard	Slip lane off SH1 Ruahine Street Along future permanent northbound alignment.	SH1 Ruahine Street	
EC-SC002 Wellington Rd	Slip lane off SH1 Wellington Road Hamilton Road Wellington Road (local) Kilbirnie Crescent	SH1 Wellington Road	
EC-SC003 Kilbirnie Park	Kilbirnie Crescent Evans Bay Parade Temporary access route in the park.	From Evans Bay Parade or Kilbirnie Crescent onto SH1 Wellington Road.	

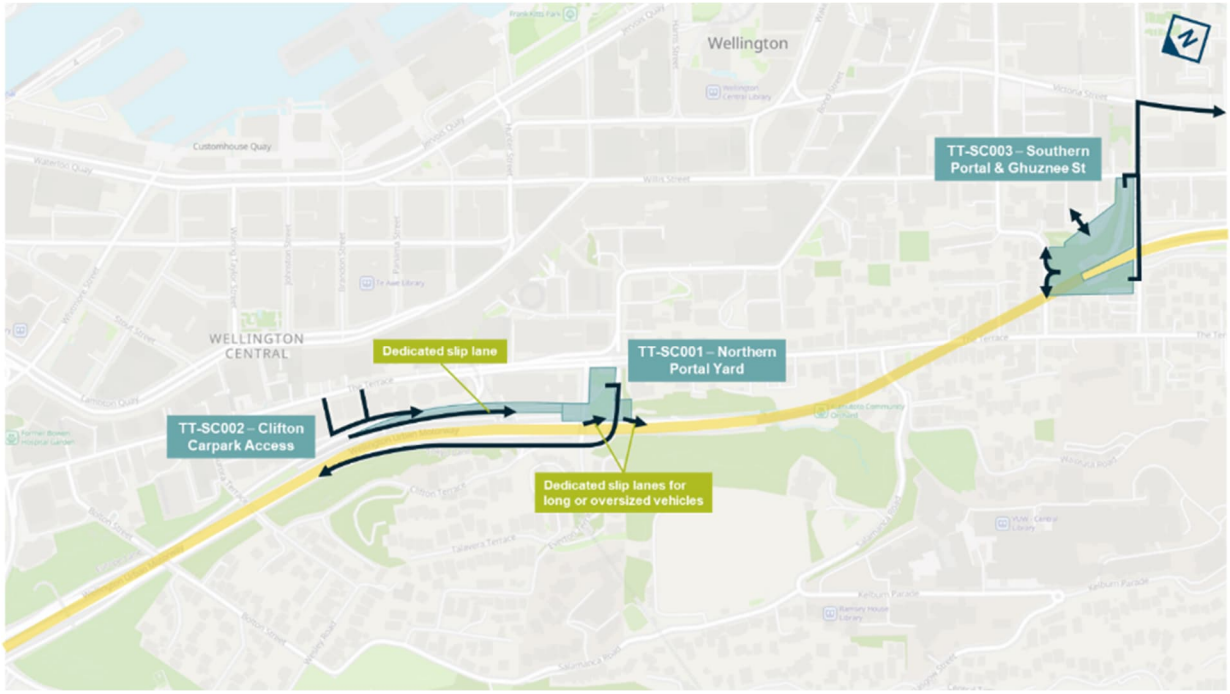


Figure 99 – Terrace Tunnel construction yard locations and accesses

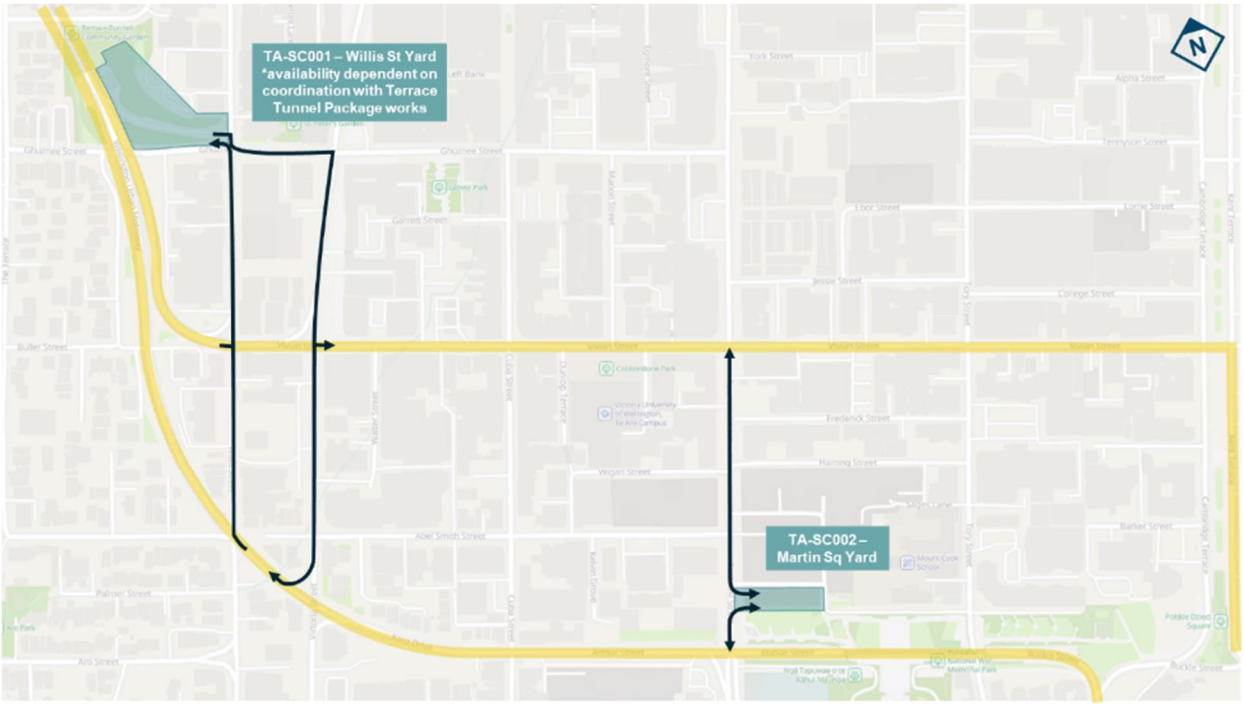


Figure 100 –Te Aro construction yard locations and accesses

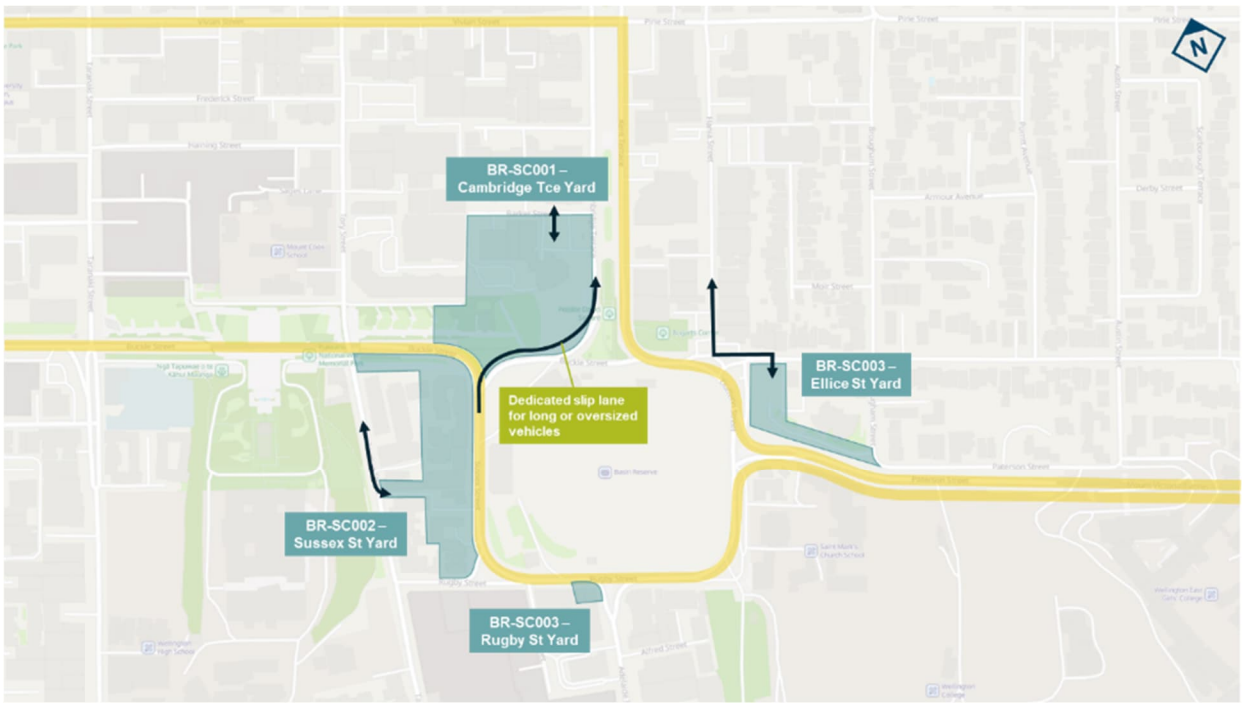


Figure 101 – Basin Reserve construction yard locations and accesses

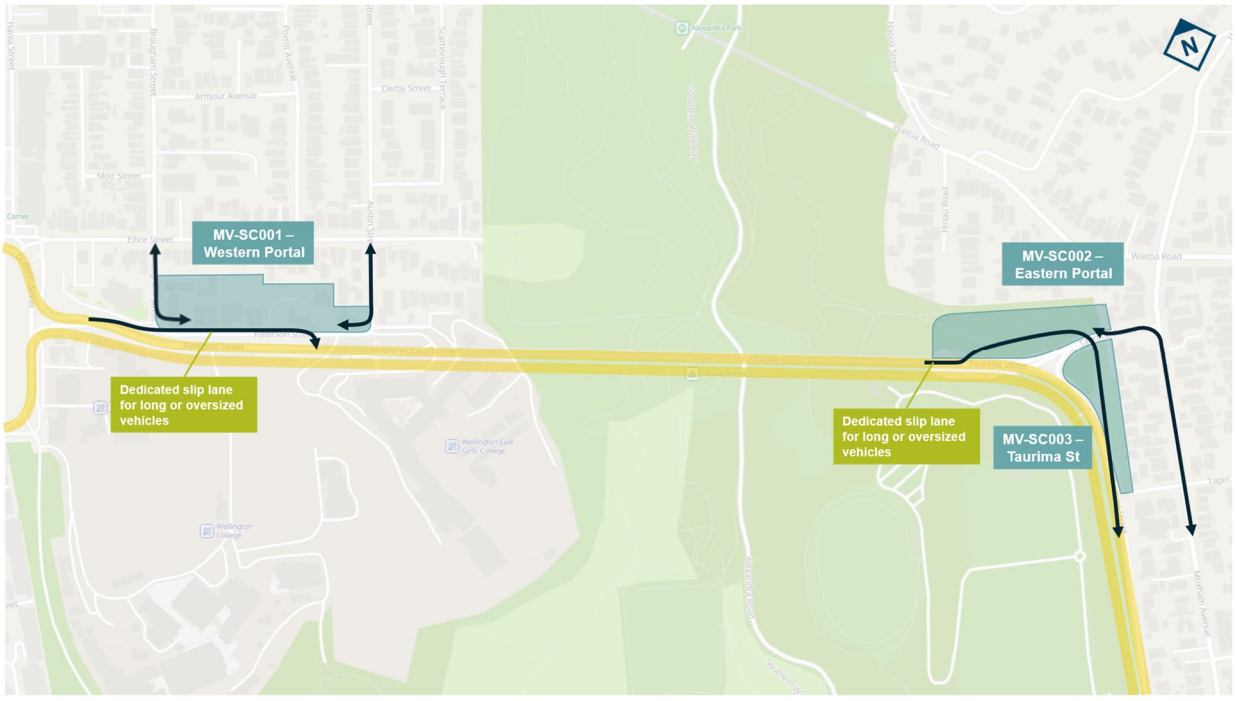


Figure 102 – Mt Victoria construction yard locations and accesses



Figure 103 – Eastern Connections construction yard locations and accesses

Terrace Tunnel – Section 1

Construction stages

647. As per the Constructability Report, the Terrace Tunnel works include the following components:

i. Shell Gully Upgrades – Works will accommodate an additional southbound lane by narrowing shoulders and relocating the median barrier. This will involve staged lane and shoulder closures, while maintaining two northbound lanes and one southbound lane (as currently provided)

ii. Northern Terrace Tunnel Portal Construction – Excavation and slope stabilisation will create the entry point for the new Terrace Tunnel and its connection to SH1. These works are primarily offline and will have minimal impact on traffic. However, a new access route through the Clifton South car park area and the establishment of a haul route will be required for construction purposes

iii. New Terrace Tunnel Construction – A southbound tunnel will be built parallel to the existing northbound tunnel. Construction will occur offline, with the primary worksite located on the north side. Existing lane arrangements are expected to be retained during daytime hours

iv. Old Terrace Tunnel Reconfiguration – The current three-lane arrangement will be converted into two northbound lanes. Construction is expected to begin after the new tunnel becomes operational and temporarily configured to carry traffic in both directions

v. Southern Portal Works – Excavation and slope stabilisation will occur from the existing service lane parallel to Ghuznee Street. The existing service road will be used to enable tunnel fit-out and plant access

vi. Ghuznee Street Bridge Replacement – The bridge will be extended to span the widened SH1 corridor, accommodating four lanes of traffic and a median. Construction will be staged to maintain one-way traffic flow across and two-way traffic flow beneath the bridge and on SH1 below the bridge, using night-time or limited short-term closures of

the existing SH1 alignment for demolition or beam replacement. During works, the existing bridge will operate as a single eastbound traffic lane

648. The construction stages are outlined in the Constructability Report prepared by Mr David Hoffman section 4.1.3.

Summary of key closures

Terrace Tunnel

649. Construction of cross-passage connections between the new and existing Terrace Tunnels has been considered under multiple scenarios in the Constructability report, including a scenario involving a four-week closure of all SH1 lanes through the tunnel. This has been assessed as causing significant disruption, which I consider not to be acceptable in transport terms as the extent of disruption would be very high.

650. Instead, alternative scenarios maintain at least one lane in each direction throughout construction by utilising the new tunnel in a temporary one lane in each direction arrangement whilst the existing tunnel is refurbished. This retains the existing capacity, albeit with several short-duration or night works closures to facilitate the switch-over to the new tunnel and then back to the permanent arrangement of dual uni-directional two-lane tunnels.

651. Under any full or partial closure scenario, I expect re-routing SH1 traffic to predominantly detour via the Quays and The Terrace, both of which are already capacity-constrained at peak times.

Ghuznee Street Bridge

652. I understand that demolition and reconstruction of the Ghuznee Street Bridge requires temporary closures of SH1 beneath the bridge for safety, as well as a reduction of the bridge itself to a single traffic lane and one footpath during construction. The proposal is to maintain a single traffic lane eastbound on the bridge during construction whilst allowing buses to also continue travelling westbound via contraflow signals. Several SH1 closure scenarios were assessed, ranging from occasional short-duration night closures to limited short-term closures.

653. When SH1 is closed beneath the bridge, I expect traffic will detour via the Quays or The Terrace and traffic on Ghuznee Street itself will be diverted via MacDonald Crescent, with some redistribution onto surrounding local streets. Temporary removal of parking spaces may be required on MacDonald Crescent to facilitate increased movements.

654. Short-duration night-time closures are expected to have low adverse effects with advance notice. The traffic lane closure on Ghuznee Street itself will result in moderate local effects in the immediate area due to detours, increased turning movements and pressure on MacDonald Crescent, but effects are expected to be low at a city-wide level.

Road network

Shell Gully upgrades

655. The Shell Gully works will maintain the existing the lane arrangement; however, staged lane and shoulder closures will increase side friction and require a temporary reduced speed limit through this section. I expect these changes to create a more constrained driving environment, which may lead to a sense of reduced comfort and slightly longer travel times through the area. While the lane capacity remains unchanged, I suspect this may cause additional delays during peak periods. Therefore, I expect this to have a low adverse effect.

Terrace Tunnel

656. As per the Constructability Report, the new Terrace Tunnel will be constructed offline, therefore, I expect the existing road network will remain largely unaffected during most of the construction period. Existing lane provisions are expected to be retained during daytime hours, with the majority of activities scheduled for night-time closures or managed under staged lane closures to minimise disruption.

657. Several scenarios were considered as part of the Constructability Report for the cross-passage breakthrough works with Scenario 1 involving a four-week closure of all SH1 lanes through the tunnel, in which traffic would be expected to predominantly reroute via the Quays or The Terrace, routes that are already capacity constrained.

658. Figure 104 below provides a summary of differences in daily volumes for a full tunnel closure. Red lines demonstrate where there is a decrease in demand, and blue demonstrates where there is an increase in demand. The thickness of the line reflects the scale of difference. I consider the effects to cause significant disruption and therefore consider this scenario not to be acceptable.

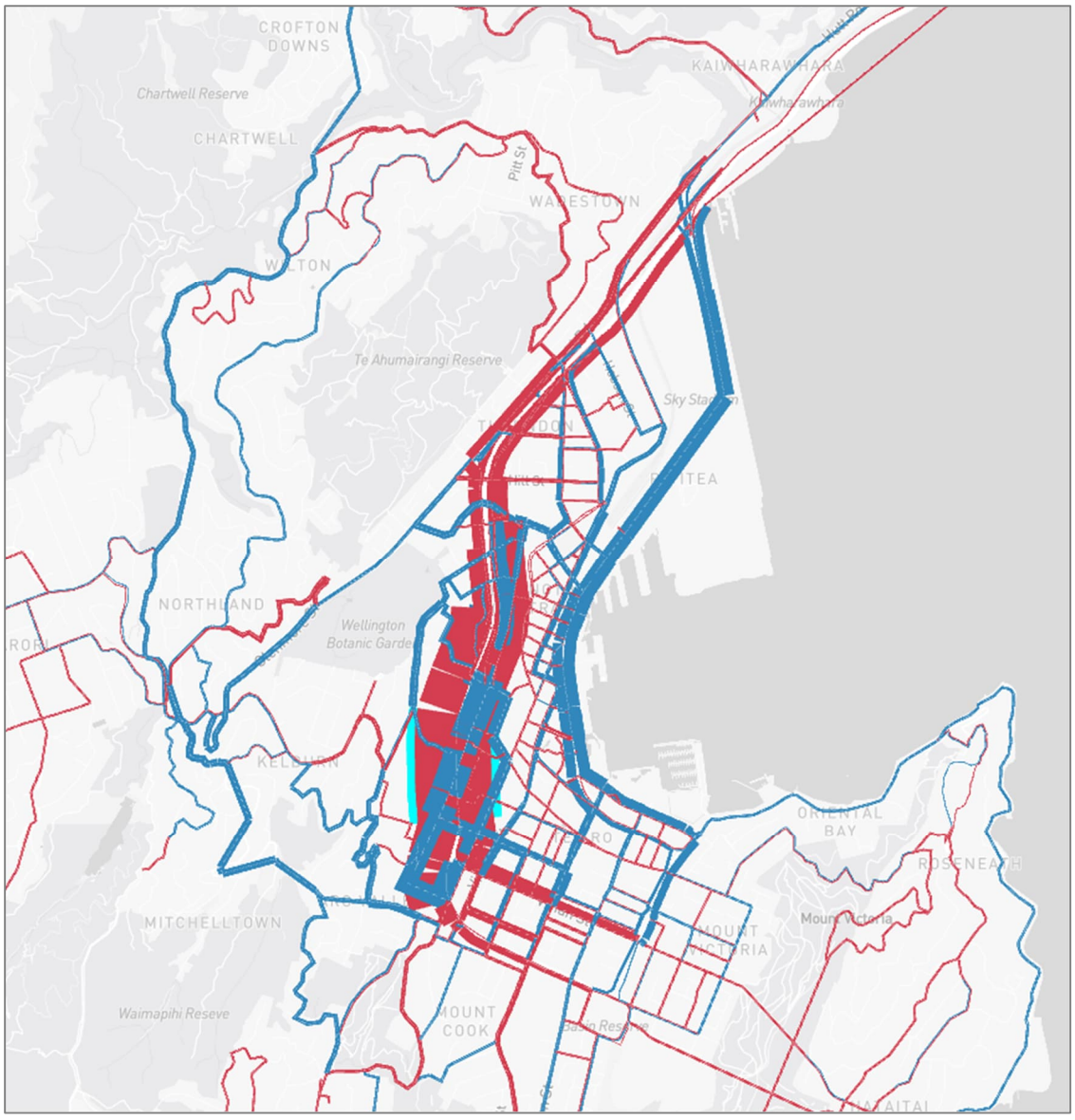


Figure 104 – Terrace Tunnel closure traffic flow difference plot

659. A full closure (Scenario 1)[34] has been assessed as causing significant network disruption which I consider would result in significant adverse effects to the network.

660. Scenario 2 involves completing the cross passages following the opening and diversion of traffic into the new tunnel with the closure of the existing tunnel, resulting in one lane in each direction, which is a reduction from the existing two lanes northbound. Based on the current flows in the tunnel which are in excess of 2,000 vehicles per hour northbound, this would require a reduction of some 500 vehicles per hour as I have assessed the residual capacity of a single lane through construction works is 1,500 vehicles per hour.

661. The Quays are used as a primary diversion route to avoid congestion through the Terrace Tunnel, with other secondary routes such as Willis Street and Boulcott Street. I consider that this would be likely to lead to quite widespread delays across both SH1 and the local roads unless there was a significant degree of mode shift or trip suppression, and as such a high adverse effect.

662. I recommend that any option that reduces the availability of lanes through the Terrace Tunnel below the current 2 lanes northbound and one lane southbound during the weekday peaks is avoided.

663. The third scenario which moves the southbound lane into the new tunnel, and then provides a working space from what was the southbound lane in the current Terrace Tunnel would still have some effect on traffic flows as I anticipate some form of 50kph speed limit to be required. However, during the peaks I do not consider that this would be significant as the modelled speeds are in the 50-60kph range due to the dense traffic conditions. While this maintains the northbound capacity for the duration of the works, it will require multiple short duration or night works northbound closures. As these closures are short term, with enough warning and organised detours, I expect the effect of this to be low adverse.

Ghuznee Street Bridge

Closure of SH1

664. The Constructability Report states that the demolition of Ghuznee Street bridge will require the closure of SH1 below to prevent demolition material from falling onto the live carriageway. Three scenarios have been considered for this closure as part of the Constructability Report, which consider a combination of closure times.

665. Scenario 1 includes 2 ~48 hour closures and ~12 separate night closures. Noting that the tunnel is already closed periodically to allow routine maintenance activities to be undertaken. As described in paragraph 656 and Figure 104 (closure of Terrace Tunnel), traffic will reroute via the Quays or The Terrace, which are already capacity constrained. However, as these closures are limited to two 48-hour closures, I expect they will be manageable with advance notice, and I expect the effect to be low. Similarly, night closures will disrupt traffic flow on SH1 but as traffic volumes are lower at this time, with advance notice I expect the effects of this to be low.

666. Scenario 2 includes approximately 20-30 night closures, which I have already assessed the effect of this to be low.

667. Scenario 3 includes a four-week closure of SH1, which will happen simultaneously with the cross passage breakthroughs, which I do not consider acceptable due to the significant

[34] Constructability Report, Mr Hoffman, Table 4

disruption this would cause to the state highway network, as described in paragraph 656 and Figure 104 (closure of Terrace Tunnel).

Closure of Ghuznee Street overbridge

668. As per the Constructability Report, Ghuznee Street overbridge itself will reduce to a single lane and one footpath during construction. Whilst a standard approach to replacing a bridge would result in a full closure of the bridge to traffic, due to the importance of Ghuznee Street in the network, this is not proposed in the Constructability Report. Traffic modelling has been undertaken to assess the effects of construction of Ghuznee Street. Two partial closure scenarios have been assessed. The first scenario includes one traffic lane open eastbound and the other traffic lane westbound is closed and traffic is diverted to MacDonald Crescent to the North. In the second scenario, buses are able to travel westbound, via traffic signals.

Partial Ghuznee Street overbridge closure – full westbound closure

669. Aimsun modelling indicates increased delays for westbound vehicles at the Ghuznee Street/Willis Street intersection during the morning peak. This is caused by more vehicles going north on Willis Street in the single lane instead of turning left to go over Ghuznee Bridge.

670. As shown in Table 73, this results in an increase in journey time of approximately 3-5 minutes, where most of this increased delay occurs for vehicles on Ghuznee Street between its intersection with Victoria Street and Willis Street.

Table 73: Ghuznee Street overbridge closure journey times – full westbound closure

Route		AM peak			PM peak		
		Do Min (minutes)	Const. (minutes)	Difference (minutes)	Do Min (minutes)	Constr. (minutes)	Difference (minutes)
Bus route 18 Webb St to Victoria Uni	Car	9	13	+4	8	10	+2
	Bus	13	17	+5	13	14	+1
Bus route 18 Victoria Uni to Webb St	Car	16	9	-7	13	11	-2
	Bus	19	12	-7	16	14	-2
General traffic Airport to Jvl (Quays)	Car	33	33.0	N/A	29	28	-1
General traffic Jvl to Airport (Quays)	Car	40	41	+1.0	28	28	No Change
General traffic Airport to Jvl (TT)	Car	32	32	N/A	25	23	-2
General traffic Jvl to Airport (TT)	Car	36	37	+1.0	29	27	-2

671. Although users of this detour will experience delays, based on evidence from the modelling, this would result in a much smaller and more manageable effect than the full closure, with effects generally limited to the immediate streets surrounding the Ghuznee Street overbridge. Therefore, I consider the effect of the one-way westbound closure of Ghuznee Street to be low.

672. In addition, unlike unplanned closures on the network, it is possible to reconfigure the intersections on parallel routes to cater for the changed patterns of traffic to reduce delay. For example, changes to Ghuznee Street / Willis Street intersection phasing, temporary signals at MacDonald Crescent / The Terrace to reflect the reduced traffic on The Terrace towards Ghuznee Street would be, in my opinion, considered and likely to form part of the detailed construction traffic management approach to be managed with help from the NPG I referred to above.

673. For users travelling eastbound from Te Herenga Waka – Victoria University of Wellington to the CBD via Ghuznee Street, the closure of the westbound traffic lane on Ghuznee Street results in a reduced journey time overall for both the morning and evening peak, with these reductions being particularly greater in the morning peak. The Aimsun modelling demonstrates that the section from the university to the Ghuznee Street overbridge will have an increase in traffic volumes in the morning peak, however the reduced opposing flows results in approximately a 7-minute reduction in journey time. Minimal change in delay is observed elsewhere along this route. Further detail on journey time routes can be found in Annexure G.

674. The wider routes (Routes 3A, 3B, 4A and 4B, via the Quays/waterfront and Terrace Tunnel) show negligible change between the Do Minimum and construction scenarios. This indicates that effects are largely contained to local streets, with no material effect on the wider network.

Partial Ghuznee Street overbridge closure – westbound closure for general traffic only

675. The second scenario is to allow bidirectional travel for buses only by way of signals at either side of the bridge. General traffic will still be limited to eastbound travel only. Effects for general traffic will be as described above. Buses will no longer need to detour via MacDonald Crescent, and Aimsun modelling indicates that buses will experience minimal additional delay compared with full westbound closure scenario. Similarly to the previous scenario, travel times for both general traffic and buses decrease, with approximately a 5-minute reduction eastbound in the AM peak and negligible changes (around one minute or less) elsewhere, as shown in Table 74. Further detail on journey time routes can be found in Annexure G.

Table 74: Ghuznee Street overbridge closure journey times – westbound closure for general traffic only

Route		AM peak			PM peak		
		Do Min (minutes)	Const. (minutes)	Difference (minutes)	Do Min (minutes)	Constr. (minutes)	Difference (minutes)
Bus route 18 Webb St to Victoria Uni	Car	9.2	12.2	+3.0	8.2	9.6	+1.4
	Bus	12.7	13.8	+1.1	12.7	11.6	-1.1
Bus route 18 Victoria Uni to Webb St	Car	16.3	11.4	-4.9	13.2	12.9	-0.3
	Bus	18.5	13.0	-4.5	16.4	15.9	-0.5
General traffic Airport to Jvl (Quays)	Car	33.0	34.0	+1.0	29.0	30.0	+1.0
	Bus	N/A	N/A	N/A	N/A	N/A	N/A
General traffic Jvl to Airport (Quays)	Car	40.0	39.0	-1.0	28.0	28.0	N/A
	Bus	N/A	N/A	N/A	N/A	N/A	N/A
General traffic Airport to Jvl (TT)	Car	32.0	32.0	N/A	25.0	25.0	N/A
	Bus	N/A	N/A	N/A	N/A	N/A	N/A
General traffic Jvl to Airport (TT)	Car	36.0	36.0	N/A	29.0	29.0	N/A
	Bus	N/A	N/A	N/A	N/A	N/A	N/A

676. Similarly to before, the wider routes (Routes 3A, 3B, 4A and 4B, via the Quays/waterfront and Terrace Tunnel) also show negligible change between the Do Minimum and construction scenarios. This indicates that effects remain localised to the Ghuznee Street area and immediate detour routes.

677. MacDonald Crescent has been identified as a key detour route to accommodate diverted traffic from Ghuznee Street. MacDonald Crescent is a narrow, curved street with on-street parking on both sides. This detour introduces additional pressure on this local street, as it is not usually carrying high traffic volumes. Temporary restrictions to parking, would be needed to allow the increased flow of vehicles to travel around the corners safely and this has been accounted for in the parking effects below.

678. In addition, with advance notice drivers are known to reroute over a wider area, as opposed to the adjacent route, or retime their journey in recognition of peak delays which has the effect of reducing the peak demand.

679. Overall, based the assessments undertaken to date, I consider that there will be negligible local effects from the reconstruction of the Ghuznee overbridge, but low on a city-wide basis.

680. As a result of the detour via MacDonald Crescent, I expect there will be a low adverse effect caused by the higher number of vehicles turning right out of MacDonald Crescent onto the Terrace than at present. I expect this may result in increased queues and delays, as well as an increase in unsafe right-turn manoeuvres.

681. I understand that access from Ghuznee Street to Buller Street may be restricted during construction, however I expect the effect of this is negligible as there is an alternative access via The Terrace that does not require an excessive detour.

Parking

682. As per the Constructability Report, 195 car parking spaces are expected to be closed for the full Terrace Tunnel construction duration and approximately 327 will have intermittent availability. The maximum number of car parks closed at any one time may be up to 422. I expect the overall adverse effect of this to be moderate.

683. This parking unavailability comprises of the Clifton Car Park, the Kumutoto Car Park (below the Boulcott Street and Everton Terrace overbridges), the Upper Willis Car Park, and on MacDonald Crescent. A summary of these parks is shown in Table 75 followed by alternative parking options.

Table 75: Construction parking unavailability (Terrace Tunnel)

Location	Number of Parks	Indicative duration
Kumutoto Car Park	Approx. 15 parks	Full construction duration
Upper Willis Car Park	Approx. 60 parks	Full construction duration
Clifton Car Park (South)	Approx. 120 parks	Full construction duration
Clifton Car Park (Upper)	Approx. 72-142 parks	During spoil transportation
Clifton Car Park	Approx. 50 parks at any one time	During SH1 Shell Gully bridge works
MacDonald Crescent	Approx. 35 parks	During Ghuznee Street bridge works

i. The Plimmer Tower Car Park building which provides 662 parking spaces and is located between approximately 200 m and 400 m from the Clifton Car Park and Kumutoto Car Park

ii. The Lower Willis Car Park building which provides 347 parking spaces and is located approximately 200 m from the Upper Willis Car Park and MacDonald Crescent

iii. On-street parking is also available on Willis Street, Boulcott Street and The Terrace, all of which are within 400 m of the closed car parking

Shell Gully

684. As part of the Shell Gully works, sections of the Clifton Terrace car park will need to be temporarily closed to mitigate the risk of falling objects and materials, and to provide space for lifting out existing barriers and installing new ones. Approximately 150 parking spaces will be affected, with closures implemented in stages of around 50 spaces at a time. The reduction in parking will require people to find alternative parking options. I expect this to have a **low** effect given the total parking supply in Wellington.

Ghuznee Street

685. With MacDonald Crescent being the detour route for traffic diverted from Ghuznee Street, parking removal along sections of the street may be required (approximately 35 parking spaces) to create sufficient width for the increased two-way traffic flow, which will be higher than what it currently experiences. As most of the parking present on MacDonald Crescent is coupon parking or residents parking, removing this parking will require residents to park further away and walk further distances to their homes, which I anticipate will be a **low** effect.

Property access

686. Construction of the Ghuznee Street bridge may restrict access to properties located along Ghuznee Street and people accessing may experience short-term disruptions during construction. At times, access could be reduced or temporarily blocked, requiring drivers to wait or use alternative entry points. I expect these disruptions to be **negligible** and limited to individual properties. They will be managed on site and traffic management plans will allow for continued access, where possible. Measures such as temporary cover plates and staged works will maintain access.

Public transport network

687. Two regular bus services and ten school bus routes will be affected by the works on Ghuznee Street. I expect lane closures and associated detours to cause some additional congestion in the surrounding area, which may result in some delays to these services. However, as noted above the nature of the works allows for the routes to be retained on their current routes and schedules would not be significantly affected. However, the increase in traffic on Willis Street is shown to introduce some additional travel time to all vehicles, including buses. And so I consider the effects would be **Moderate** on public transport for the period of the Ghuznee Street works. However I understand that this will be for a relatively short period of the overall construction period, and the changes to timetables and/or route can be well communicated to passengers.

Active transport network

Tunnel works

688. The pedestrian paths that currently cross over the existing tunnel (referenced in paragraph 108), will be temporarily closed for the duration of the works, due to the tunnel portal construction works and the location of the construction yards.

689. The path connecting both The Terrace and the Clifton Terrace car park to Club Kelburn and Kelburn Park can be diverted via Salamanca Road. As the Clifton Terrace car park already has multiple access points to The Terrace, I expect no specific detour will be required. The path linking Ghuznee Street with MacDonald Crescent will be diverted via The Terrace or Willis Street. I expect the overall impact of these closures to be low, as the proposed detour routes add only a small amount of additional travel distance compared to the existing paths.

Ghuznee Street Bridge

690. The Ghuznee Street Bridge works will temporarily remove the northern footpath and shoulder during early demolition stages, which will require pedestrians to use diversions and temporary crossings. These changes reduce the directness of routes along key desire lines, particularly between the university and the city centre, however I consider the overall effect to be negligible.

691. Cyclists travelling on Ghuznee Street through the work area will also experience narrowed lanes and reduced shoulder space, which I consider to be a low adverse effect on the basis that I anticipate that the narrowing would be combined with a temporary speed limit of 30 k/h for the works.

692. During the Ghuznee Street bridge works, the TT-SC003 construction yard will be operational, which may restrict access to the Locky Dock parking facility on Willis Street. Users would need to use their own locks, or use an alternative Locky Dock facility which is available approximately 500 metres away on Dixon Street (around a seven-minute walk), which may be less convenient for some cyclists. Therefore, I consider the effect to be low adverse.

693. Access from Ghuznee Street to Buller Street may be restricted during construction. As Buller Street forms part of the direct cycle connection to the shared path on Abel Smith Street, this will restrict that cycle connection, forcing cyclists to divert onto other routes, which I expect may not provide the same level of amenity. However, there are other routes available, and therefore, I consider the effect of this to be low adverse.

Summary of effects

694. A summary of the effects that have been rated above negligible, is shown below in Table 76.

Table 76: Summary of effects for the Terrace Tunnel section

Category	Effect	Effect rating
Road network	Constrained driving environment, reduced comfort, and longer travel times through Shell Gully area as a result of increased side friction and temporary reduced speed limit.	Low
Road network	Increased travel time as a result of a reduction of one northbound lane through the Terrace Tunnel for cross passage construction.	High
Road network	Rerouting required due to short-term closures or night closures of the Terrace Tunnel/SH1 for cross passage construction in the Terrace Tunnel and demolition of the existing Ghuznee Street Bridge.	Low
Road network	Rerouting required due to westbound traffic on the Ghuznee Street Bridge to be diverted. Additional pressure on MacDonald Crescent (detour route).	Moderate
Road network	Increased queues, delays, and unsafe turning manoeuvres at the MacDonald Crescent/The Terrace intersection, as a result of the detour.	Low
Parking	Increased parking demand due to intermittent availability/unavailability of parking throughout construction.	Moderate
Parking	Increased parking demand in Clifton Terrace car park due to temporary closure for Shell Gully works.	Low
Parking	Residents on MacDonald Crescent needing to walk a further distance to their home, as a result of the removal of parking on MacDonald Crescent.	Low
Public transport network	Delays to bus services on Ghuznee Street, as a result of lane closures and associated detours.	Moderate
Active transport network	Additional travel distance required as a result of detours required due to temporary closures of pedestrian paths over Terrace Tunnel.	Low
Active transport network	Narrowed lanes and reduced shoulder space for cyclists travelling on Ghuznee Street, as a result of the works on the bridge.	Low
Active transport network	Unavailability of Locky Dock facilities, due to restricted access to the facility on Willis Street.	Low
Active transport network	Forcing cyclists to detour from the direct cycle connection as access to Buller Street may be restricted from Ghuznee Street.	Low

Te Aro (Vivian Street) – Section 2

Construction stages

Vivian Street Reconfiguration

695. I have assessed the construction works for the Vivian Street widening component of the Te Aro section. The works, which comprise verandah construction, kerb realignments, and remarking, will be delivered block by block, progressing in two phases per block, working on the northern side and then shifting works to the southern side. The indicative construction layout is shown in Figure 105.

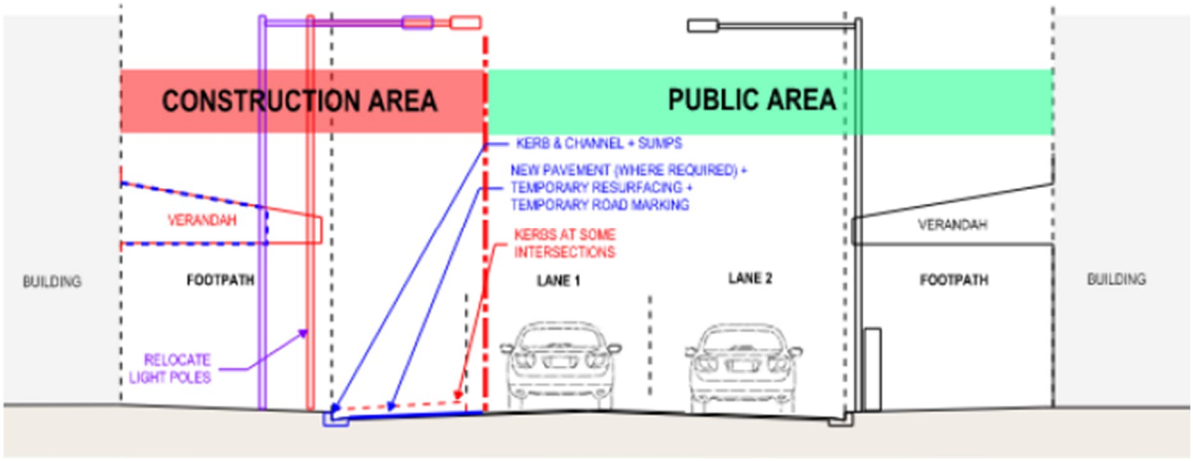


Figure 105 – Indicative construction layout on Vivian Street to maintain two lanes of traffic

696. Verandah construction may necessitate temporary pedestrian diversions or closures, and at night, a full road closure will be required.

697. Temporary closures of side roads and footpaths will be required during these works, managed via staged line marking and signal adjustments. However, these closures would be very short term and not atypical to the occasional closures needed for minor maintenance or works across the network. Where relatively direct alternative routes are not available, I expect the construction management plan to limit closures to periods when the demands are at the lowest. I do however note that the nature of the area means that undertaking these closures overnight would require consideration of access for taxis and Uber vehicles, and for pedestrian routes and safety so as to limit the effects.

Karo Drive and Cuba St intersection

698. Construction works at the Karo Drive and Cuba Street intersection are limited in scope, primarily involving resurfacing and signal modifications.

Summary of key closures

Vivian Street

699. Construction works along Vivian Street will involve narrowed lanes, reduced speed limits and traffic management measures. Temporary overnight full closures may also be required for a short period to accelerate construction.

700. During overnight closures, I consider that traffic will divert primarily via Kent Terrace and the Quays, with some redistribution onto The Terrace and Victoria Street.

701. Day-to-day works will slightly reduce speeds and increase side friction but are expected to have a negligible effect on through traffic. Overnight closures occur during periods of low demand and I expect would result in low adverse effects.

Road network

702. Drivers travelling along Vivian Street and Arthur Street will experience slower speeds during construction, noting that this section of road already operates at reduced speeds during peak periods. I expect the work zones, narrowed lanes, reduced speed limit, and traffic management measures will increase side friction, making lane changes more difficult. As per the Aimsun modelling, where a speed reduction to 30km/h is introduced, traffic volumes along SH1 (both on Arthur Street and Vivian Street) decrease, particularly in the PM peak. These volumes are offset by small increases in traffic volume on Taranaki Street and Jervois Quay, indicating some diversion onto alternate routes.

703. Overall, journeys from Ngauranga to Newtown Hospital are estimated to be around four minutes longer (Table 77). In addition to the directly affected SH1 corridor, I have considered the potential effects on key diversion routes. For those travelling along the Quays, both into and out of the CBD, the modelling indicates that travel time changes are negligible.

704. For buses, there are small increases in travel time for route 18 (westbound from Webb Street to Victoria University) of approximately two minutes observed in the morning peak and similarly for eastbound vehicles in the evening peak. There is also a small increase in travel time for Route 7 (southbound from Manners Street to Brooklyn) of approximately two minutes.

705. While some increases in travel time are anticipated, these effects are generally limited to the surrounding network and are not widespread. Travel times along the Quays, which form a key diversion route, remain largely unchanged. Overall, based on the modelling results, I consider this to have a low adverse effect on the network. Further detail on journey time routes can be found in Annexure G.

Table 77: Vivian Street reduction in speed resulting journey times

Route		AM peak			PM peak		
		Do Min (minutes)	Const. (minutes)	Difference (minutes)	Do Min (minutes)	Const. (minutes)	Difference (minutes)
Bus route 7 Brooklyn to Manners St	Bus	11.5	11	-0.5	14.2	13.4	-0.8
Bus route 7 Manners St to Brooklyn	Bus	12	14	+2	12.1	11.7	-0.4
Bus route 18 Webb St to Victoria Uni	Car	9	11	+2	8	8	+0.3
	Bus	13	15	+2	13	12.5	-0.2
Bus route 18 Victoria Uni to Webb St	Car	16	15	-1	13	15	+2
	Bus	18.5	18	-0.5	16	19	+3
General traffic Ngauranga to Hospital	Car	26	30	+4	20	21	+1
General traffic Hospital to Ngauranga	Car	11	12	+1	11	12	+1
General traffic Airport to Jvl (Quays)	Car	33	31	-2	29	32	+3
General traffic Jvl to Airport (Quays)	Car	40	40	No Change	28	30	+2
General traffic Airport to Jvl (TT)	Car	32	30	-2	25	29	+4
General traffic Jvl to Airport (TT)	Car	36	40	+4	29	29	No Change

706. Any closure of side roads may affect the routes for access and therefore advance communication for affected premises and emergency services will be important to inform them in advance of the detour routes. I consider the effect of this to be **negligible** as this is a routine process for a number of development and maintenance scenarios.

Parking

707. Drivers looking for on-street parking along Vivian Street will find fewer options as construction progresses. At any given time, between 10 and 22 spaces will be unavailable due to active work zones, meaning motorists may need to plan ahead or park further away.

708. As the Project progresses, all on-street parking spaces on Vivian Street (76 parks and five taxi stands) will be permanently removed to accommodate the proposed layout. This will require drivers to use alternative parking or pick-up locations.

709. People who normally access the parking on the Arthur Street slip lane, will also experience temporary restrictions, with up to 15 spaces (14 standard space and 1 mobility space) unavailable for weeks or months during pavement and utility works on approach to the Cuba Street intersection.

710. It should be noted that throughout the construction period for this section, the maximum reduction of parking spaces does not exceed the end state loss of parking as I assessed above in paragraph 435. As the Project progresses, all car parking spaces will be permanently removed.

711. Overall, the cumulative effect will be a reduction in parking availability across Te Aro. However, because these changes align with the proposed design, I consider the construction-specific effect to be negligible with the overall effect factored into the operational assessment in the prior chapter.

Property access

712. People accessing driveways and shop entrances along Vivian Street may experience short-term disruptions during construction. For customers and residents, I consider this may result in brief delays or the need to adjust arrival times.

713. These disruptions are expected to be limited to individual properties and managed on site. It is understood that restrictions will last for days rather than weeks, and traffic management plans will allow for continued access, where possible. Measures such as temporary cover plates and staged works will help maintain business operations and residential access.

714. I consider the effect on local access to be negligible due to the short duration of restrictions and active on-site management. While users may experience temporary inconvenience, clear communication and traffic management will minimise impacts.

715. Deliveries and loading activities for businesses will also be affected when loading bays are unavailable. Couriers and suppliers will need to utilise the alternate bays on the surrounding streets, which I have demonstrated in Figure 85 to Figure 88. In most cases this would have a negligible effect, but there may be specific locations where the needs would require specific consideration, such as the temporary conversion of parking spaces to loading bay is needed. I would anticipate these to be identified during the consultation process ahead of the construction traffic management plan being prepared.

Public transport network

716. Vivian Street does not serve any scheduled public buses, however, the 791 school bus travels along this route. I anticipate that students who use the school bus route along Vivian Street between Taranaki Street and Cambridge Terrace will notice little change during construction. As there are no bus stops directly on Vivian Street, buses will continue to operate as normal, and bus stop locations will remain unaffected. During intersection works it is likely that there will be some delays which will delay service that cross Vivian Street, but these works are minor and so would be for a very limited period and the impact during this time minor. Overall, I consider the effect on the public transport network in Te Aro to be negligible.

Active transport network

717. Due to the verandah construction, pedestrians will need to navigate temporary footpath closures, narrowed footpaths, temporary crossings, and diversions as construction progresses block by block. Temporary traffic management will direct users via alternative routes to maintain connectivity and safety, but users may experience slower movement through these areas. I expect that for most pedestrians, these changes will feel similar to routine maintenance works, being short-term and manageable. Alternative footpath access will be maintained throughout construction to keep pedestrian connectivity intact, therefore the effect on users is negligible.

718. Cyclists will experience narrower lanes during construction on Vivian Street, which reduces the space available for safe overtaking by motor vehicles. While slower speeds will provide some safety benefit, cycling at 30 km/h still requires significant effort, and drivers may attempt to pass despite limited clearance. I anticipate this to increase the risk of close passes and discomfort for cyclists. However, with parallel routes available, I expect this effect to be low.

Summary of effects

719. A summary of the effects that have been rated above negligible, is shown below in Table 78.

Table 78: Summary of effects for the Te Aro section

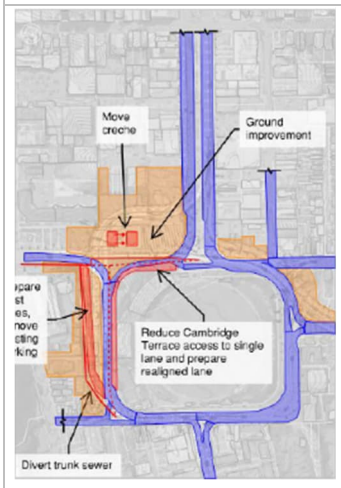
Category	Effect	Effect rating
Road network	Reconfiguration and temporary lane closures Vivian Street and Arthur Street	Low
Active transport network	Increased risk of close passes and discomfort for cyclists down Vivian Street, as a result of narrower lanes during construction.	Low

Basin Reserve – Section 3

Construction stages

720. Construction for the Basin Reserve section is anticipated to take a number of years with construction occurring in multiple areas. The following stages show a potential construction sequence.

Traffic route / Public access | Complete construction | Current construction | Yard / staging area



Stage 1 – Site preparation and early works

The first stage involves clearing existing buildings on Cambridge Terrace and removing landscaping features within the National War Memorial Park, which will temporarily block pedestrian and cyclist access through the park, including the Commonwealth Walkway and cycle route.

The Home of Compassion Creche building will be relocated, which may result in the loss of the turning bay at Martin Square.

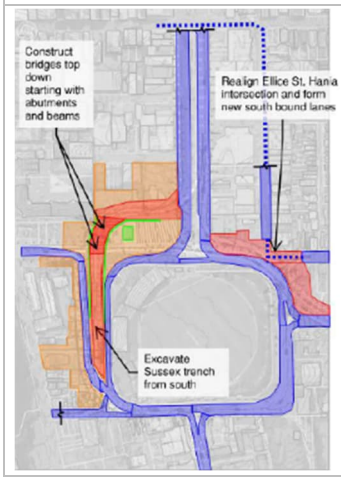
The Commonwealth Walkway and cycle trail will be closed for the duration of construction in this area of the Basin.

Additional works in this stage include ground improvements in the northwest corner, preparation of west lanes on Sussex Street and the SH1 Arras Tunnel on-ramp (requiring removal of parking on the west side), and reducing Cambridge Terrace to a single lane in preparation for realignment.



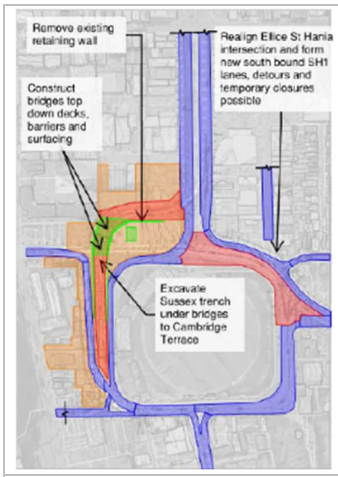
Stage 2 – On-ramp and secant wall construction

Two lanes will be opened to the Arras Tunnel by constructing a parallel on-ramp to maintain continuous SH1 traffic flow. Traffic will be diverted onto this new on-ramp, enabling the construction of secant walls and piles for the next phase.



Stage 3 – Bridge construction and intersection realignment

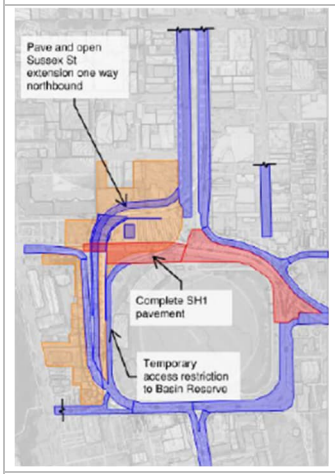
Bridge construction will begin using a top-down approach, starting with abutments and beams. It is assumed that the Commonwealth Walkway will remain closed from the time of the creche relocation through this stage. Excavation of the Sussex trench will commence from the south, and the Ellice Street / Hania Street intersection will be realigned to allow work on new southbound lanes in the northeast corner.



Stage 4 – Continued excavation and bridge works

Excavation of the Sussex trench will continue toward Cambridge Terrace. Bridge works will progress with decks, barriers, and surfacing. Realignment of the Ellice Street / Hania Street intersection will also continue, with temporary lane closures and detours possibly expected.

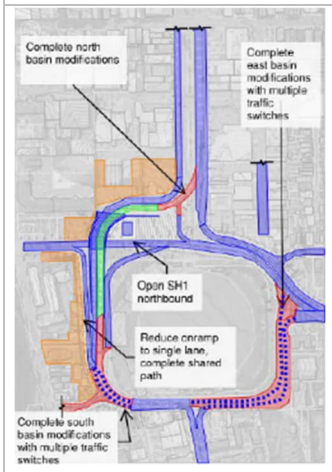
Access to Dufferin Street will be maintained from Kent Terrace during this phase.



Stage 5 – Sussex Street extension and SH1 pavement

The Sussex Street extension will be paved and opened as a one-way northbound route. SH1 northbound pavement works on Buckle Street will be completed. Temporary access restrictions to the Basin Reserve on the west side (via Sussex Street) will occur during this stage.

Access to Dufferin Street will be maintained from Kent Terrace during this phase (not shown in figure).



Stage 6 – Basin modifications and traffic switches

SH1 northbound lanes on Buckle Street will open, and modifications to the north, south, and east Basin areas will be completed through multiple traffic switches.

The existing slip lane will be reduced to a single lane, and the footpath will be constructed to provide pedestrian connectivity.

Both access to St Mark's School and Preschool will be maintained for most of the construction period, though short disruptions may occur during trenching or drainage works. These are anticipated to be scheduled during holiday periods, weekends, or other times of lower use, and mitigated with temporary cover plates and off-peak work. During reconstruction of Dufferin Street, continuous access to at least one of the two pedestrian entry points to St Mark's will be maintained.

Access to the Dufferin Street service lane will require a temporary arrangement during road reconstruction, which may be for a period of months.

As works in this area are completed, there will be a traffic switch phase which requires access to be blocked off for a short period for hours to days while final tie-ins, signage, and line marking are completed.

Bus services will generally continue at the Dufferin Street service lane bus stop (Metlink stop #6010), but temporary relocation to the parking

	spaces on the south side of Rugby Street will occur during reconstruction phases to maintain public transport access.
	**Stage 7 – Final landscaping and traffic arrangement** The final stage includes restoring surrounding land, completing landscaping and pedestrian paths, removing site compounds, and opening the permanent traffic layout.

Additional works on Kent Terrace, Ellice Street, and Adelaide Road

721. Early activities include removing parking and footpath assets. These works will be staged to minimise disruption but will still require traffic management, footpath closures, and temporary changes to pedestrian and cycle access.

722. Adelaide Road works will involve traffic shifts and adjustments to pedestrian facilities, with staged modifications to allow for continued access for buses, schools, and Government House. Temporary access points and bus loading zones may be required during construction.

Summary of key closures

723. Construction through the Basin Reserve area will result in lane reductions, reduced access to some side streets, and temporary reconfiguration of intersections. Access from Sussex Street to Cambridge Terrace will be reduced to a single lane, and movements to and from Ellice Street and Hania Street will be restricted at times.

724. Traffic will divert onto Kent Terrace and surrounding routes, with congestion extending back toward the Mt Victoria Tunnel and along Sussex Street. A temporary parallel on-ramp will be built first to maintain SH1 continuity during works on the Sussex Street trench.

725. Drivers will experience noticeable delays, particularly during peak periods, with increased travel times through the Basin Reserve area. While congestion will be more apparent locally, the overall effect on the wider network is assessed as low adverse due to maintained SH1 connectivity and staged construction.

Road network

Basin Stage 3 construction effects

726. Construction Scenario 3 includes the diversion of northbound traffic on Sussex Street around the worksite to access SH1 via the Arras Tunnel and Cambridge Terrace and access to Cambridge Terrace from Sussex Street will be reduced to a single lane for these works.

727. The Aimsun modelling indicates only minor changes in travel time for key movements through the Basin Reserve area, including Route 1 buses between Island Bay and Courtenay Place, which passes directly through the construction area, and general traffic travelling between the Airport and Johnsonville via the Terrace Tunnel. As shown in Table 79, Route 1 experiences an

increase of approximately one minute in both morning and evening peaks, while general traffic experiences an increase of up to four minutes. These increases in journey time are relatively small are expected to have a low effect.

728. Similar increases in travel time are observed on routes that provide alternatives to the Basin Reserve corridor. Bus route 3 between Kilbirnie and Manners Street experiences increases of up to four minutes, while general traffic travelling between the Airport and Johnsonville via the Quays experiences increases of up to three minutes. The change across both direct and alternative routes indicates that traffic is being redistributed across the wider network. I consider that this will have a low adverse effect on the network.

729. During this construction stage, access will also be restricted to and from Ellice Street and Hania Street, which will require local traffic to detour via alternative routes such as Pirie Street and Elizabeth Street. While this will alter traffic patterns within Mount Victoria, the modelling indicates that the wider road network is able to accommodate these changes with only minor impacts on journey times.

730. The Aimsun modelling indicates only minor changes in travel times on routes that continue to pass through the Basin Reserve area despite the temporary access restrictions and local detours. This is in part due to some drivers choosing alternative routes around the construction area, resulting in a redistribution of traffic demand across the wider network, but also due to the sequencing of the works which limits the impact on the existing network.

Table 79: Journey time changes as a result of Basin Reserve construction (stage 3)

Route		AM peak			PM peak		
		Do Min (minutes)	Const. (minutes)	Difference (minutes)	Do Min (minutes)	Const. (minutes)	Difference (minutes)
Bus route 1 Island Bay to Crtny Pl	Car	16	17	+1	15	15	+0.1
	Bus	23	24	+1	23	24	+1
Bus route 1 Crtny Pl to Island Bay	Car	13	13.5	+0.5	14	15	+1
	Bus	23	24	+1	23	23	No change
Bus route 3 Kilbirnie to Manners	Car	25	29	+4	17	20	+3
	Bus	36	39	+3	28	32	+4
Bus route 3 Manners to Kilbirnie	Car	14	14	+0.5	17	16	-1
	Bus	21	22	+1	25	25	N/A
General traffic Airport to Jvl (Quays)	Car	33	36	+3	29	29	N/A
General traffic Jvl to Airport (Quays)	Car	40	43	+3	28	29	+1
General traffic Airport to Jvl (TT)	Car	32	36	+4	25	25	No change
General traffic Jvl to Airport (TT)	Car	36	36	No change	29	30	+1
General traffic Rintoul Road to Courtney Place	Car	8	9	+1.5	7	7	No change
General traffic Courtney Place to Rintoul Road	Car	6	6	+0.5	7	8	+1

Basin Stage 5 construction effects

731. Construction stage 5 includes two-way traffic on Sussex Street, with one southbound lane maintained to provide access to Adelaide Road. Access to Dufferin Street will be maintained for those coming from the Mt Victoria Tunnel and access for eastbound traffic to the schools on

Dufferin Street will also be maintained via a short right-turn pocket. This is slightly different to the layout shown in the indicative staging figures presented above.

732. Similarly to construction Stage 3, the Aimsun modelling indicates only minor changes in travel times for movements continuing through the Basin Reserve area. This includes bus route 1 betweeen Island Bay and Courtenay Place, and general traffic travelling between the Airport and Johnsonville via the Terrace Tunnel. As shown in Table 80, changes in journey time for these movements are generally limited to approximately three minutes or less, with some routes showing little change or slight improvements in travel time. This demonstrates that the road network surrounding the Basin Reserve continue to operate effectively during this construction stage.

733. Larger changes are observed for movements between Kilbirnie and Manners Street (bus route 3). In the AM peak, journey times increase by up to approximately eight minutes for general traffic and 9 minutes for buses for buses travelling towards the CBD. This reflects changes in traffic distribution across the network during this stage of construction and the increased demand on these routes providing alternative access to the CBD. I consider this will result in a moderate adverse effect on the network.

Table 80: Journey time changes as a result of Basin Reserve construction (stage 5)

Route		AM peak			PM peak		
		Do Min (minutes)	Const. (minutes)	Difference (minutes)	Do Min (minutes)	Const. (minutes)	Difference (minutes)
Bus route 1 Island Bay to Crtny Pl	Car	16	18	+2	15	15	-0.2
	Bus	23	24	+1	23	23	No Change
Bus route 1 Crtny Pl to Island Bay	Car	13	19	+6	14	17	+3
	Bus	23	22	-1	23	22	-1
Bus route 3 Kilbirnie to Manners	Car	25	33	+8	17	16	-1
	Bus	36	45	+9	28	26	-2
Bus route 3 Manners to Kilbirnie	Car	13	19	+6	16	19	+2
	Bus	21	28	+7	25	28	+3
General traffic Airport to Jvl (Quays)	Car	33	36	+3	29	31.0	+2
General traffic Jvl to Airport (Quays)	Car	40	39	-1	28	28	No Change
General traffic Airport to Jvl (TT)	Car	32	30	-2	25	25	No Change
General traffic Jvl to Airport (TT)	Car	36	37	+1	29	26	-3
General traffic Rintoul Road to Courtney Place	Car	8	11	+2	7	9	+2
General traffic Courtney Place to Rintoul Road	Car	6	11	+6	7	10	+3

734. A temporary access arrangement for the Dufferin Street service lane will remain in place for several months, and I anticipate that this will cause delays for vehicles, specifically accessing St Mark's School and Wellington College. I expect that queues have the potential to extend onto the state highway and adjacent streets during peak school drop-off and pick-up times, although impacts will be mitigated through off-peak scheduling and communication with affected schools. With appropriate management of the works, I consider that the risk of that queue extending can be mitigated, and therefore I expect this will result in a low adverse effect.

735. Short-term lane closures lasting hours to days during traffic switch phases will temporarily block main access routes, requiring detours and increasing travel times for local trips. Minor intersection closures will also contribute to delays and inconvenience for drivers, which I expect will have a moderate adverse effect on the network.

736. Two northbound and two southbound SH1 lanes will remain operational between the Mt Victoria Tunnel and Vivian Street / Arras Tunnel throughout the construction period, maintaining connectivity.

737. The Constructability Report identifies a potential diversion associated with the lane reduction at the Basin corner of Buckle Street and Dufferin Street via Pirie Street and Hania Street, before merging onto SH1 via Ellice Street. This diversion would redirect a substantial amount of state highway traffic onto Hania Street, which is a local street and services several businesses. The effects associated with the lane reduction at Bogarts Corner are considered to be less adverse than the introduction of significant through-traffic onto Hania Street, which I anticipate would induce a moderate adverse effect.

738. A temporary parallel two lane on-ramp into the Arras Tunnel will maintain continuous SH1 traffic flow during works on Sussex Street, preventing significant congestion on the state highway network. This will be reduced to a single lane during stage 6, which reflects the operational layout.

739. A significant proportion of works will occur offline to construct new grades and alignments, reducing direct impacts on live traffic lanes. While site access to and from SH1 lanes will be required at times, I do not anticipate earthwork volumes to significantly affect existing congestion (refer to detailed assessment below), therefore I expect the effect to be negligible.

740. In addition, I understand from Mr David Hoffman that night works will be utilised to allow more restrictive traffic controls to be implemented outside peak periods, reducing disruption at peak times.

Parking

741. As per the constructability report, a minimum of 36 spaces will be closed for the entire Basin Reserve construction duration (approximately 18 on Sussex Street , 9 on Hania Street and 9 on Ellice Street), and 94 will have intermittent availability. I assessed the permanent loss of parking in Chapter 7. A summary of these parks is shown in Table 81.

Table 81: Construction parking unavailability (Basin Reserve)

Location	Number of Parks	Indicative duration
Rugby Street	Approx. 24 parks*	During realignment of Rugby Street
Sussex Street	Approx. 18 parks*	Full construction duration
Ellice Street	Approx. 9 parks	Full construction duration
Hania Street	Approx. 9 parks	Full construction duration
Cambridge Terrace	Approx. 2 parks	During realignment of the terraces
Kent Terrace	Approx. 32 parks*	During realignment of the terraces
Cricket Museum parking	Approx. 36 parks	Temporary restrictions

*Note that these bays are permanently removed.

742. Whilst the loss of these parks will result in increased occupancy in nearby parks, and potentially increased walk distance for those who are parking, I consider the effects to be low given the distributed nature of the parks.

Property access

743. People accessing the Basin Reserve from the west side via Sussex Street will face temporary restrictions during Stage 5. Drivers will need to use alternative entry points, which I anticipate will increase travel time and reduce convenience for users.

744. It is my understanding that parents and caregivers accessing St Mark's School and Preschool will generally retain access throughout construction, but short disruptions may occur during trenching or drainage works, which could affect school pick-up and drop-off times. I expect that these impacts will be mitigated by scheduling works during holiday periods, weekends, or other times of lower use, and by using temporary cover plates and off-peak work.

745. During reconstruction of Dufferin Street, access to the Dufferin Street service lane may be controlled, however, pedestrians will still be able to access St Mark's School via at least one of the two entry points.

746. It is my understanding that vehicular access to Wellington College will be maintained throughout construction and I consider that this is an essential component of the construction methodology.

747. People traveling along Adelaide Road will experience traffic shifts and changes to pedestrian facilities. I anticipate that these adjustments may create uncertainty for drivers and pedestrians and could increase travel times for buses and vehicles accessing the schools and Government House.

748. Event attendees will need to navigate temporary access arrangements during major events such as cricket matches or ANZAC Day commemorations. Pedestrian routes will be clearly delineated from construction zones, but some events may require temporary access through the site, which I expect will increase walking distances and require active crowd management.

749. Visitors to Government House will retain access throughout construction, although they may need to use alternate routes via Hospital Road, which is already the primary entrance gate for tours.

Public transport effects

750. School bus passengers who normally use the Dufferin Street service lane stop (Metlink stop #6010) will need to board at a temporary location during reconstruction phases. The stop will be relocated approximately 100 m south to Rugby Street (or Adelaide Road), which will require some passengers to walk further to catch the bus, however some will be required to walk less. For regular commuters, I expect this change to be negligible, as the relocation is considered short.

751. Passengers may experience slightly longer travel times to the hospital, depending on their route. I anticipate that temporary closures and traffic switches around the Basin Reserve may increase congestion at some times, and buses may experience delays. I presented the modelling of journey times above, where I showed that the bus journey times did not increase by a significant amount. I do note that this location is identified as having poor reliability for services at present. As a result the baseline is against relatively poor reliability, and therefore during construction I would anticipate there would remain an expectation of continued unreliability. Therefore, I expect the effect of this to be low.

Active transport network

752. People walking or cycling along the Commonwealth Walkway between Pukeahu National War Memorial Park at Tory Street and Cambridge Terrace will experience closures for the full duration of construction of the Sussex Street Trench and overbridges, as well as during the

relocation of the Home of Compassion Creche. The alternative route for pedestrians travelling east west is the Old Buckle Street pathway. However, this pathway will be closed early on in construction works up until SH1 traffic is on the new alignment and the slip lane from Sussex Street has been reduced to a single lane.

753. These closures result in pedestrians and cyclists needing to detour around the south side of the Basin along Tasman Street and Rugby Street, increasing travel distances and reducing convenience for both commuters and recreational users. If considering the increased distance from Tasman Street to the northern entrance of the Basin Reserve, this distance approximately doubles, however this does not depict the exact detour route users will take and is more to demonstrate comparative distances. I consider the adverse effect of this is low.

754. During complex works on the Sussex Street trench and SH1 overbridge, the eastern side of the Basin Reserve will serve as the primary diversion route for pedestrians and cyclists. I anticipate that this will maintain connectivity but concentrate users into narrower corridors, increasing the potential for congestion and conflict between modes. However, I expect the effect of this to be negligible.

755. Major public events such as ANZAC Day commemorations, Basin Reserve cricket matches, and National War Memorial events will require additional coordination. Temporary access through the site may be needed, creating uncertainty for event attendees and requiring clear wayfinding and crowd management to maintain safety. These events will be managed on an individual basis and access will be maintained where possible, therefore I expect the effect will be low on the basis that the bespoke event planning is undertaken and the timing of the events is considered when programming the works.

756. Around school access points, alternating traffic flows and active construction zones will increase safety risks for pedestrians. Children and caregivers may face more complex crossing conditions, requiring temporary crossings and clear delineation of routes to avoid conflicts with construction vehicles. However, it is my understanding that these routes are used predominantly by regular students and caregivers who are already familiar with the area and travel patterns, meaning users are more likely to quickly adapt to the temporary changes. Therefore, I expect the overall effect negligible.

757. Footpath closures around the Basin Reserve will be required. As these will be temporary and staged to minimise disruption, I expect the effect of this to be negligible.

Summary of effects

758. A summary of the effects that have been rated above negligible, is shown below in Table 82.

Table 82: Summary of effects for the Basin Reserve section

Category	Effect	Effect rating
Road network	Traffic delays and congestion, as a result of lane reductions, restricted access at key intersections, and traffic diversions in the Basin Reserve area, particularly during peak periods.	Moderate
Road network	Access delays affecting St Mark's School and Wellington College, as a result of stop-go traffic management on Dufferin Street.	Low
Road network	Delays and disruption to local travel, as a result of short-term lane and minor intersection closures during traffic switch phases.	Moderate
Road network	Increase in congestion around the basin as a result of the reduction to one traffic lane in each direction between Adelaide Road and Kent / Cambridge Terrace.	Low
Road network	Increased traffic and reduced amenity on Hania Street, as a result of SH1 traffic being diverted onto it for multiple years.	Moderate
Public transport	Increased delays and decreased reliability for those travelling by public transport around the Basin Reserve, particularly those travelling to the	Low

Category	Effect	Effect rating
	hospital, as a result of temporary closures and traffic switches around the Basin Reserve.	
Active transport	Increase travel distances and reduced convenience for active mode users who usually use the Commonwealth Walkway, as a result of the path closures.	Low
Active transport	Uncertainty for event attendees at major public events in the area due to temporary access requirements.	Low

Mt Victoria Tunnel – Section 4

Construction stages

759. The Mt Victoria Tunnel section involves a series of works to deliver a new tunnel, upgrade the existing tunnel infrastructure, and improve active transport connections. These works will occur over several years and include the following key stages:

    i. Close Paterson St for duration of works and clear site around western portal

    ii. Construct new tunnel services building, and temporary facilities as required, relocate services from the existing tunnel to these to maintain operation

    iii. Excavate and construct western portal

    iv. Advance tunnel from west to east

    v. Excavate and construct eastern portal

    vi. Complete cross passages and pavement on approaches

    vii. Switch traffic to new tunnel in a bidirectional flow mode with one lane in each direction

    viii. Open new tunnel shared path to users

    ix. Refurbish existing tunnel

    x. Open permanent traffic arrangement with two lanes of single direction traffic in each tunnel

Summary of key closures

760. Construction is proposed to maintain at least one lane in each direction on SH1 for most of the works. Cross-passage construction will occur after the new tunnel is operational, avoiding major disruption. Portal strengthening, services works, and blasting activities will require night-time or short-duration closures.

761. In the event of any closure, traffic would reroute via Hataitai Road, Evans Bay Parade and Constable Street.

762. A full multi-week closure was considered but is not proposed due to significant disruption. Night-time closures, including brief closures for blasting after 9 pm, are expected to have low adverse effects, as traffic volumes are lower and queues can dissipate before peak periods.

Tunnel closures

763. I understand from Mr Hoffman's report that construction of the Mt Victoria Tunnel section is to be managed in a manner that maintains a lane in each direction for SH1 for the majority of the time. The refurbishment of the current tunnel will be carried out after the new tunnel is available and temporarily used in a two-way configuration, mimicking the existing arrangement. As such I consider this proposed approach to construction to have a negligible effect on road traffic.

764. Similarly to the Terrace Tunnel section, three scenarios have been considered as part of the Constructability Report for cross passage breakthrough works. Scenario 1 considers a four-week long closure of the tunnel. Figure 106 below provides a summary of differences in daily volumes. Red lines demonstrate where there is a decrease in traffic, and blue demonstrates where there is an increase in traffic. The thickness of the line reflects the scale of difference. This indicates that in the event of a closure traffic would be expected to redistribute relatively evenly onto alternative local roads – namely Hataitai Road, Evans Bay Parade, and Constable Street – meaning that these roads would be operating at capacity for periods of the day. I consider the effects to cause significant disruption and therefore consider this scenario to be not acceptable.

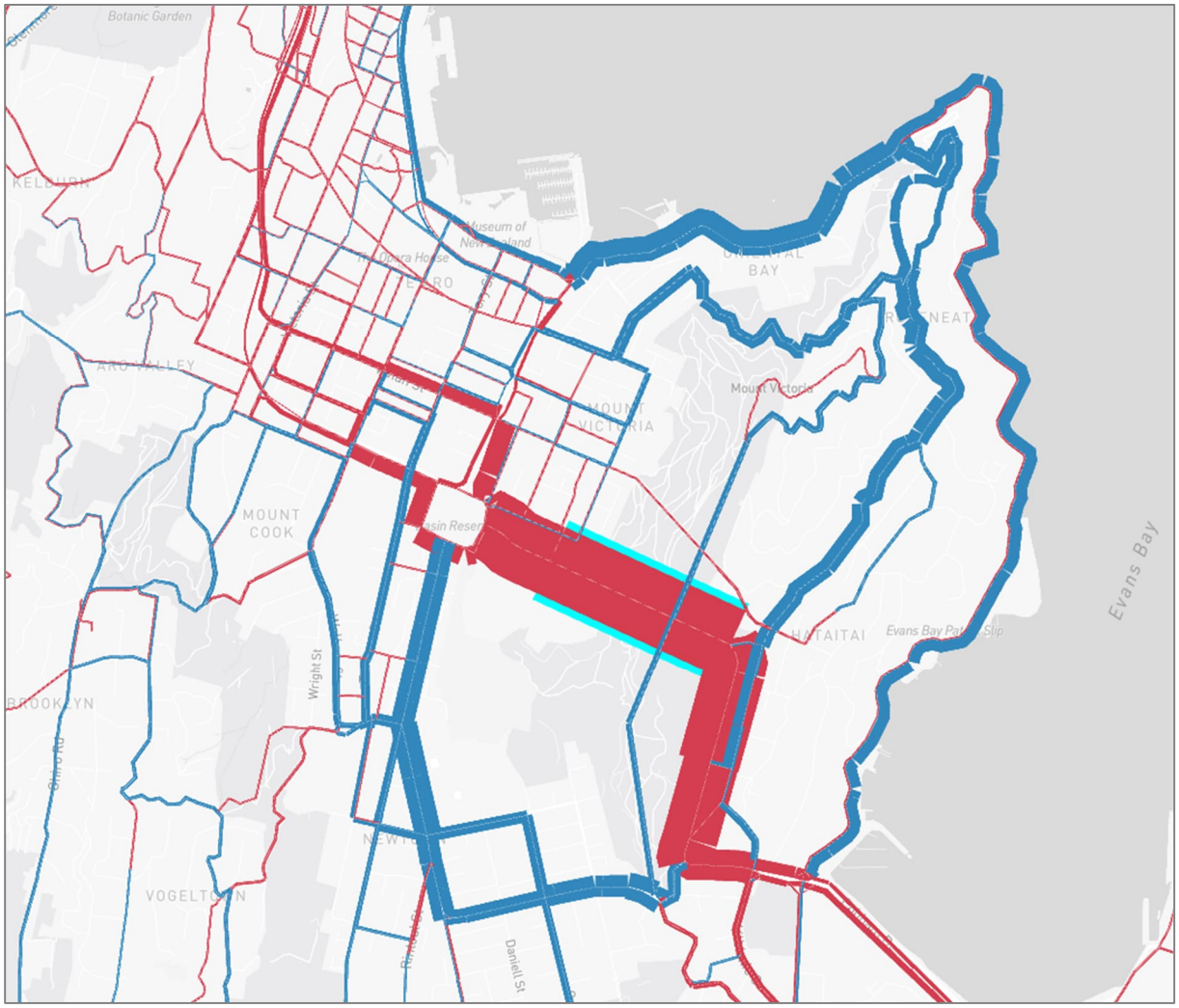


Figure 106 – Mt Victoria Tunnel closure traffic flow difference plot

765. Scenario 2 from the Constructability Report includes a methodology where cross passage breakthrough works will be able to occur following the opening of the new tunnel, therefore without disruption to traffic or any adverse effect.

766. Portal strengthening and tunnel services modifications will require either a single lane closure for multiple months, or off-peak and night closures. A single lane closure for multiple months would require either eastbound or westbound traffic to reroute, onto routes that are already at capacity and therefore, cause significant disruption. I consider this effect to be high.

767. I expect the effect of overnight closures is not as high due to the reduced traffic volumes at these times and limited trips being made, however, in the event of weekend closures, more traffic will need to reroute.

768. While the weekend closures are planned for off-peak periods, I anticipate they will still cause noticeable delays and congestion on detour routes and people may change the way that they travel. Therefore, I consider this to have a moderate effect.

769. Blasting activities will require regular full closures of the existing tunnel from 8-10pm each day for a period of up to six months. It is my understanding that these interruptions will be brief and scheduled in advance, but they will cause complete traffic holds during each blast, with the possibility of emergency repairs requiring longer closures with no prior notice.

770. Traffic volumes at this time of the day remain moderately high, however, network demand decreases after 8pm providing capacity for any queues that form during the closure to dissipate following reopening of the tunnel. As a result, I do not expect any residual congestion to extend into peak travel periods or other times of high network demand.

771. In contrast, closures earlier in the morning would occur during a period when there is limited opportunity for travellers to adjust departure times and would be more likely to result in congestion continuing into the morning peak. Accordingly, restricting blasting activities to after 8 pm represents the least disruptive option from a traffic perspective, and I expect the adverse effect is low.

Paterson Street closure

772. With Paterson Street being fully closed for the duration of the works, this removes a key route to Wellington East Girls' College, requiring parents, caregivers, and students to reroute via Austin Street and Ellice Street.

773. Due to the previous construction of the school Main Block and West Wing project, I am aware there is already a precedent set by the school which involves dropping off and collecting students at least a block away from the school gates. Parents will need to be informed of similar instruction with the closure of Paterson Street.

774. I consider the effect to be moderate for those accessing the school and local residents, but negligible for the wider community, as the effects are very localised.

Parking

775. From the commencement of works until the completion of the realigned Paterson Street, approximately 89 on-street parking spaces will be unavailable. Of these 89, around 33 spaces are planned for permanent removal to accommodate the proposed layout. I have already assessed the operational effect of this loss in the prior chapter.

776. During construction, the following restrictions will apply:

    i. Approximately 10 spaces on Austin Street will be unavailable to facilitate two-way traffic. Eight of these will be reinstated once works are completed

    ii. Paterson Street will be blocked off for construction, resulting in the loss of approximately 32 spaces for the duration of the works

Table 83: Construction parking unavailability (Mt Victoria Tunnel)

Location	Number of Parks	Indicative duration
Austin Street	Approx. 10 parks	Full construction duration
Paterson Street	Approx. 31 parks	Full construction duration
Ellice Street	Approx. 10 parks	Full construction duration
Hania Street	Approx. 29 parks	Full construction duration
Brougham Street	Approx. 9 parks	Full construction duration

777. It is my understanding that all of the parking spaces on Austin Street and Paterson Street are either ‘resident parking’ or ‘coupon parking’, therefore indicating these are being used by nearby residents. Residents that live on Paterson Street or Austin Street, and usually utilise the on-street parking, will need to find a park elsewhere. For some residents, the nearest possible parking is approximately 150 m away. However, residential parking demand will be reduced due to the removal of the existing properties along Paterson Street.

778. With the closure of Paterson Street, the access to the school is anticipated to be restricted at times (discussed in the following section), which will limit access to on-site parking. It is anticipated that during the restrictions of the Paterson Street access, traffic will be rerouted to the Austin Street entrance and directed internally within the school, maintaining access to the on-site parking.

779. It is also possible that up to 15 spaces may be unavailable at the Hataitai Netball Pavilion parking area if this section is used as a site office and work area for the new pedestrian overbridge.

780. The netball pavilion currently provides 113 parking spaces, and also uses the adjacent velodrome car park, which offers 79 spaces, as overflow parking. Therefore, the loss in 15 car parking spaces represents a potential reduction of approximately 8%. As a result, I expect the overall impact of this temporary loss is considered negligible.

Property access

Wellington East Girls’ College access

781. With the closure of Paterson Street, the primary Paterson Street access to the school will be closed from the commencement of works until completion of the new tunnel cut-and-cover section, enabling the formation of the new access. This closure is expected to span the entire construction duration for this section. As discussed previously, pick-up and drop-off will be encouraged to take place at least a block away from the school gate. Those that are parking within the school grounds, such as staff, will need to be made aware of the Paterson Street access closure.

782. Traffic currently using the Paterson Street driveway will be rerouted to the Austin Street driveway and directed internally within the school. This change will concentrate all vehicle movements at a single-entry point, potentially causing congestion during peak drop-off and pick-up times and requiring additional traffic management measures.

783. The existing one-way roading system within the school grounds will need to change to account for the two-way traffic through this single access.

784. While the access steps on Paterson Street may remain open, pedestrian access along Paterson Street will be blocked where the road section is closed. Students will be required to detour via Austin Street and Ellice Street, and low-mobility access will be available via Austin Street.

785. Just west of the Mt Victoria Tunnel entrance, the existing pedestrian route leading uphill to Wellington East Girls’ College will remain open, meaning students can continue to catch buses from the area in front of St Mark’s School without disruption. This provides continuity for those arriving to the school via these bus services.

786. During works around the new tunnel western portal and final pavement reinstatement for the Paterson Street driveway, access to the school from the end of Austin Street may be temporarily closed for several weeks. During this period, all vehicle access to the school will be restricted, requiring alternative arrangements for drop-offs, deliveries, and emergency access.

787. The temporary closure of vehicle access to the school for several weeks will restrict all vehicle access and create disruption to normal routines. Staff parking within the school grounds will be unavailable, and parents and caregivers who typically drive into the school grounds for drop-off and pick-up will not have this option. I anticipate that this change will increase demand for on-street parking in the local area, even if just short term. As a result, I expect some parents may need to park further away and students walk longer distances, potentially leading to congestion on nearby streets and increased safety risks during peak periods. I therefore consider this to have a moderate adverse effect if the closure were to occur in term time. The effect would be much lower should the closure occur outside term time, something that would be considered buy the proposed conditions to have a Traffic Access Management Plan for the School.

Paterson Street residential property access

788. Access to properties on Paterson Street will not need to be maintained, as this section of construction involves the demolition or relocation of these properties. Once the sites are cleared, residential property access will no longer be applicable.

Public transport network

Western portal

789. On the western side of the tunnel, primary bus services for Wellington East Girls College are expected to continue using the Ellice Street bus stop (Metlink Stop No. 6008) throughout construction. In some phases of construction access for school buses may need to divert via Elizabth Street, instead of accessing via Ellice Street. Because these services will remain operational and accessible, I expect the effect on public transport availability is expected to be low adverse, with relatively minor changes to routes or timetables anticipated.

790. There is, however, a possibility that parents may use bus stops for school drop-offs and pick-ups. I anticipate that this could temporarily obstruct buses and create safety concerns for passengers. While this would likely be a localised and short-term issue, I expect the effect on bus operations would be low and easily managed through enforcement of parking restrictions.

Eastern portal

791. With the closure of Taurima Street on the eastern side of the tunnel, people intending to drive through the Mt Victoria tunnel will need to detour via Moxham Avenue. I anticipate that this will increase traffic volumes down Moxham Avenue, which is a key bus route, however travel times are expected to significantly improve in the AM peak and be negligible in the PM peak with the Project construction works. This is due to the effects of queues from Taurima interfering with the Moxham Road traffic flows.

792. As per the Constructability Report, the Hataitai Connection bridge and interchange would be completed prior to removing the Taurima Street access point, which will provide a viable detour route that maintains traffic flows and turn options for those intending to travel through the Mt Victoria tunnel. This sequencing is important as there is not the capacity for the traffic to divert via the Goa Street intersection, with right turns onto Ruahine Street especially (towards Mt Victoria Tunnel) in peak traffic very difficult. Considering this detour route, I expect the adverse effect of these delays to be low.

Active transport network

Closure of Mt Victoria Shared Path

793. With the closure of the shared path through the existing tunnel, there will be no pedestrian or cyclist access through the tunnel for a duration of years, removing a key direct link for active mode users between the Basin Reserve and the Hataitai shops.

794. As a result, I anticipate there will be a range of responses. Some users will continue via an alternative route, some will choose to travel by e-bikes or e-scooters on alternative routes, and some will choose to travel by car or bus.

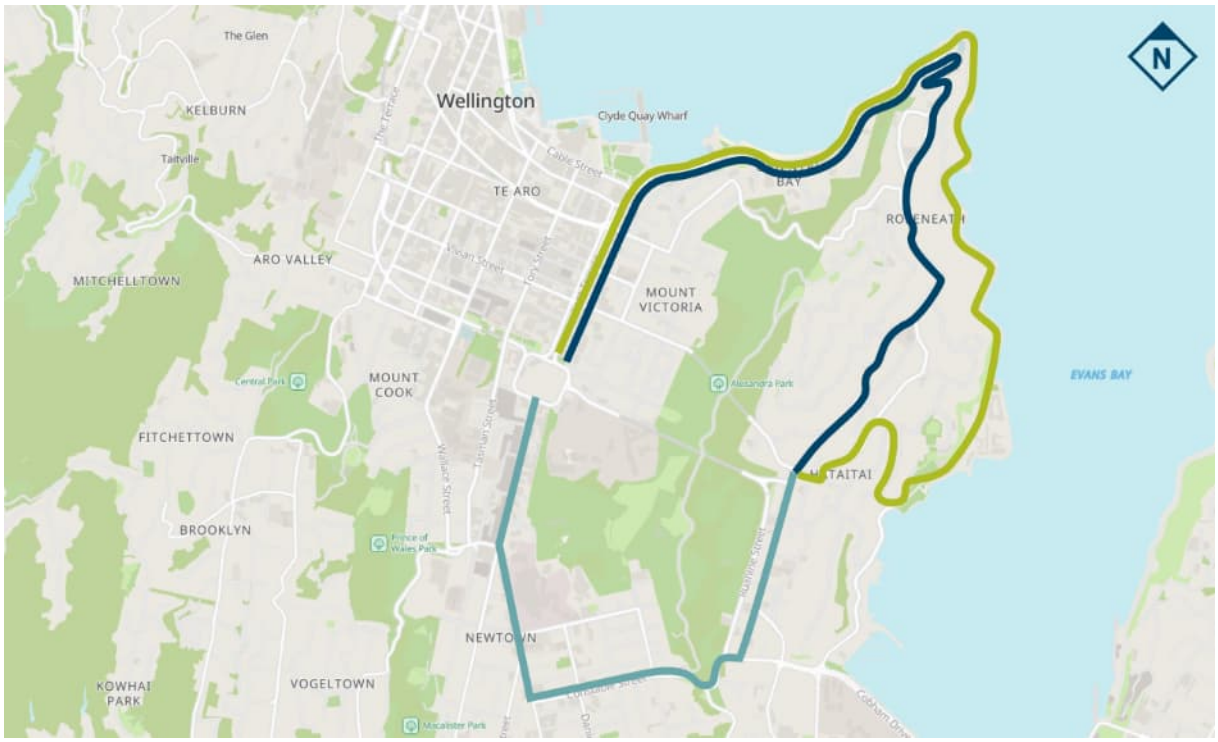
795. Presently, the existing route between the Basin Reserve and the Hataitai Shops is 1.3 km long and has an elevation change of around 30 m, making it a practical and accessible option for most users. Assuming users require a paved surface equivalent to the existing Shared Use Path, for example to use an e-scooter, the three primary alternative options are:

    i. Via Cambridge Terrace, Oriental Parade, Carlton Gore Road, Grafton Road, and Hataitai Road – 5.2 km with approximately 90 m of elevation change

    ii. Via Cambridge Terrace, Oriental Parade, Evans Bay Parade and Waipapa Rd – 6.3 km with approximately 65 m elevation change

    iii. Via Newtown and Constable Street to Moxham Avenue – 3.8 km with 60 m elevation change

796. It should be noted that the routes outlined are not intended to depict the exact detour routes users will take and are more to demonstrate comparative distances and changes in elevation. Most longer distance trips will involve more practical movements between the CBD and Hataitai rather than following these prescribed paths. An example is anyone longer distances would be able to adjust their overall route to minimise the relative difference in journey length.


The Glen
KELBURN
Wellington
Clyde Quay Wharf
Tinakori Road
Cable Street
Tasman Street
Tory Street
Vivian Street
Tainui Street
Tainui Street
Tainui

generally consist of compacted gravel and therefore mainly suitable for MTB type cycles rather than small wheeled scooters. However, they involve noticeably greater elevation changes compared with the current tunnel route, which may reduce their practicality for some users. These options are mentioned for completeness only and are not expected to form the primary diversion routes.

798. I note that there will be a period when the new eastern tunnel portal is being constructed where a section of the Hataitai to City Walkway adjacent to the eastern tunnel portal is not available. In this case the remaining route would need to be via Hataitai Park and the walking track that goes to Alexandra Road from adjacent to the gymnastics facility. From there cyclists could use Alexandra Road and pedestrians the path that runs parallel and rejoins to Hataitai to City Walkway some 750m north.

799. There is also a potential alternative for pedestrians to walk alongside Alexandra Road itself, as there is currently a formed path within the shoulder space, which is presently signposted for pedestrian use. I have shown some photos in Figure 108. While there are some sections along this route where pedestrians may be uncomfortably close to live traffic, particularly larger vehicles such as tour buses. Overall, all these routes involve a long detour, although they do retain some connection.



Figure 108 – Pedestrian path along the eastern side of Alexandra Road

800. I anticipate these changes will add considerable distance and additional effort to daily commutes during construction, making walking and traditional cycling less convenient and potentially discouraging active travel for some users. Given the number of pedestrians and cyclists using the tunnel each day, and considering these alternative routes are significantly longer and more challenging, I consider the effect on these users to be very high.

801. For the significant portion of users that already use e-bikes or e-scooters, or those that choose to change mode to them, I expect the effect is likely to be less pronounced. I understand that the additional distance and elevation will be easier to manage with powered devices, meaning users can maintain similar effort compared to their previous route. However, the longer routes may still affect convenience and battery range.

802. Overall, I expect the greatest impact will fall on pedestrians and cyclists, while e-bike and e-scooter users will experience a moderate adverse effect.

Summary of effects

803. A summary of the effects that have been rated above negligible, is shown below in Table 84.

Table 84: Summary of effects for the Mt Victoria section

Category	Effect	Effect rating
Road network	Rerouting of either westbound or eastbound traffic through the Mt Victoria Tunnel onto routes that are already at capacity.	High
Road network	Rerouting traffic through the Mt Victoria Tunnel onto routes that are already at capacity, as a result of weekend closures of the whole tunnel.	Moderate
Road network	Short-term traffic delays, as a result of regular brief full traffic stoppages after 9pm for blasting activities.	Low
Road network	Rerouting of school traffic, as a result of the closure of Paterson Street.	Moderate
Property access	Increased demand for on-street parking around Wellington East Girls' College, meaning parents will need to park further away and there may be congestion on nearby streets and increased safety risks, as a result of the school vehicle access closure.	Moderate
Public transport network	Use of bus stops for pick-up and drop-off for the school.	Low
Public transport network	Rerouting of traffic via the Hataitai Connection bridge and overpass to as a result of the closure of Taurima Street. =	Low
Active transport network	Considerable distance added to commutes for those who walk or cycle, as a result of the closure of the Mt Victoria Tunnel shared path.	Very high
Active transport network	Considerable distance added to commutes for those who travel by e-bike or e-scooter, as a result of the closure of the Mt Victoria Tunnel shared path.	Moderate

Eastern Connections – Section 5

Construction stages

804. This section covers works from the eastern portal grade separation through to Cobham Drive and includes the widening of Ruahine Street and Wellington Road, construction of the Hataitai Connection bridge, upgrades to local road intersections in Hataitai and Kilbirnie, and the installation of a new stormwater main.

805. The Hataitai Connection bridge and interchange will be completed prior to the removal of the Taurima Street and existing Goa Street access points. Should the Hataitai Connection bridge not be complete prior to the removal of the Hataitai Park active travel bridge, safe access from Hataitai to Hataitai Park will be limited until the completion of the replacement active travel bridge.

806. Works to install the new stormwater pipe between Ruahine Road near Goa Street to Evans Bay are expected to have minimal impact on traffic overall.

Summary of key closures

807. Widening works on Wellington Road will involve staged construction with multiple traffic switches, while maintaining one lane in each direction during peak periods. Construction of the Hataitai Connection bridge will require short-duration off-peak or overnight closures of SH1 for bridge lifts and deck construction.

808. During short-term closures, traffic will detour via Taurima Street, Moxham Avenue and Hamilton Road. Access to Hataitai Park will be temporarily restricted during traffic switches.

809. Prior to the long term closure of Taurima Street, the Hataitai Connection bridge will be opened and a temporary access to from SH1 to the new service lane which will facilitate access to and from Hataitai.

810. Traffic speeds are expected to reduce during works, but impacts are limited by staging and off-peak scheduling. Short-duration closures and temporary access restrictions result in low adverse effects.

Road network

811. Construction for the widening works will be staged and managed throughout this section to maintain one lane in either direction during workdays and peak hours. While re-alignment works on Wellington Road will require multiple traffic switches, it is my understanding that access and traffic movements should be maintained. Traffic speeds are likely to be reduced, however I consider that this will have a negligible impact given peak hour traffic speeds are low.

812. During the construction of the new Hataitai Connection bridge and interchange at the Hataitai Park access several options have been considered in the Construction Methodology.

813. Under Scenario 1, SH1 traffic would be diverted into the northbound alignment and the future on- and off- ramps, allowing the new overbridge to be constructed offline while maintaining uninterrupted traffic flow on the state highway. However, this would require the closure of vehicle access to Hataitai Park for an extended period, up to several months. While this scenario minimises disruption to SH1 traffic operations, it would result in a significant loss of access to Hataitai Park, which I consider not to be acceptable, as maintaining vehicular access is critical for the function of the Hataitai Park activities.

814. Under Scenario 2, closures would be required on SH1 for a short-duration during off-peak or overnight periods to facilitate bridge beam lifts and deck construction, with traffic likely detoured via Goa Street, Moxham Avenue, and Hamilton Road during these periods. Access to Hataitai Park would be temporarily closed only to enable traffic switches, with closures lasting from hours to a few days. This approach reduces the duration of park access disruption but introduces traffic disruption during off-peak or overnight construction activities and I consider the effect of this to be low.

815. Scenario 3 provides flexibility for SH1 traffic to either remain on the existing alignment during bridge construction or be diverted to the new on- and off-ramps as required. Bridge construction involves short-duration off-peak or overnight closures. Access to Hataitai Park would be closed for short periods (days to weeks) on two occasions to allow reconstruction of the access during the initial diversion and final alignment stages. I consider the effect of this to be low.

816. As mentioned in the public transport network effects, the full closure of Taurima Street during eastern portal construction will create some disruption as road users intending to drive between Hataitai Village and the Mt Victoria tunnel will need to detour via Moxham Avenue.

817. For eastbound users travelling into Hataitai, access will require travelling further along SH1 Ruahine Street and entering Moxham Avenue via the new service lane running parallel to Tapiri Street, approximately 100 m south of Tapiri Street. I've shown this in Figure 109. The Aimsun modelling estimates that this detour will add approximately one minute to journey times during both the morning and evening peak periods, which I consider to have a negligible effect.

818. For westbound users travelling towards the Mt Victoria Tunnel, the Constructability Report states that the Hataitai Connection bridge and interchange should be completed prior to removing the Taurima Street access point. As such, users will travel southbound along Moxham Avenue access SH1 Ruahine Street via the Hataitai Connection Bridge and interchange, which I've shown in Figure 109. This provides a viable detour route that maintains traffic flows and turn options for those intending to travel from Hataitai Village through to the Mt Victoria tunnel. Aimsun modelling indicates that increases in journey time during both peak periods are negligible.



Figure 109 – Detour travel time between Mt Victoria Tunnel and Hataitai shops due to Taurima Street closure

819. These works also include a temporary closure of Wellington Road at its intersection with SH1 Ruahine Street. As a result, users travelling between the eastern suburbs and Newtown will be required to divert via Kilbirnie and Crawford Road.

820. In the morning peak, traffic volume changes across the network are generally minimal. Reductions are observed along the SH1 corridor through and east of the Mt Victoria Tunnel, including decreases on Cobham Drive westbound (-250 vehicles) and within the Mt Victoria Tunnel (-100 vehicles eastbound), indicating some suppression of inbound demand through the construction area.

821. In the evening peak, these reductions persist along the eastern SH1 corridor, with decreases through the Mt Victoria Tunnel eastbound (-150 vehicles). Minor increases are observed along alternative routes such as through Kilbirnie and around the bays.

822. Aimsun modelling, which alongside including the closure of Wellington Road also includes the closure of Taurima Street and a reduced speed through the construction area, indicates generally minor changes in journey time across the wider network. As shown in Table 85, users travelling along SH1 between the Airport and Johnsonville will experience changes in travel times of up to approximately four minutes. Based on this modelling, this will have a low adverse effect.

823. Figure 110 shows this route as well as general traffic travelling from the Airport to Bowen Street (around the bays) and bus route 3 travelling from Kilbirnie to Manners Street (through Newtown). For users travelling this route from Kilbirnie to the CBD, journey times decrease in both the AM and PM peaks for both general traffic and buses.

824. Journey time changes around the bays are also minimal, with most of increased delay occurring along Cobham Drive. Therefore, based on the modelling, I consider the effect on parallel routes to be negligible.



Figure 110 – Travel Time changes due to Eastern Connections construction works

Table 85: Effects of Taurima Street closure on journey time

Route		AM peak			PM peak		
		Do Min (minutes)	Const. (minutes)	Difference (minutes)	Do Min (minutes)	Const. (minutes)	Difference (minutes)
Bus route 3 Kilbirnie to Manners	Car	25	19	-6	17	13	-3
	Bus	36	28	-8	28	24	-4
Bus route 3 Manners to Kilbirnie	Car	13	14	+1	16	17	+0.6
	Bus	21	23	+2	25	27	+2
Bus route 14 Kilbirnie to Wilton	Bus	67	67	No Change	67	65	-2
Bus route 31x Miramar to Courtenay	Bus	23	21	-2	24	20	-4
Bus route 31x Courtenay to Miramar	Bus	37	25	-12	17	16	-1
AX Airport Express Airport to Courtenay	Bus	23	24	+1	21	19.9	-1
AX Airport Express Courtenay to Airport	Bus	38	27	-11	19	18	-1
General traffic Airport to Jvl (Quays)	Car	33	35	+2	29	27	-2
General traffic Jvl to Airport (Quays)	Car	40	39	-1	28	29	+1
General traffic Airport to Jvl (TT)	Car	32	36	+4	25	21	-4
General traffic Jvl to Airport (TT)	Car	36	35	-1	29	31	+2
General traffic Airport to Bowen	Car	27	30	+3	22	20	-2
General traffic Bowen to Airport	Car	21	21	No Change	17.9	18.4	+0.5

825. As part of the works to build traffic islands, the stormwater infrastructure will require some traffic management, but I do not anticipate this to limit traffic movement except at discrete locations on local roads.

Parking

826. At the commencement of works, approximately 104 parking spaces will be removed, which is equivalent to the scenario at completion of the Project considered earlier in this report. Permanent works within this section will result in the removal of approximately 56 parking spaces along SH1 (Ruahine Street and Wellington Road) and an additional 49 spaces along local roads, including Taurima Street, Goa Street, Moxham Avenue, Hamilton Road, Evans Bay Parade and in Hataitai Park.

827. For a period of several weeks, access to Hataitai Park may be restricted to enable pavement works along the existing Goa Street west of Ruahine Street. This restriction will temporarily prevent access to around 264 parking spaces within Hataitai Park and will need to be carefully managed to coincide with periods of low demand. Access would still be available by foot, but I anticipate this may place a high transfer of demand to the on-street parking in Hataitai near pedestrian accesses.

Property access

828. During the period of closure of Taurima Street, access will need to be maintained to the properties on this street. Temporary traffic management will need to allow for continued pedestrian access where possible and staged works will help maintain business operations and residential access. I consider the effect on local access to be low due to the duration of restrictions and active on-site management. While users may experience temporary inconvenience, clear communication and traffic management will minimise impacts.

829. Similar to Paterson Street, access to Hataitai Kindergarten will not need to be maintained, as this section of construction involves the demolition of this property. Once demolition is complete, property access will no longer be applicable.

830. It is my understanding that access to 23 properties located directly on SH1 or Walmer Street within the works zone for the SH1 alignment between Wellington Road and Kilbirnie Crescent may be restricted at times. Vehicle access will require coordination with on-site activities, as cars may need to pass through the construction area. Temporary steel cover plates can be used to bridge small trenches if necessary to maintain access. I consider the effect of this to be negligible.

Public transport network

831. The effect of construction on bus routes I consider to be largely akin to the long-term effects arising from the project. The bus routes travel along Moxham, and the works proposed as part of the Project there are relatively minor in duration and nature. However, the closure of Taurima Street will result in changes to the traffic patterns that align to the permanent situation at that point.

832. During construction the new service lane south of Tapiri Street will enable school bus services travelling southbound on Ruahine Street to turn left into the service lane and left onto Moxham Avenue to maintain access to Hataitai whilst Taurima Street is closed. Vehicle tracking has confirmed that this movement is possible, however I recommend that consideration is given to widening the width of the service lane entry and exit points to facilitate safe turning movements.

It is noted that the use of the service lane will require the temporary removal of several parking spaces Moxham Avenue to facilitate turning movements by school buses.

833. Where I consider there may be greater temporary effects is during the works to implement the new intersections on Wellington Road, with Hamilton Road and Evans Bay Parade. Delays and queues from general traffic through these works has the potential to block the passage of buses leading to delays and journey time unreliability. The modelling that has been undertaken shows that the effect of this is moderate adverse.

Active transport network

834. The existing pedestrian bridge will need to be removed to enable construction of the new SH1 northbound lanes. Users will need to take longer, less direct routes, reducing convenience and potentially discouraging active travel. Until the new overbridge is completed, there will be no alternative safe crossing point or controlled intersection in this area, noting that while some pedestrians currently cross at-grade along the state highway, this route is informal and does not provide a safe or suitable alternative. This will temporarily eliminate a key connection for pedestrians and cyclists, affecting active mode users who rely on this crossing for safe and direct access. Therefore, I consider the effect of this to be **moderate**. I note however that this effect would be **low** if the construction sequence delivers the new overbridge before the existing pedestrian bridge is removed.

Summary of effects

835. A summary of the effects that have been rated above negligible, is shown below in Table 86.

Table 86: Summary of effects for the Eastern Connections section

Category	Effect	Effect rating
Road network	Off-peak or overnight traffic disruption and loss of access to Hataitai Park for days to weeks as a result of detour of traffic off SH1 Ruahine Street	Low
Road network	Delays for those travelling between Hataitai and the Mt Victoria tunnel as a result of the closure of Taurima Street.	Low
Property access	Access restrictions to properties on Taurima Street, creating inconvenience.	Low
Public Transport	Delays associated with Works on Wellington Road and at Hamiliton Road intersection	Moderate
Active transport network	Longer, less direct routes for active mode users, as a result of the pedestrian bridge being removed before the Hataitai Connection bridge has been completed.	Moderate

Construction traffic generation

836. As per the SH1 Wellington Improvements Constructability Report, construction traffic will comprise light vehicles, heavy vehicles and plant, and heavy truck movements for earthworks. Due to the continuous nature of the heavy vehicle movements for spoil cartage, these will have the greatest adverse effect on the transport network.

Heavy vehicle movements for earthworks

837. I understand from the Constructability Report, that during active spoil cartage, up to 31 additional heavy vehicles per hour are expected to depart the spoil handling areas at the tunnels and continue onto both the local road and state highway network, towards the potential spoil disposal sites. The spoil handling areas for the tunnels are the Terrace Tunnel Northern Portal yard and the Mt Victoria Tunnel Western Portal yard.

Departing from the Terrace Tunnel Northern Portal yard

838. The majority of construction vehicles will depart the Terrace Tunnel Northern Portal yard via Kumutoto Lane and onto Boulcott Street.

839. For the potential disposal sites to the North of the yard (Kiwi Point Quarry, several Transmission Gully sites and the Paekākāriki sand borrow site), I expect the spoil cartage trucks will continue straight from Boulcott Street onto Clifton Terrace and the SH1 Wellington Urban Motorway on-ramp. This routing results in a relatively short distance travelled on the local road network before construction traffic joins the state highway network. Therefore, I expect the effects of spoil cartage associated with these disposal sites to be limited and are consider them to have a negligible effect on the network.

840. There are three other potential disposal sites mentioned in the Constructability Report:

    i. Ian Galloway Park

    ii. Macalister Park

    iii. Southern Landfill

841. For the route to Ian Galloway Park, I expect the effect on the local network will be greater. The typical direct route from the Terrace Tunnel Northern Portal yard involves travelling along The Terrace, Salamanca Road, Kelburn Parade, Glasow Street, Upland Road, Glenmore Road, Chaytor Street, and Curtis Street. I consider this route is unsuitable as it passes through Kelburn Village, which is 30km/h zone, Kelburn Normal School, and a number of roads and roundabouts that are shared with cyclists, evident by cyclist sharrow markings.

842. Use of this route by spoil cartage trucks would increase heavy vehicle presence within this low-speed, local environment, which I anticipate will lead to increased safety risk and reduced amenity for pedestrians and cyclists. On this basis, I consider this route unsuitable for regular spoil cartage movements, and alternatives should be considered.

843. I propose the following alternative route: From Boulcott Street onto Everton Terrace, The Terrace, Bowen Street, Tinakori Road, Glenmore Street, Chaytor Street, and Curtis Street.

844. I expect that directing the heavy vehicles onto the alternative route will still have an adverse effect on these roads and their users. As previously mentioned, the spoil cartage vehicles will introduce up to 31 additional heavy vehicle trips perday (62 one way movements per day) onto these roads, which I anticipate will have a noticeable effect on Bowen Street, in which the heavy vehicle peak hour volumes would more than double compared with the 2033 Do Minimum volumes.

845. Bowen Street also has on-road separated cycle lanes, as well as being a significant bus route, therefore increasing the interaction between heavy vehicles, buses, and cyclists and resulting in adverse safety and amenity effects. Given the scale of increase relative to the 2033 Do Minimum heavy vehicle volumes, I consider this to have a moderate adverse effect on Bowen Street but would be negligible effect on safety or travel time elsewhere given the higher existing flows.

846. Glenmore Street near the roundabout at its intersection with Upland Road experiences delays at peak times, which I anticipate will be worsened with the increase of heavy vehicles along this route. I expect this to have a low effect on this intersection, and suggest considering operating outside of peak hours.

847. Curtis Street, which is the access road to Ian Galloway Park, is a narrow street with cars parked along the side. With regular spoil cartage travelling via Curtis Street, restricting parking here may need to be considered. The residents that typically park here will need to find an alternative

place to park, which will be a further walk away, therefore I consider this to have a low effect on these residents.

848. For the route to Macalister Park, one of the potential disposal sites in Berhampore, the heavy vehicles travel along the state highway network for the majority of the journey, with the only local road being Adelaide Road. From the Basin to John Street, the addition of spoil cartage heavy vehicles will see and increase in ~25% of heavy vehicle volumes at the peak hour (in the southbound direction) along this stretch, and ~50% increase from John Street to Macalister Park.

849. While these percentage increases are notable, Adelaide Road functions as an arterial and already accommodates relatively high traffic volumes, including heavy vehicles and buses, and. The additional spoil cartage traffic would increase existing traffic volumes but would not change the existing function of the corridor, therefore is expected to result in a negligible adverse effect on Adelaide Road.

850. For the route to the Southern Landfill, one of the potential disposal sites in Ōwhiro Bay, the route includes travelling along Everton Terrace, The Terrace, Ghuznee Street, Victoria Street, Webb Street, Brooklyn Road, Ohiro Road, Happy Valley Road and Landfill Road.

851. Southern Landfill is an established landfill facility that regularly accommodates heavy vehicle movements. As a result, spoil cartage traffic travelling to this site would be consistent with the existing function of the surrounding road network, and is expected to have a negligible effect on the surrounding network.

852. There may be a greater effect on the more urban areas that it passes on its route, such as Brooklyn town centre, which is posted as a 30 km/h zone, as well as Ghuznee Street, which would experience a ~45% increase in heavy vehicles at its peak hour. I consider this to have a low effect on these areas.

853. In the event that this activity occurs during the Ghuznee Street closure, the heavy vehicles can alternatively travel along SH1 northbound, take the Tinakori Road exit and return onto SH1 southbound, exit on Victoria Street, and continue the previous route.

854. Taking into consideration the effects described above, the sites to the north may result in less disruption to the network and are more preferable routes.

Departing from the Mt Victoria Western Portal Yard

855. Heavy vehicles will depart the Mt Victoria Western Portal yard via Brougham Street and travel onto Pirie Street and take a left turn at the signals onto SH1 Kent Terrace. This is the more preferable route as opposed to travelling down Ellice Street and turning across two lanes in the Basin gyratory to get into the straight through lane.

856. If this is occurring after the Project restricts access from Pirie Street onto SH1 Kent Terrace, as it is in its operational state, the spoil cartage trucks will need to continue along Brougham Street onto Elizabeth Street and turning left onto Kent Terrace and continuing onto SH1 Kent Terrace.

857. Elizabeth Street includes access to Clyde Quay School, a zebra crossing, and is serviced by several bus routes. The introduction of spoil cartage heavy vehicles along this corridor would increase the interaction between heavy vehicles, pedestrians, and buses, particularly at peak times, and result in safety and amenity effects. If peak hours and school drop off and pick up times are avoided, the adverse effect will be low.

858. As discussed in paragraph 838, the effect of travelling to the potential disposal sites to the North of the yard, will be negligible as this route results in a relatively short distance travelled on the local road network before construction traffic joins the state highway network.

859. When travelling from the Mt Victoria Western Portal Yard to Macalister Park, once the spoil cartage vehicles have reached SH1 Kent Terrace, the effect will be as discussed in paragraphs 847 and 848. Similarly, travelling to Ian Galloway Park, the effect will be as discussed in paragraphs 843 to 846 and when travelling to the Southern Landfill disposal site, the effect will be as discussed in paragraphs 849 to 852.

Construction oversized vehicles

860. In addition to general construction traffic, there will be occasional movements of oversized vehicles associated with the delivery, removal, or relocation of large plant, equipment, and prefabricated components. These movements may include mobile cranes, piling rigs, bridge girders, precast elements, and other large or heavy items required for specific construction activities.

861. Oversized vehicle movements are expected to be infrequent and irregular, and are generally associated with specific construction activities rather than daily operations. Where required, these movements are to be planned and managed under specific traffic management arrangements, including the use of temporary traffic controls or delivery outside peak traffic periods.

862. Due to their infrequent nature and the ability to plan and manage these movements, the effect of oversized construction vehicles is expected to be low as it will be short-term and localised to the delivery routes, site access points, and construction yards.

Construction light vehicles

863. During construction, most personnel will move within and between construction sites in utility vehicles or light trucks (<3.5 t). These movements will be supplemented by project management, supervision, engineering, surveying, maintenance staff, and small delivery vehicles, which will typically be cars, SUVs, vans, and light utility vehicles.

864. The total number of light vehicle movements will vary depending on the staging of works and construction methodology. Light vehicle movements are expected to be concentrated around shift start and finish times, with additional inter-site movements occurring during the day. As construction crews typically start work shifts at around 7am, these movements generally occur prior to peak commuter traffic periods.

865. Light vehicle movements associated with construction activities are expected to be dispersed across multiple sites and access points and are low relative to existing traffic volumes on the surrounding road network. As a result, construction light vehicles are anticipated to have a negligible effect on the transport network.

Construction parking demand

866. Given that construction workers will likely start work at 7am and that most of them are arriving via private vehicle, they may occupy parks that would have otherwise been used by existing commuters in adjacent urban areas, should they need to utilise public parking areas. Therefore, construction worker travel is expected to increase demand on inner-city parking. Table 87 shows the approximate maximum number of workers per shift that are expected in each site area.

Table 87: Approximate maximum number of workers per shift in each area

Section	Approximate maximum number of workers per shift
Terrace Tunnel	100
Te Aro	30

Section	Approximate maximum number of workers per shift
Basin	50
Mt Victoria Tunnel	150
Eastern Connections	50

867. It is expected that the construction yards at each site area will provide parking initially, however there is also on- or off-street parking in the vicinity of most of the site areas that can be utilised, which were demonstrated in Figure 80, Figure 83, Figure 84, and Figure 92. Also, given its central location, the site areas are well served by a range of transport options including public transport and active travel modes.

868. In areas like the Basin Reserve and Mt Victoria, where there is limited public parking available within the vicinity of the site area, the introduction of a relatively large construction workforce is expected to place pressure on an already constrained parking supply. As a result, the effect of this increased parking demand is considered to be **moderate**. It is recommended that the construction management plan considers integrated parking to account for this demand.

Summary of effects

869. A summary of the effects that have been rated above negligible, is shown below in Table 88.

Table 88: Summary of effects for the construction traffic section

Category	Effect	Effect rating
Heavy vehicle movements	Adverse safety effects on Bowen Street, as a result of the increase in peak hour heavy vehicle volumes.	Moderate
Heavy vehicle movements	Increased delays at the intersection of Glenmore Street and Upland Road as a result of the increase in peak hour heavy vehicle volumes.	Low
Heavy vehicle movements	Residents who park on Curtis Street will need to find an alternative location to park.	Low
Heavy vehicle movements	Adverse safety effects through Brooklyn town centre and Ghuznee Street, as a result of the increase in peak hour heavy vehicle volumes.	Low
Heavy vehicle movements	Adverse safety effects on Elizabeth Street, as a result of the increase in peak hour heavy vehicle volumes.	Low
Oversized vehicles	Disruption of oversized vehicles added onto the network.	Low
Construction parking demand	Increased parking demand throughout Basin Reserve and Mt Victoria site areas, as a result of introduced construction parking demand.	Moderate

Overall Summary of Construction Assessment

870. In this chapter I have assessed a potential viable approach which is available to implement the Project. It is just one of many approaches that could be taken to deliver the Project, but has allowed me to assess the potential effects of the delivery of the Project.

871. I consider that it is inevitable that the construction will continue for several years, and throughout that time there will be disruption for individuals with access changes to property, and increases to journey times for some journeys.

872. However, the detailed modelling that has been undertaken to support this assessment has shown that the approaches to construction sequencing contained within the Constructability Report are expected to be effective in making the delays to the movement of cars and buses of a level that is not likely to cause significant disruption to journeys. I consider this is in part due to significant works occurring offline, and then utilising the new infrastructure for later phases of the construction on existing SH1 routes.

873. The modelling of the key construction phases, that is to say the construction phases that I considered had the potential to cause the most delays to the network showed that no delay was expected to be more than 10 minutes, even in the peak. And for the majority of the construction stages and routes assessed, the delays were less than 5 minutes.

874. For bus journeys the assessment showed that the negative impacts were even smaller, and in many cases there were actually improvements to bus journey times. Whilst this may appear counter-intuitive, this is as a result of the bus routes generally not passing along the actual corridor with the works, and therefore delay. And so where the works do create bottlenecks for general traffic, that leaves many bus routes, or segments of these bus routes operating in a 'shadow' from the upstream works where there are less vehicles running past the restriction. Secondary to this are the existing bus lanes that protect bus journeys.

875. And so whilst noting there are some increases in journey times and some decreases, I do not consider that the scale of the delays is such that it will lead to a significantly worse transport environment. As outlined in Chapter 4, the modelling approach used to assess the delays assumes that all current drivers still undertake those journeys at the same time and the same mode, which I consider a very conservative assumption.

876. What I haven't attempted to do is to assess the combinations of the works along the corridor. However I would note that I would not expect this to be the summation of the delays I have assessed, but more likely to be slightly higher than the maximum delay. The reason for this is that the flow along the corridor is governed by the greatest restriction – the lowest number of lanes, the slowest speed, etc. For routes that are running across the SH1 corridor through work sites they are somewhat independent of other works. I accept that there is some degree of diversion that may occur and combine to increase the delays, but noting the scale of the delays modelled these are still going to be relatively small delays that would be less than 10 minutes in most cases.

877. I do note that the works associated with the Basin Stage 5 have the potential to delay movements from Kent Terrace to Adelaide Road by 9 minutes during the 8am-9am peak, and that this is a route to the Hospital. This is a phase of the construction that would need careful co-ordination, planning, and monitoring to ensure access to a key destination is maintained, which is covered within the Construction Traffic Management Plan.

9. Summary of feedback on Project

Public Consultation

878. During late 2025 NZTA engaged in a consultation process with the community and directly affected property owners. Details of this are included with the AEE. In this chapter, I present a summary of the main themes that relate to Transport scope of the Project.

879. In reviewing the feedback received, I have identified the following themes and key issues relevant to my assessment which reflect points that were raised by multiple respondents:

i. Additional capacity on SH1 will result in additional demand and more congestion

ii. Project should include more support for public transport

iii. Vivian Street changes

iv. Pedestrian and cycle link through Mt Victoria

v. Access changes for Hataitai

vi. Changes prioritise SH1 traffic over local resident access

Additional capacity on SH1 will result in additional demand and more congestion

880. I discussed the issues of induced traffic in paragraph 347 above. In delivering the intended outcomes for the Project, there will be additional and longer distance journeys. However, as I also showed in Table 38, the Project results in only a small proportional increase in the emissions, with the reduction in congestion partially offsetting the additional total distance travelled by vehicles.

881. I also demonstrated throughout Chapter 5 of my assessment that the journey times for trips on SH1 and the Local road network are reduced as a result of the Project, with the changes to Vivian Street providing capacity aligned to these new demands.

882. I do note that there are some locations on SH1 outside of the Project area that modelling indicates will experience increases in demand, and that does lead to minor increases in journey time. However, the benefits in journey time through Wellington Central, both local and State Highway routes, generally results in lower journey times, as shown in Table 43 and Table 44.

Project should include more support for public transport

883. The Project will result in a more efficient journey for all traffic on SH1. As a result, the forecasts predict that there will be a diversion away from local roads and onto SH1, especially during the peak periods. This will reduce congestion on local roads, and enable improvement in public transport infrastructure and services. Currently the opportunities for these public transport schemes are limited by the traffic volumes on the local road network which prevent measures such as bus lanes being implemented or being effective.

884. Another example is the opportunity afforded by the Project to provide an alternate and faster route for express services to the Airport travelling via SH1 through Mt Victoria Tunnel.

885. In saying the above, I reiterate that these are opportunities facilitated by the Project, and not components of the Project itself. Future design and funding would be needed for these measures, but the Project does not preclude such projects being carried forward by the relevant parties.

Vivian Street changes

886. Comments under this theme included three issues. The first was related to the loss of parking on SH1 through Te Aro on Vivian Street. I covered this in detail in Chapter 5 and in Chapter 7 from paragraph 452.

887. In summary, I consider the loss of parking on Vivian Street is a relatively small proportion of the total parking in the Te Aro area, and so in a macro sense the Project will not lead to a significant change in the ability to find a park. However, the nearest parks for some properties on Vivian Street may become further away. I note that there is not parking all the way along Vivian Street, and only on one side for much of the length. As such there are many properties that currently do not have adjacent parking available.

888. Whilst the comments received were primarily related to parking, I note that in my assessment I considered the loading activities that may be undertaken from parking bays, and have made recommendations related to support loading activities for properties on Vivan Street.

889. Public parking will remain available within a short walk distance of all properties, on the adjacent side roads. I consider that this is appropriate from both a point of practicality, and in terms of the hierarchy of the road network noting the purpose of a state highway is to deliver on the nationally strategic purpose of moving people and goods.

890. Secondly, multiple responses related to the interaction between vehicles on Vivian Street and pedestrians crossing Vivian Street. I note that the speed limit for Vivian Street is to remain at 50kph. Whilst the Project will increase the capacity and efficiency for vehicles, this is not being done in a manner that will put pedestrians at risk. I did investigate and assess the proposals for the operation of the intersections along Vivian Street considering the ability for pedestrians to cross. I established that whilst the crossing distance increased slightly in some places as a result of the third traffic lane, in many locations the kerbs are not proposed to change, with the space coming from the removal of parked vehicles. Where the crossing distance is increasing the modelling has assumed changes to the timings to provide additional, and adequate, time for pedestrians to cross Vivian Street.

891. The proposed operation permits additional time in the cycle to be given to pedestrians and indeed the cycle times do not increase and therefore there will be either improvements or no change to the time between invitations to cross. In some key locations additional footpath space has been provided to ease pedestrian congestion adjacent to crossings.

892. Finally, feedback was received related to the operation of the multiple signals along Vivian Street for those driving along SH1. Concern was raised about the efficiency of this and if it would allow the Project to deliver the benefits sought. I have engaged with the design team of the Project and understand they have specifically considered this, and it has been reflected within the modelling that has been used to support my assessment. I understand that engagement is continuing with WCC to provide a co-ordinated and efficient signal management plan that will deliver the appropriate support for SH1 movement whilst also supporting the continued cross movements on the local network for pedestrians, local traffic and on some routes, public transport.

Pedestrian and cycle link through Mt Victoria

893. Several responses related to the proposed path being inadequate width, whilst other respondents questioned the need for the path. In my opinion the proposed path maintains the existing connection which provides a key link for the current users, and as such ought to be retained. The Project proposes to achieve this through the provision of a facility that is segregated from traffic but still maintains the shared path form of the current connection. The width of the current path does not meet current design standards, and reflects a facility that is approaching a century old.

894. The Project proposes a 3.6m wide shared path, and respondents suggest for safety and capacity this needs to be wider. I am satisfied that safety, including the gradient as it pertains to downhill cycle speed, has been considered in the design of the tunnel. While I do appreciate the desire from some respondents for an even wider facility, I note that the proposal reflects a substantial improvement compared to the current connection, and can safely accommodate the needs of pedestrians and cyclists that are current users, and new users that the Project attracts.

Access changes for Hataitai

895. Comments referred to the turn restrictions at the Ruahine/ Wellington Road intersection, Hamilton Road/Wellington Road and Evans Bay Parade/Wellington Road, and the closure of Goa Street to Ruahine Street.

896. Whilst there are changes to the access into and out of Hataitai from SH1 the changes from the Project will reduce, or remove, the congestion that currently constrains access to the existing network connections. As I presented earlier, some journeys are expected to take up to 2 minutes longer than at present due to the new routes that some people will need to make arising from turn restrictions that are part of the Project. However, these turn restrictions are a key component in enabling the benefits of the investment in the additional lanes through Mt Victoria, and the changes at the Basin to be realised.

897. The benefits of travel time savings of over five minutes for a large number of people need to be considered against the effects of the two minute increase to a much smaller number of people. I also consider that the reliability of the journey time for both of those groups will be significantly improved, and so whilst there may be an increase in the average journey time for the Hataitai residents, I consider the maximum journey time for the Hataitai residents will likely be lower than at present.

898. I also consider that there will be some Hataitai residents that would benefit in the future from going through the new Mt Victoria Tunnel versus their current route over Constable Street, and it is this group of residents whose journey would be most impacted by the turn restrictions. Noting the current level of congestion on SH1 through Mt Victoria and around the Basin, I appreciate that having confidence in the Project to deliver the benefits set out in earlier chapters and then see this route as preferable may not be obvious to those residents at present, but I expect will be once the scheme is operational.

Changes prioritise SH1 traffic over local resident access

899. A number of comments were received that stated the Project prioritised SH1 traffic movements over the needs of local residents. There are several aspects of my response to this. Firstly, the changes to SH1 are explicitly intended to deliver improvements to national and regionally strategic journeys. This is aligned with the strategic role of SH1 and why the funding and management of the route is distinct to other roads that are managed by WCC which are focussed on serving local needs.

900. I am aware from feedback, and have observed myself, during peak periods there is currently a quantum of traffic using Moxham Avenue which appears to be through traffic diverting off SH1 and then rejoining in an attempt to bypass congestion. Often this is referred to as rat-running. I consider that this is both inefficient and is currently detrimental to the safety and efficiency of local residents in Hataitai. Through the delivery of the improvements to SH1, the Project will remove the demand from this rat running traffic which will bring benefits to some Hataitai residents who are currently adversely affected by this.

901. Finally, the scheme provides access and egress to and from SH1 for local residents of Hataitai. The Hataitai connection overbridge is being constructed to provide an improved access to SH1 compared to the current Taurima Street intersection.

Pre lodgement feedback from GWRC and WCC

902. Both GWRC and WCC engaged with the project team through a series of ‘deep dive’ workshops, and I was party to these workshops where relevant to my scope. This supported the consistency in both understanding of the scheme and the understanding of the issues and effects of interest to the Councils.

903. During the preparation of this final report, a Draft version of the document was shared with GWRC and WCC to allow a review of the scope of the assessment and draft contents in order to satisfy pre-lodgement engagement obligations under the FTAA.

904. Both GWRC and WCC provided written comments, and this was followed by a meeting where I was able to clarify some feedback received and discuss the information to be included in this final version of the Transport Assessment to cover the issues raised.

905. I have summarised the key issues received from GWRC below:

i. **Implications on mode shift.** As shown in my assessment the Project is likely to result in a small increase in the private vehicle mode share for Wellington, and GWRC highlighted that this was contrary to their policy, as laid out in statutory documents. I acknowledge this, but note the new infrastructure delivered by the Project supports the viability for further investment in public transport priority lanes in the city. As shown in the preceding chapters, the public transport travel times and reliability generally decrease, that is to say improve as a result of the removal of bottlenecks that currently negatively impact on bus services

ii. **Lack of information for public transport journey times.** The modelling needed to supply this information was not available at the time that the draft report was issued, however the comments and the discussion in the subsequent meeting allowed me to develop the specific set of public transport journey time routes with GWRC input that has been used as the basis for the public transport assessment of effects in chapters 7 and 8 above, and Annexure F and Annexure G.

iii. **Lack of information on construction effects.** As above, the Aimsun modelling was not available until after the draft was sent to GWRC, and so I was able to use the pre-lodgement meeting process to collaborate with the GWRC officers to define the metrics which were suitable to use for the assessment of the construction phase on the public transport network

iv. **Opportunities for public transport enhancement.** GWRC discussed in several comments that the Project did not include specific measures to support bus journey efficiency, and that there are opportunities that would support their goals in relation to improved public transport. I understand that some early discussions between GWRC and NZTA have already occurred. These are noted, and whilst they are not proposed as part of the Project assessed, there is the potential to incorporate these as part of detailed design or subsequently through future investment. My assessment is explicit in stating that no benefits have been assumed as a result of infrastructure or service changes not explicitly proposed to be delivered as part of the Project, and as shown in prior chapters, there is a substantial improvement to bus service reliability and journey time as a result of reduced congestion from the Project

v. **Request more detail on Hataitai, Mt Victoria and Kilbirnie areas.** The Project results in changes to access routes for traffic in these areas that directly or indirectly influence bus journey times and reliability. I have provided additional assessment of these areas in the prior chapters

vi. **Ghuznee Street Bridge Construction.** Feedback related to the need to retain two-way bus flow over Ghuznee Street Bridge and the challenges for buses to navigate potential diversion routes. As a result, I have undertaken additional assessment and demonstrated that it is viable to retain two-way bus movements (but only eastbound flow of other vehicles) on Ghuznee Street bridge during construction

906. WCC raised similar feedback to GWRC in relation to points 2, 3, 5 and 6. I have summarised the additional key issues received from WCC below:

i. **Lack of information on parking, access and kerbside management.** Parking occupancy information was not available until after the draft was sent to WCC. My report now includes

information related to parking occupancy based on surveys undertaken by WCC that has informed my assessment of effects in relation to parking and the inclusion of mitigation measures for both parking and loading

ii. **Implications on safety, particularly local roads and outside schools.** WCC discussed in several comments the need to provide additional commentary in relation to traffic volume changes on local roads and in particular outside schools. Additional assessment has been undertaken to explore the potential effects as summarised in previous chapters

iii. **Lack of assessment of potential longer-term effects beyond 2053.** The transport models underpinning my assessment, and transport assessment and investment in the Greater Wellington Region in general, do not extend beyond 2053. It is my opinion that the relative effects of the Project as assessed in 2033 and 2053 would remain valid beyond 2053. And so it is my view that 2053 remains a reasonable basis for assessing longer-term effects, consistent with the approach applied in other recently assessed transport projects in Wellington and New Zealand

10. MEASURES TO AVOID, REMEDY OR MITIGATE ACTUAL OR POTENTIAL ADVERSE EFFECTS

907. In this section of the report, I outline the adverse effects of the Project that I have identified in my assessment and that I consider require mitigation. I show these along with the scale of the effects.

Measures to avoid, remedy or mitigate effects during operation

Vivian Street

908. In my assessment, I identified a moderate adverse effect on the safety through Vivian Street arising from the additional lanes, increase in mean journey speed and the increase in traffic flows. Whilst the Project is intended to increase the efficiency of journeys by reduced travel time, this does not necessitate significantly higher free flow speeds through Vivian Street, it is the reduction in congestion at peak times that deliver the project benefits.

909. As such I consider the recommendations of the Safe System Audit to utilise coordination of the traffic signals, and outside of peak periods to use the signals to actively discourage excess speeds though Vivian Street to be necessary to prevent an adverse safety effect. I consider that if not mitigated the effects would land disproportionately on vulnerable users as they sought to cross Vivian Street.

910. I have also identified that the loss of parking on Vivian Street is a high adverse effect to businesses loading requirements. In response I recommend that loading bays on adjoining roads and / or off peak state highway loading bays are provided where practicable, and I consider that this would result in the adverse effect being of a ‘moderate’ rating.

Basin Reserve Area

911. I initially identified a moderate adverse effect on pedestrian and cyclist access to the north, as access will rely on a new signalised pedestrian and cyclist crossing of the westbound SH1 lanes, replacing the existing zebra crossing arrangement with fewer conflicting traffic movements. I suggested a mitigation to provide additional crossing width and storage space for pedestrians, and this has since been updated in the design.

912. I initially identified an adverse effect with the increase in traffic through Dufferin Street, which is used for school pick-up and drop-off. I engaged with the design team in relation to this, and there have been several layout changes incorporated to mitigate this risk, including the positioning of the crossing and separation of drop off areas for school buses and private vehicles. I also recommend that consideration is given to a reduced or variable low speed zone past the school.

Moxham Avenue

913. The changes to access onto SH1 in the Eastern Connections result in an increase in the traffic on Moxham Avenue southbound. This increase has the potential to result in adverse effects on safety for active mode users, and delays and unreliability to key bus routes.

914. I consider that the additional measures included in the design for consent to reduce conflicts for cyclists via the now proposed shared use path supporting safety measure for of those travelling along or crossing Moxham Avenue will help to mitigate the adverse effects of the Project in this location. These measures are shown on the Project drawings, and includes an improved crossing adjacent the Hataitai School, kerb buildouts and intersection realignments. As noted above, the design shown on the Project drawings has included the measures in response to mitigations I raised with the design team in preparing this assessment and would reduce the effects to low.

Measures to avoid, remedy or mitigate effects during construction

Terrace Tunnel

915. For the works on Ghuznee Street I consider that there will need to be some mitigations put in place to support access during the works. These mitigations include advance notice of the works, management of the key detour routes, including considering management of parking to improve the capacity of those routes, amended priorities and controls for intersections along the routes and the scheduling of the works to minimise effects. Whilst these responses are relatively standard and typical approaches to the management of construction works, I have included these here as they would be on the local roads not under the control of NZTA, but WCC. If implemented I consider that these would reduce the effects to low adverse.

916. During construction, the loss of parking in the Terrace Tunnel section has a moderate adverse effect. I recommend that the effects could be limited by not overlapping the construction periods where the Clifton car park is most impacted with the period of parking removal from MacDonald Crescent which would reduce the effect to low.

Mt Victoria Tunnel

917. The closure of the shared path through the Mt Victoria tunnel for a number of years will cause a very high level of adverse effect on pedestrians and cyclists and a moderate level of adverse effect on e-bike and e-scooter users. Whilst I considered that some may elect to swap to public transport via the Hataitai Tunnel, those on e-bikes and e-scooters could use one of the paths over Mt Victoria with relative ease, others would be left with a key barrier to their journey for an extended period.

918. I understand that some period of the tunnel shared path closure is related to the need to relocate the plant that provides ventilation to the tunnel which is essential for safety. However, given the importance of the shared path, I recommend that consideration be given to options for temporary ventilation with a view to reducing the period of closure. There are also periods when the approaches to the tunnel need to be closed to allow demolition of the adjacent control buildings, and so where possible this should occur at both portals simultaneously to minimise the period of closure.

919. I consider that this effect is in need of mitigation noting the relatively high number of daily users of the tunnel. Noting that this is an existing facility which is to be retained in an improved form, consideration to support the users is needed.

920. I recommend that as mitigation pedestrians and cyclists affected by the closure of the shared path have access to a subsidised scheduled bus or shuttle service between either side of the closed tunnel path during the period of closure. As shown in Figure 39, the existing bus services already operate at a relatively high frequency – approximately one bus every two minutes travelling from the eastern suburbs to the city in the morning peak (7-9am), and the same travelling from the city to the eastern suburbs in the evening peak (4-6pm). The buses are already equipped with external bicycle racks. Making these services subsidised for affected users or providing a separate shuttle service would remove the cost barrier associated with the mode shift and allow displaced users to continue to travel between the eastern suburbs and the city. The implementation of subsidies on existing bus services could not be delivered by NZTA alone, as it would require the support and approval of GWRC.

921. The next mitigation measure I recommend is the upgrade of the existing Hataitai-to-City route over Mt Victoria to improve its overall level of amenity as a detour route. I understand that parts of this route already provide a reasonable standard, including relatively wide paths and sections with acceptable gradients, however, other sections are characterised by narrow path widths, steep gradients, and stairs. The proposed mitigation would include paving the path and where practicable installing lighting.

922. Finally, and noting there is a period in the proposed construction approach that currently assumes that the Hataitai to City walkway and the current tunnel are both unavailable, I recommend that a

temporary access path for pedestrians is created that links to Hinau Road and to Hataitai Park adjacent to the substation along an alignment that broadly replicates the existing track linkages. As an extension to this, I would recommend that grade separated pedestrian access over Ruahine Street is retained or provided until after the Hataitai to City path is reopened and the Hataitai Connection Overbridge constructed and available to pedestrians and cyclists.

923. The implementation of track upgrades could not be delivered by NZTA alone, as they would require the support and approval of WCC as administrator of the Wellington Town Belt, I consider that these upgrades would improve the attractiveness and usability of the routes for pedestrians and e-bike and e-scooter users, and would partially offset the loss of the shared path through the tunnel. While an upgraded route would not fully replicate the directness or weather protection offered by the tunnel, in combination with subsidised access to existing bus services it would significantly reduce the overall level of adverse effect experienced during the closure period.

Eastern Connections

924. Whilst it is not possible to identify the specific measures to address the potential delays to buses through Hataitai at this time, I consider an allowance and requirement to monitor changes to delays and journey time reliability on the bus network is important given the very high number of people potentially affected. Subsequent to this, should the construction works result in significant increases to journey time or deterioration in reliability, some mitigations should be explored. These mitigations could include amending the intersection phasing to limit queues and delays on the approaches with bus routes, or for long term works introducing or temporarily extending bus priority lanes.

925. For the works on the Hataitai Connection bridge and interchange, I identified the adverse effect associated with the restriction of access to Hataitai Park for up to several months. I consider maintaining vehicular access to Hataitai Park critical to maintaining the function of the park activities. As a mitigation, the construction methodology has already been altered to construct temporary works, which will significantly reduce the duration of the closure.

Summary of effects

926. A range of effects management measures are proposed to address the potential adverse effects. Table 89 summarises the potential adverse transport effects of the Project, magnitude and overall level of effect following recommended effects management measures.

Table 89: Summary of effects and mitigations

Effect	Effect rating pre mitigation	Measures incorporated into consent design following earlier recommendations	Recommended mitigation	Effect rating post mitigation
For Operation				
On Vivian Street, increased lanes, higher mean journey speed, and increase in traffic flows increases safety risk to vulnerable users crossing.	3. Moderate		Safe System Audit recommendations to utilise coordination of traffic signals and outside of peak periods use signals to actively discourage excess speeds.	2. Low
On Vivian Street the loss of Loading bays impacts business efficiency.	4. High		Investigate reallocating some parking bays on side roads in Te Aro and consider off peak loading bays on Vivian Street should there remain evidence of issues for loading.	3. Moderate
On Kent / Cambridge Terrace, greater conflicting traffic flows and narrow pedestrian	3. Moderate	Design has been updated to provide additional crossing	-	2. Low

Effect	Effect rating pre mitigation	Measures incorporated into consent design following earlier recommendations	Recommended mitigation	Effect rating post mitigation
crossing width risks crowding and potential conflicts with vehicles on SH1.		width and storage space for pedestrians.		
Outside of St Mark's School, increases in traffic past school PUDO area reducing safety for vulnerable road users crossing the road.	2. Low	Change to one way flow northbound. Table crossing located to be visible for approaching traffic.	Provide reduced/variable low speed zone past the school PUDO	1. Negligible
Increase in traffic on Moxham Ave reducing safety for active mode users and disruption to bus services.	3. Moderate	Design updated to provide traffic calming features including intersection realignment, improved crossing and kerb buildouts on Moxham.		2. Low
Construction				
On Ghuznee Street, there is reduced access and disruption due to construction.	3. Moderate		Advance notice of works. Management of key detour routes. Management of parking on MacDonald Crescent to improve efficiency of detour routes. Amended controls for intersections along the routes. Schedule of works to minimise effects.	2. Low
During construction, the loss of parking in the Terrace Tunnel section results in limited parking availability in the area.	3. Moderate		Consider the timing of the closure periods so that the period where parking is removed from MacDonald Crescent is when there is minimal impact on Clifton car park.	2. Low
Effect on active transport modes due to Mt Victoria Tunnel path closure during construction	4. Very High		Provide subsidised travel on existing bus services through Hataitai bus tunnel. Increase frequency of bus services during peak periods. Upgrade of the alternative walking and cycling routes to make alternative routes more accessible, such as paving the existing walking path over the top of Mt Victoria and generally improving the condition of the alternative routes (through increased lighting, widened footpaths, or temporary barriers/bollards) to make for a smoother/more pleasant journey. Consideration of temporary ventilation in the tunnel to reduce the period of closure. Clear communication / engagement and advance notice to determine any additional needs of typical users.	3. Moderate
Effect on Buses through Hataitai during construction	3. Moderate		Engage and plan in partnership with GWRC and WCC (as RCA). Consider bus routes in the detailed intersection construction plan, including ability to maintain the cross movement between Kilbirnie Crescent and Hamilton Road. Monitor bus journey times and adjust	2. Low

Effect	Effect rating pre mitigation	Measures incorporated into consent design following earlier recommendations	Recommended mitigation	Effect rating post mitigation
			signal phasing, consider temporary bus lanes if required.	
Limited access to Hataitai Park and associated parking loss during construction	3. Moderate	Construction methodology updated to keep Hataitai Park closure to a short duration.		2. Low

11. CONCLUSION AND RECOMMENDATIONS

927. In this ITA, I have assessed the forecast transport effects of the Project.

928. I consider that whilst there will undoubtedly be changes to both the Project and the future environment compared to the assumptions, the locations and quantum of the relative effects of the Project against the Do Minimum are a fair and robust basis for the assessment. My assessment has taken an approach that reflects an 'envelope of effects' that cover the foreseeable range of project and transport environment changes.

929. I have considered a number of factors for the Project, and I conclude that the Project will provide significant transport efficiency, reliability and resilience benefits to the transport network of Wellington, including, but not limited to SH1.

930. My assessment demonstrates that for all of the journeys I assessed between key destinations in and surrounding Wellington City the average journey times are expected to decrease, typically between 5 and 10 minutes. This included journeys on the local road network as more trips divert to SH1.

931. I also concluded that the significant journey time variability that is currently on the network would substantially reduce, which provides greater certainty to those travelling across Wellington.

932. Finally, I conclude that the Project will contribute to a more resilient network. This is in relation to the increased transport capacity, and the provision of additional lanes across the city, which mitigate the effect of any works or unplanned blockage on SH1 itself, but also to cater for more diverted traffic if other routes are blocked. Thereby the Project protects the accessibility for Wellington travellers for planned and unforeseen temporary network blockages.

933. My assessment identifies some areas of adverse effects. These included the restrictions and increases in journey times for the residents of Hataitai and people travelling to and from Mt Victoria. However, I concluded that these are of a level that is unlikely to create significant challenges for these areas, with an average increase of 2 minutes for Hataitai and 3 minutes for Mt Victoria. I note that some of these journeys would become quicker via SH1 than the previous local road routes, and this would require an adaptation from residents.

934. Whilst I considered the loss of parking on Vivian Street to be of low adverse effect, I noted that those bays also offered the ability for loading activities to be undertaken, and the loss of those facilities I considered a high adverse effect for the frontage properties. Noting that the Project does not have the ability to reallocate the parking bays on the adjacent local road network, I recommend that engagement be had with WCC on this issue. Should this not result in adequate servicing a further option would be overnight bays on Vivian Street. Both of these mitigations would still lead to a moderate adverse effect.

935. I also found that there were several specific adverse effects related to schools adjacent to the Basin Reserve and Moxham Avenue, and recommended some mitigations for these which have been incorporated into the current designs. I also identified a number of other adverse effects that I expect will arise with the Project, and I classified these primarily as low (if not negligible) or moderate effect, as summarised in various tables in my report.

936. Notwithstanding that matters related to the possibility of tolling parts of SH1 are operational matters that sit outside of this FTAA process, I assessed the operational effects on the Project infrastructure if operating with tolled sections for drivers passing through either the Terrace Tunnels or Mt Victoria Tunnel. I concluded that the introduction of the tolls would result in greater journey time savings for the State Highway than the Project option, and in the peaks, the use of SH1 through the Project area increased over the Do Minimum scenario in most locations. However, through the tunnels, particularly outside of the AM and PM peak, it is forecast that a proportion of drivers are expected to choose to utilise diversions onto the local road network.

937. When I assessed the effects of a tolled scenario on the local roads I found that there would be a small number of routes where the traffic is expected to increase compared to the Do Minimum on a daily basis, but that these increased flows were still below the levels those roads carry in the AM and PM peaks, indicating that the network has the capacity to accommodate those flows safely and efficiently.

938. I do note that modelling suggests this effect is constrained to light vehicles, with heavy vehicles continuing to use the State Highway in higher numbers than without the Project, diverted away from the local road network. I considered this beneficial for efficiency in general and for the safety and efficiency of the local road network.

939. I have assessed the potential construction period transport effects based on a feasible working assumption of approaches, recognising the uncertainty at this time in the timing, construction methodologies, and the phasing of construction.

940. Based on information from both modelling and first principles assessment, I concluded that scenarios that required the closure of either tunnel for prolonged periods of time was likely to cause very high level of disruption and congestion and recommended that those options were not progressed.

941. My opinion and experience from other major infrastructure construction projects is if the Project were to be constructed using the approach outlined in Chapter 8 there would be low to moderate adverse effects in several areas across the City, but this would not be excessive, should be carefully monitored and managed through the NPG and mitigations I recommend be implemented. I also note that for many journeys, the construction approach outlined in the Constructability Report has protected their journey times by focussing on off-line construction and sequencing that uses the new infrastructure before works occur on the existing SH1 corridor.

942. I note that the construction delays expected are up to 10 minutes for individual phases, and would potentially be cumulative to up to 15 minutes. The scale and duration of the Project implementation allows a more developed communication and management plan for the works, which will help support this most affected with options to manage these delays.

943. I recommend that mitigation is needed to address the temporary closure of the Walking and Cycling connection through the Mt Victoria Tunnel during construction. Without mitigation this severs a key connection with limited alternatives available.

Recommendations

944. I provided a full table of my recommended mitigations in the previous chapter.

ANNEXURE A Bus Patronage Data from Metlink

Number	Bus Stop	24-Oct-2025	25-Oct-2025	26-Oct-2025	27-Oct-2025[1]	28-Oct-2025	29-Oct-2025	30-Oct-2025	Total
6008	Wellington East Girls' College - Ellice Street (school	636				4	712	762	**2,114**
6010	Basin Reserve (school stop)	752				696	1,300	1,188	**3,936**
6012	Kent Terrace at Pirie Street	526	342	348	157	479	570	492	**2,914**
6013	Kent Terrace at Basin Reserve	229	82	118	69	216	240	204	**1,158**
6014	Adelaide Road at Basin Reserve (near 13)	2,026	370	278	218	1,136	1,559	1,510	**7,097**
6218	Moxham Avenue at Raupo Street (near 87)	170	94	98	36	194	202	136	**930**
6219	Kilbirnie School - Moxham Avenue	154	74	76	44	148	166	166	**828**
6220	Kupe Street at Hamilton Road	102	26	60	50	130	136	132	**636**
6221	Hamilton Road at Wellington Road (near 115)	148	88	110	63	200	190	246	**1,045**
6710	Victoria Street at Ghuznee Street	532	272	190	98	404	533	536	**2,565**
6711	Victoria Street at Abel Smith Street	461	254	220	136	446	526	520	**2,563**
6908	Ghuznee Street at Victoria Street	334	60	42	44	339	308	368	**1,495**
6911	Taranaki Street at Frederick Street	748	376	271	250	800	826	715	**3,986**
6912	Taranaki Street at Pukeahu National War Memorial Park	330	128	63	36	264	304	272	**1,397**
7012	Cambridge Terrace at Vivian Street	458	356	296	174	459	501	490	**2,734**
7013	Cambridge Terrace at Barker Street	342	135	98	90	200	294	273	**1,432**
7014	Adelaide Road at Basin Reserve (near 12)	1,727	449	284	248	1,295	1,931	1,527	**7,461**
7218	Moxham Avenue at Raupo Street (near 88)	181	176	86	31	166	164	175	**979**
7219	Moxham Avenue near Goa Street	216	92	94	68	194	229	220	**1,113**
7220	Kupe Street at Moxham Avenue	122	56	58	26	126	137	131	**656**
7221	Hamilton Road at Wellington Road (near 124)	306	165	169	94	313	310	315	**1,672**
7907	The Terrace opposite MacDonald Crescent	52	22	32	34	78	81	87	**386**
7908	Ghuznee Street at Willis Street	756	153	103	100	710	686	651	**3,159**
7911	Taranaki Street at Vivian Street	518	269	242	156	431	502	531	**2,649**
7912	Taranaki Street at Abel Smith Street	658	322	244	196	510	613	645	**3,188**

[1] Note that 27 October was a public holiday.

ANNEXURE B Journey Times

This Annexure presents modelled journey times for a series of routes that pass through or parallel to the Project. Figure 1 below shows the routes used.



Figure 1 – Key routes

Table 1 : Journey times for key routes in 2033 (WTSM)

Route	2033 Travel Time (minutes)					
	AM			PM		
	Do Minimum	With Project (Non-Tolled)	With Project (Tolled)	Do Minimum	With Project (Non-Tolled)	With Project (Tolled)
Airport to Johnsonville (SH1)	32	-6	-8	41	-6	-8
Johnsonville to Airport (SH1)	48	-6	-9	41	-6	-8
Airport to Johnsonville (Bays)	37	-1	2	51	2	4
Johnsonville to Airport (Bays)	48	-1	0	43	-3	0
Post Office Square to Johnsonville	11	0	1	26	0	1
Johnsonville to Post Office Square	30	-1	-1	19	-1	0
Post Office Square to Airport (SH1)	22	-3	-4	29	-3	-4
Airport to Post Office Square (SH1)	32	-7	-6	31	-4	-4
Post Office Square to Airport (Bays)	26	-1	1	25	2	3
Airport to Post Office Square (Bays)	20	-1	0	26	-2	1
Post Office Square to Hospital	12	-1	0	16	-2	-1
Hospital to Post Office Square	18	-3	-1	20	0	1
Hospital to Johnsonville	18	-1	-1	30	-2	-2
Johnsonville to Hospital	37	-4	-5	29	-5	-5

Table 2 : Journey times for key routes in 2053 (WTSM)

Route	2053 Travel Time (minutes)					
	AM			PM		
	Do Minimum	With Project (Non-Tolled)	With Project (Tolled)	Do Minimum	With Project (Non-Tolled)	With Project (Tolled)
Airport to Johnsonville (SH1)	35	-6	-8	45	-7	-8
Johnsonville to Airport (SH1)	55	-6	-9	46	-6	-9
Airport to Johnsonville (Bays)	40	-1	1	53	2	4
Johnsonville to Airport (Bays)	55	-2	-1	47	-4	-1
Post Office Square to Johnsonville	11	0	1	27	0	1
Johnsonville to Post Office Square	33	-2	-1	20	-1	0
Post Office Square to Airport (SH1)	27	-4	-5	33	-3	-4
Airport to Post Office Square (SH1)	36	-7	-8	33	-5	-5
Airport to Post Office Square (Bays)	28	-1	0	26	2	3
Post Office Square to Airport (Bays)	24	-2	-1	30	-3	0
Post Office Square to Hospital	12	-2	-1	17	-2	-1
Hospital to Post Office Square	20	-3	-2	20	0	1
Hospital to Johnsonville	19	-2	-2	32	-2	-2
Johnsonville to Hospital	41	-4	-5	30	-5	-5

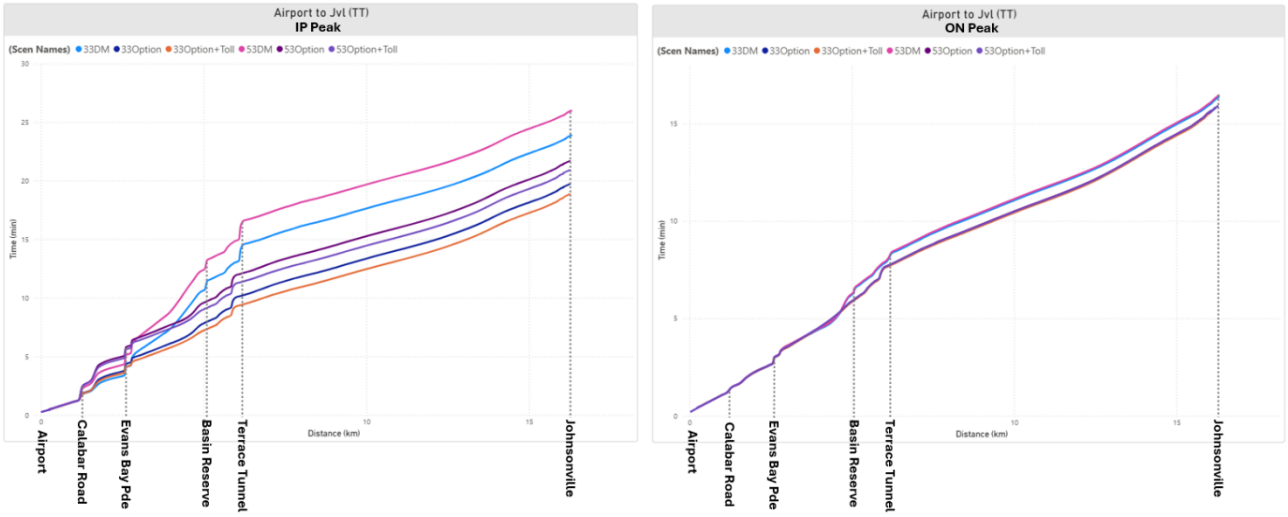


Figure 2 – Travel Time Profile for Airport to Johnsonville (via SH1) for Tolled and Non-Tolled

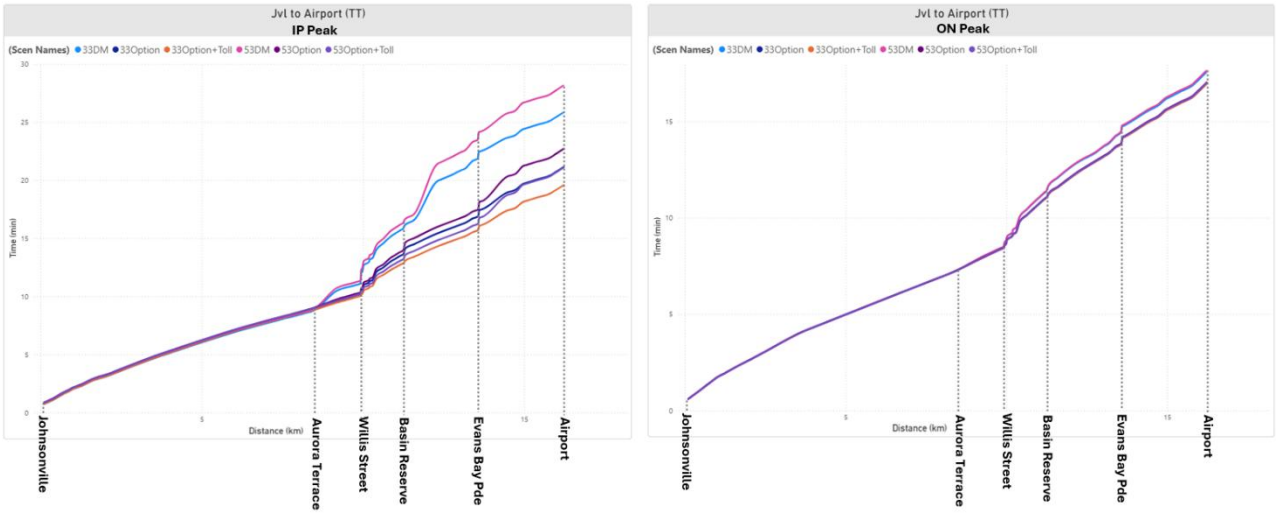


Figure 3 – Travel Time Profile for Johnsonville to Airport (via SH1) for Tolled and Non-Tolled

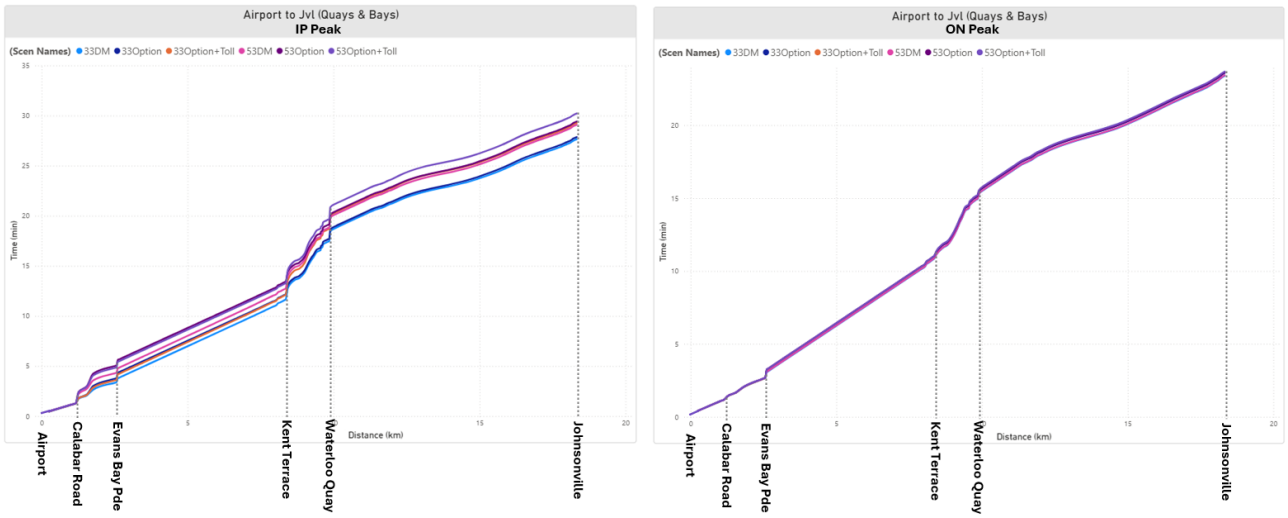


Figure 4 – Travel Time Profile for Airport to Johnsonville (via Bays) for Tolled and Non-Tolled

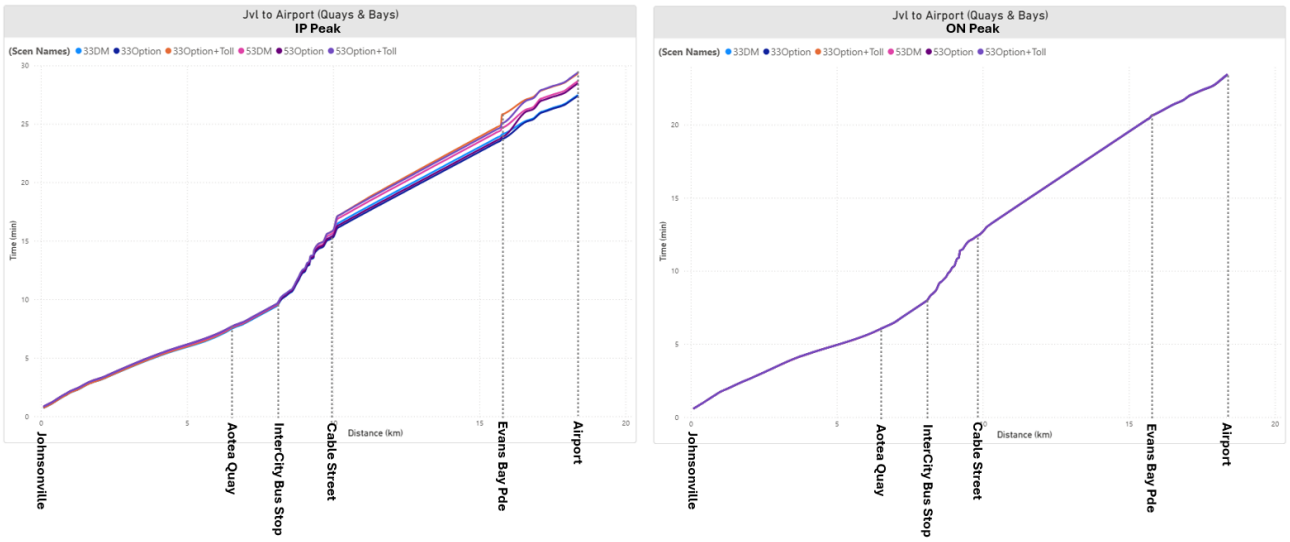


Figure 5 – Travel Time Profile for Johnsonville to Airport (via SH1) for Tolled and Non-Tolled

Table 3 : Journey times for tolled and non-tolled routes 2023 (WTSM)

Route	2033 Travel Time (minutes)					
	AM			PM		
	Do Minimum	With Project (Non-Tolled)	With Project (Tolled)	Do Minimum	With Project (Non-Tolled)	With Project (Tolled)
SH1 West to CBD (Tunnel)	10	-5	-6	9	-5	-6
SH1 CBD to West (Tunnel)	5	0	-1	7	-1	-2
SH1 West to CBD (Terrace)	10	-2	-1	10	-2	-2
SH1 CBD to West (Terrace)	7	0	1	9	-1	1
SH1 East to CBD (Tunnel)	12	-6	-8	12	-7	-8
SH1 CBD to East (Tunnel)	11	-4	-5	14	-4	-6
SH1 East to CBD (Bays)	16	-2	-1	18	0	0
SH1 CBD to East (Bays)	11	-1	-1	12	-1	-1
SH1 East to CBD (Newtown)	14	-4	-3	15	-5	-3
SH1 CBD to East (Newtown)	12	-1	0	15	1	1
Airport to Hospital (Tunnel)	20	-3	-4	17	-3	-4
Hospital to Airport (Tunnel)	21	-4	-5	23	-4	-4
Airport to Hospital (Newtown)	16	-2	-1	14	-2	-1
Hospital to Airport (Newtown)	14	-1	0	16	0	1

Table 4 : Journey times for tolled and non-tolled routes 2053 (WTSM)

Route	2033 Travel Time (minutes)					
	AM			PM		
	Do Minimum	With Project (Non-Tolled)	With Project (Tolled)	Do Minimum	With Project (Non-Tolled)	With Project (Tolled)
SH1 West to CBD (Tunnel)	11	-5	-6	10	-6	-6
SH1 CBD to West (Tunnel)	5	-1	-1	7	-2	-2
SH1 West to CBD (Terrace)	11	-2	-2	10	-2	-2
SH1 CBD to West (Terrace)	8	0	1	9	-1	1
SH1 East to CBD (Tunnel)	14	-7	-9	13	-8	-9
SH1 CBD to East (Tunnel)	12	-5	-6	15	-5	-6
SH1 East to CBD (Bays)	16	-2	-2	18	0	0
SH1 CBD to East (Bays)	11	-1	-1	12	-1	-1
SH1 East to CBD (Newtown)	16	-5	-4	16	-5	-4
SH1 CBD to East (Newtown)	13	-1	0	17	1	1
Airport to Hospital (Tunnel)	23	-3	-5	20	-4	-5
Hospital to Airport (Tunnel)	26	-5	-6	27	-4	-5
Airport to Hospital (Newtown)	19	-2	-2	16	-2	-2
Hospital to Airport (Newtown)	17	-1	0	20	0	0

ANNEXURE C Detailed Assessment of Tolled Scenario

Introduction

1. At a high level, I consider that the introduction of tolls will dissuade a proportion of potential users from undertaking journeys on the tolled SH1 section of the Project. These users would respond in a number of ways, including rerouting to alternative parallel routes, shifting to different modes of transport, supressing (not making) trips, or altering the timing of their travel.
2. While not all potential outcomes to tolling have been modelled, my assessment has adopted a "bookend" approach to capture the plausible range of operational states. One end, the un-tolled scenario represents the maximum increase in traffic volumes on SH1 through the Project area, and the other end the tolled scenario represents an operational state where the tolls dis-incentivise a portion of potential users from using SH1 as a tolled Project, and therefore more traffic may remain on local roads. Together these scenarios provide an indication on how operational effects may vary depending on whether tolling is applied.
3. For the purpose of this assessment, I made an assumption that if tolled, the Project would operate as a "dynamic toll scheme", that is, varying tolls by time of day as is common for tolled roads in urban environments internationally.
4. The overnight toll has been assumed to be at a low level, and this reduces the effects of causing diversion onto the local road network at the times when there is no congestion on the parallel routes.
5. In my opinion, noting the proposed timing of the Project construction, the assessed tolled scenario provides a robust "bookend" to the range of transport effects I expect are likely to occur in the future. It is standard practice within Transport Planning to assess future conditions in the presence of uncertainty, and this represents a case of "known" uncertainty – where the realised outcome sits within the tolled and un-tolled scenarios assessed. In such cases, it is common practice to assess the transport effects both with and without the scheme and to consider the scale and likelihood of effects within that range.

Traffic volumes

6. Table 1 below presents the anticipated daily 2033 traffic volumes at key locations on SH1 under a tolled scenario.

Table 1 : Daily volumes under a tolled scenario 2033 (WTSM)

Location		Northbound			Southbound		
		Do Minimum	With Project (Tolled)	Difference	Do Minimum	With Project (Tolled)	Difference
SH1	Cobham Drive (East of Troy)	27,100	28,000	+3%	28,300	29,000	+2%
	Cobham Drive (West of Troy)	20,200	22,900	+13%	19,700	19,900	+1%
	Wellington Road (SH1 Section)	20,800	24,200	+16%	17,400	17,700	+2%
	Ruahine Street	19,800	20,000	+1%	18,600	17,700	-5%
	Mt Victoria Tunnel	21,100	23,000	+9%	22,900	21,800	-5%
	Kent Terrace	n/a	n/a	n/a	27,100	31,500	+16%
	Vivian Street (Cuba to Victoria)	n/a	n/a	n/a	18,900	20,300	+7%
	Terrace Tunnel	31,100	26,100	-16%	25,200	24,200	-4%
Local Roads	Evans Bay Parade	1,600	1,700	0%	2,100	2,800	+33%
	The Terrace	9,600	11,100	+16%	3,700	3,700	0%
	Adelaide Road	13,000	14,300	+12%	5,500	10,000	+82%
	Constable Street	11,100	12,300	+11%	11,600	14,000	+21%

7. Traffic volumes are expected to increase broadly in line with where the most additional capacity is being provided, with the largest daily northbound increases occurring on Wellington Road and Cobham Drive (west of Troy Street), at 16% and 13% respectively, and the largest daily southbound increases occurring on Kent Terrace (South of Pirie Street) at 16%.

8. The largest daily decrease in traffic volumes occur in the Terrace Tunnel in the northbound direction at -16%, arising from reductions in the interpeak and the overnight periods where traffic is choosing to detour to avoid the toll in times when the alternate routes are uncongested. The northbound decrease in the Terrace Tunnel is aligned with my expectations as the Project does not change the capacity northbound, but does introduce charges to travelling northbound.

9. The largest daily decrease in traffic on Ruahine / Mt Victoria Tunnel is -5% in the southbound direction, with similar features to the above, but reduced due to the longer untolled detour routes.

10. The above table shows total vehicles, but a more detailed table that is included in the Traffic Modelling Report also shows the vehicle composition, which demonstrates with tolling there is a difference in response between light vehicles (typically cars) and heavy vehicles. Even allowing for toll rates that are typically double the cost of light vehicles, the running costs and time of heavy vehicles makes them less likely to detour off a more efficient route to avoid paying a toll. The additional capacity and improved form of SH1 means that the route remains attractive for heavy vehicles and there is not the reduction in HGV flows on SH1 that is seen in the light vehicle flows.

11. I consider overall, the daily flow data presented above demonstrates that there is a High benefit for both efficiency of both SH1 and the local road network, and further for the safety of the local road network for the tolled scenario compared to the Do-minimum.

12. The next four tables below show the anticipated AM (6:00 am to 9:00 am) peak, interpeak, PM (3:00 pm to 6:00 pm) peak, and overnight traffic volumes for 2033 under a tolled scenario at key locations on SH1.

Table 2 : AM peak (6:00 am – 9:00 am) volumes under a tolled scenario 2033 (WTSM)

Location		Northbound			Southbound		
		Do Minimum	With Project (Tolled)	Difference	Do Minimum	With Project (Tolled)	Difference
SH1	Cobham Drive (East of Troy)	4,800	4,900	+2%	4,700	4,900	+4%
	Cobham Drive (West of Troy)	3,500	4,100	+17%	3,400	3,600	+6%
	Wellington Road (SH1 Section)	3,500	4,800	+26%	2,900	3,300	+14%
	Ruahine Street	3,400	3,900	+15%	3,200	3,300	+3%
	Mt Victoria Tunnel	3,700	4,500	+22%	3,800	4,000	+5%
	Vivian Street (Cuba to Victoria)	n/a	n/a	n/a	3,500	4,600	+31%
	Terrace Tunnel	4,600	3,800	-17%	4,800	6,200	+29%
Local Roads	Evans Bay Parade	400	200	-50%	500	400	-20%
	The Terrace	1,300	1,500	+15%	900	800	-11%
	Adelaide Road	1,900	2,000	+5%	700	1,200	+71%
	Constable Street	1,800	2,000	+11%	1,800	2,100	+17%

Table 3 : Inter peak (9:00 am – 3:00 pm) volumes under a tolled scenario 2033 (WTSM)

Location		Northbound			Southbound		
		Do Minimum	With Project (Tolled)	Difference	Do Minimum	With Project (Tolled)	Difference
SH1	Cobham Drive (East of Troy)	9,800	10,100	+3%	9,800	9,900	+1%
	Cobham Drive (West of Troy)	6,700	7,900	+18%	6,100	6,600	+8%
	Wellington Road (SH1 Section)	7,300	8,000	+10%	5,000	4,800	-4%
	Ruahine Street	7,000	6,400	-9%	6,000	4,800	-20%
	Mt Victoria Tunnel	7,400	7,400	+0%	7,700	6,100	-21%
	Vivian Street (Cuba to Victoria)	n/a	n/a	n/a	6,800	6,700	-1%
	Terrace Tunnel	10,700	8,600	-20%	8,500	6,900	-19%
Local Roads	Evans Bay Parade	500	900	+80%	500	1,600	+220%
	The Terrace	3,600	4,200	+17%	1,300	1,300	+0%
	Adelaide Road	5,300	5,400	+2%	1,700	3,400	+100%
	Constable Street	4,200	4,400	+5%	4,500	5,400	+20%

Table 4 : PM peak (3:00 pm – 6:00 pm) volumes under a tolled scenario 2033 (WTSM)

Location		Northbound			Southbound		
		Do Minimum	With Project (Tolled)	Difference	Do Minimum	With Project (Tolled)	Difference
SH1	Cobham Drive (East of Troy)	5,500	5,700	+4%	5,800	6,000	+3%
	Cobham Drive (West of Troy)	4,300	4,700	+9%	3,700	4,100	+11%
	Wellington Road (SH1 Section)	4,100	5,300	+29%	3,400	4,400	+29%
	Ruahine Street	3,800	4,700	+24%	3,500	4,400	+26%
	Mt Victoria Tunnel	4,000	5,500	+38%	4,300	5,300	+23%
	Vivian Street (Cuba to Victoria)	n/a	n/a	n/a	4,000	5,500	+38%
	Terrace Tunnel	7,800	7,400	-5%	4,800	5,800	+21%
Local Roads	Evans Bay Parade	400	200	-50%	1,000	600	-40%
	The Terrace	2,600	2,900	+12%	800	800	+0%
	Adelaide Road	2,200	2,200	+0%	1,700	2,000	+18%
	Constable Street	2,100	2,100	+0%	2,400	2,400	+0%

Table 5 : Overnight (6:00 pm – 6:00 am) volumes under a tolled scenario 2033 (WTSM)

Location		Northbound			Southbound		
		Do Minimum	With Project (Tolled)	Difference	Do Minimum	With Project (Tolled)	Difference
SH1	Cobham Drive (East of Troy)	7,000	7,300	+4%	7,900	8,200	+4%
	Cobham Drive (West of Troy)	5,800	6,200	+7%	6,600	5,600	-15%
	Wellington Road (SH1 Section)	5,800	6,500	+12%	6,100	5,200	-15%
	Ruahine Street	5,500	5,000	-9%	5,800	5,200	-10%
	Mt Victoria Tunnel	6,000	5,600	-7%	7,100	6,400	-10%
	Vivian Street (Cuba to Victoria)	n/a	n/a	n/a	4,700	3,500	-26%
	Terrace Tunnel	8,000	6,300	-21%	7,000	5,300	-24%
Local Roads	Evans Bay Parade	300	300	+0%	200	200	+0%
	The Terrace	2,200	2,400	+9%	700	700	+0%
	Adelaide Road	3,600	4,600	+28%	1,300	3,400	+162%
	Constable Street	2,900	3,800	+31%	2,900	4,200	+45%

13. Again, the greatest AM peak in the northbound direction occurs on Wellington Road and in the Mt Victoria Tunnel at 26% and 22% respectively, whereas the greatest AM peak in the southbound direction occurs on Vivian Street (Cuba Street to Victoria Street) and Terrace Tunnel at 31% and 29% respectively.
14. Under a tolled scenario, the AM and PM peaks traffic volumes see a reduction in the eastbound direction on the state highway, with an increase in volume in the westbound direction. This is coupled with an increase in traffic volume on the local surrounding network, notably on Adelaide Road, Riddiford Street, Constable Street, and Crawford Road.
15. During the interpeak and overnight periods traffic volumes decrease in the southbound direction at Ruahine Street / Mt Victoria Tunnel and the Terrace Tunnel respectively. As shown in the tables above, Mt Victoria Tunnel experiences increased volumes during the AM and PM peaks. However, in the interpeak and overnight periods when there is little or no congestion on parallel routes, vehicles are more likely to divert off SH1 and instead route via the Bays or Constable Street. In summary, lower levels of congestion across the local network during the interpeak and overnight periods, make these routes more attractive options for vehicles seeking to avoid the toll on SH1.
16. Figure 1 to Figure 5 below present a summary of differences in traffic volumes in 2033 daily, AM, interpeak, PM, and overnight periods, respectively, compared to the Do Minimum. The green lines demonstrate where there is an increase in demand, and red demonstrates where there is a decrease in demand. The thickness of the line and the numbers reflect the scale of difference in traffic volumes.

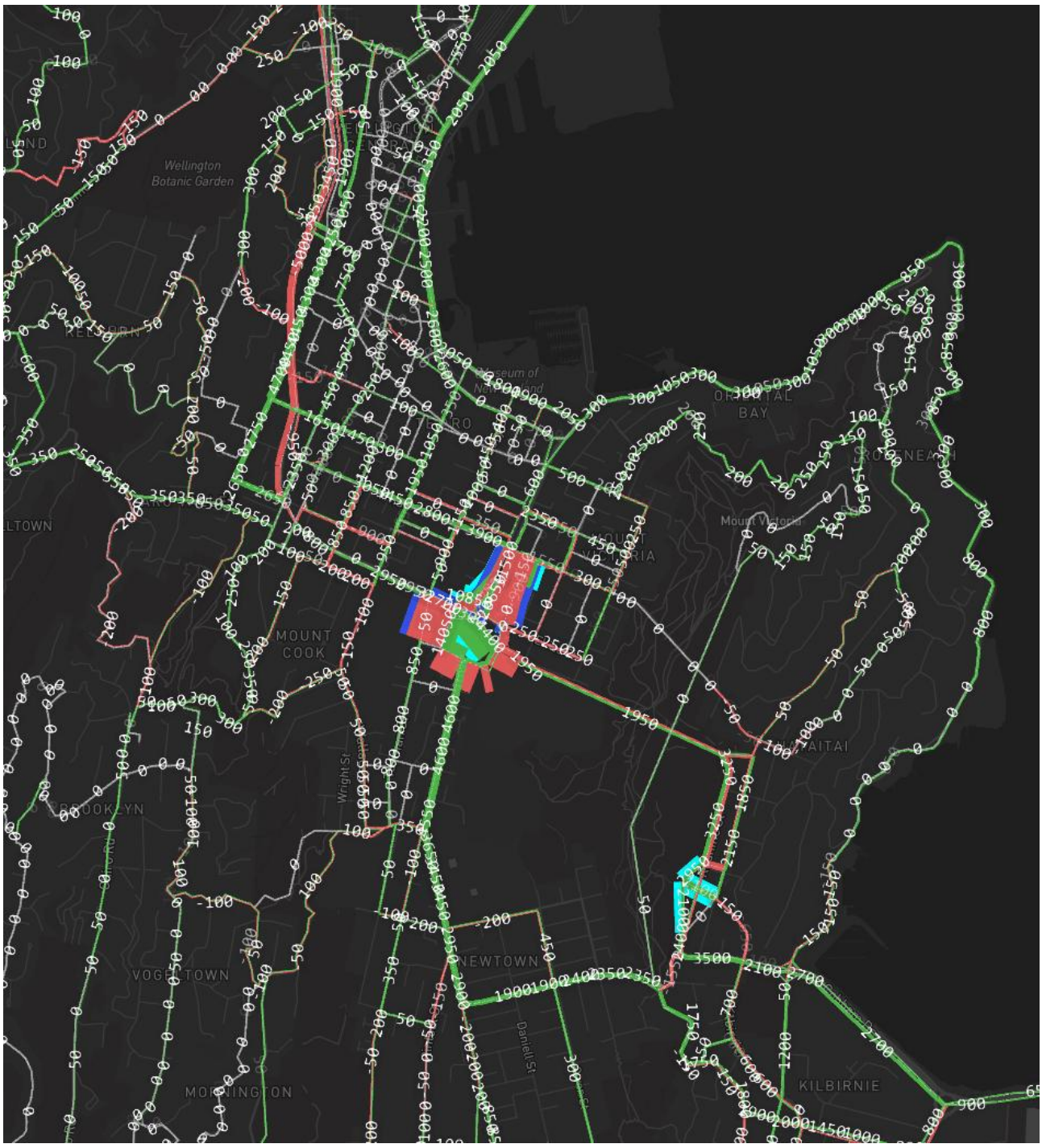


Figure 1 – Volume difference plot 2033 daily traffic under a tolled scenario (WTSM)

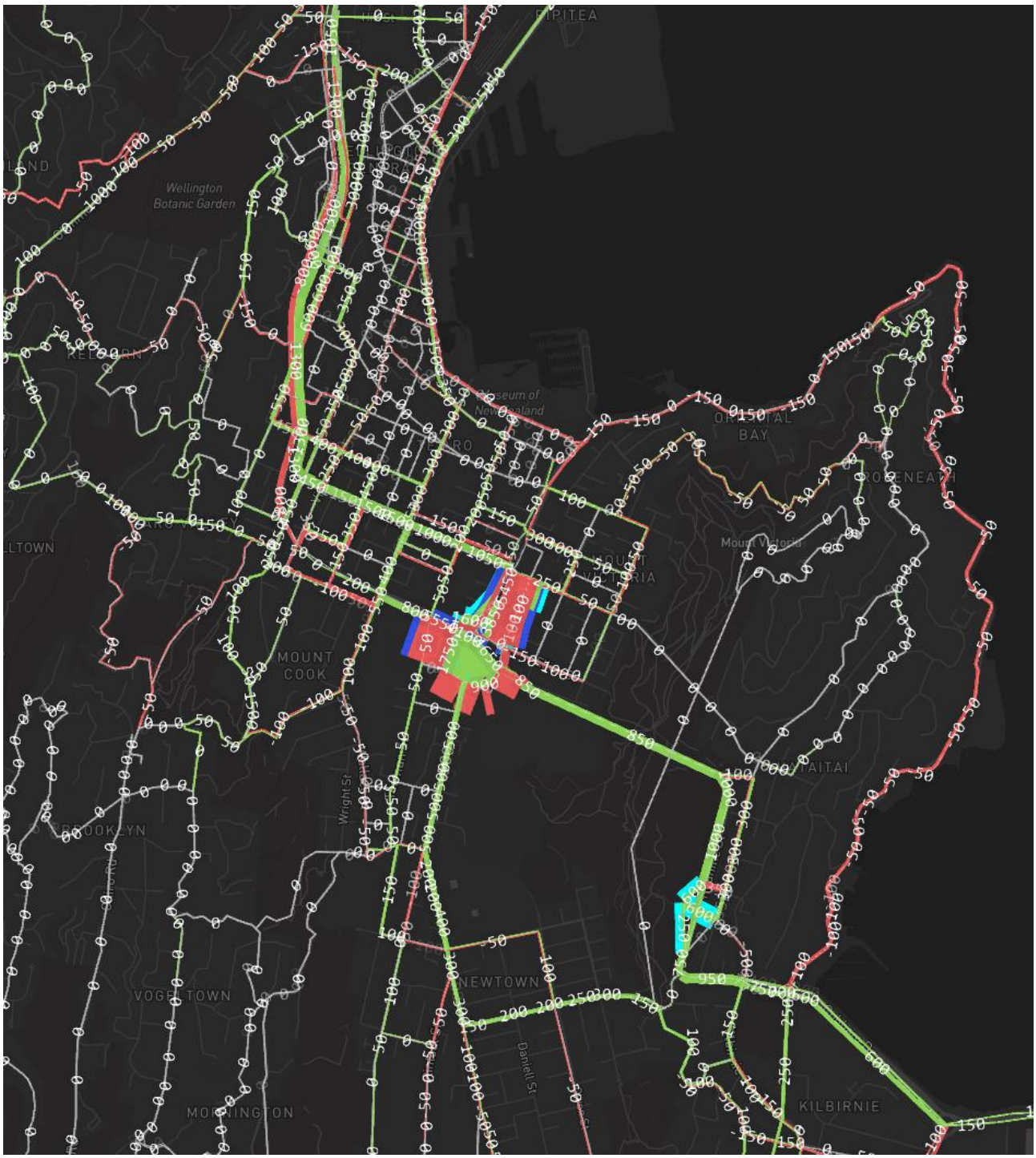


Figure 2 – Volume difference plot 2033 AM peak (6 am to 9 am) under a tolled scenario (WTSM)

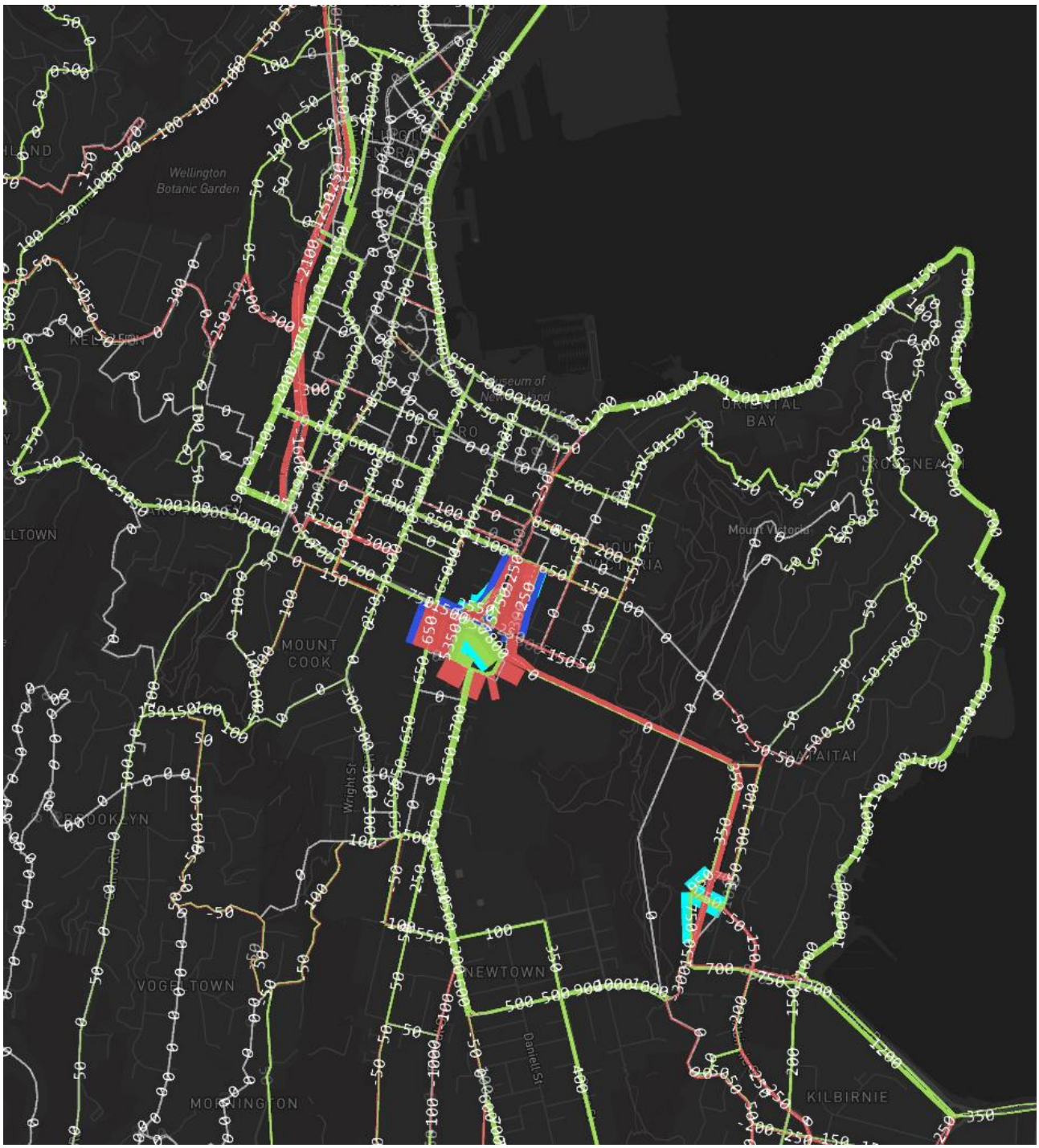


Figure 3 – Volume difference plot 2033 interpeak (9 am to 3 pm) under a tolled scenario (WTSM)

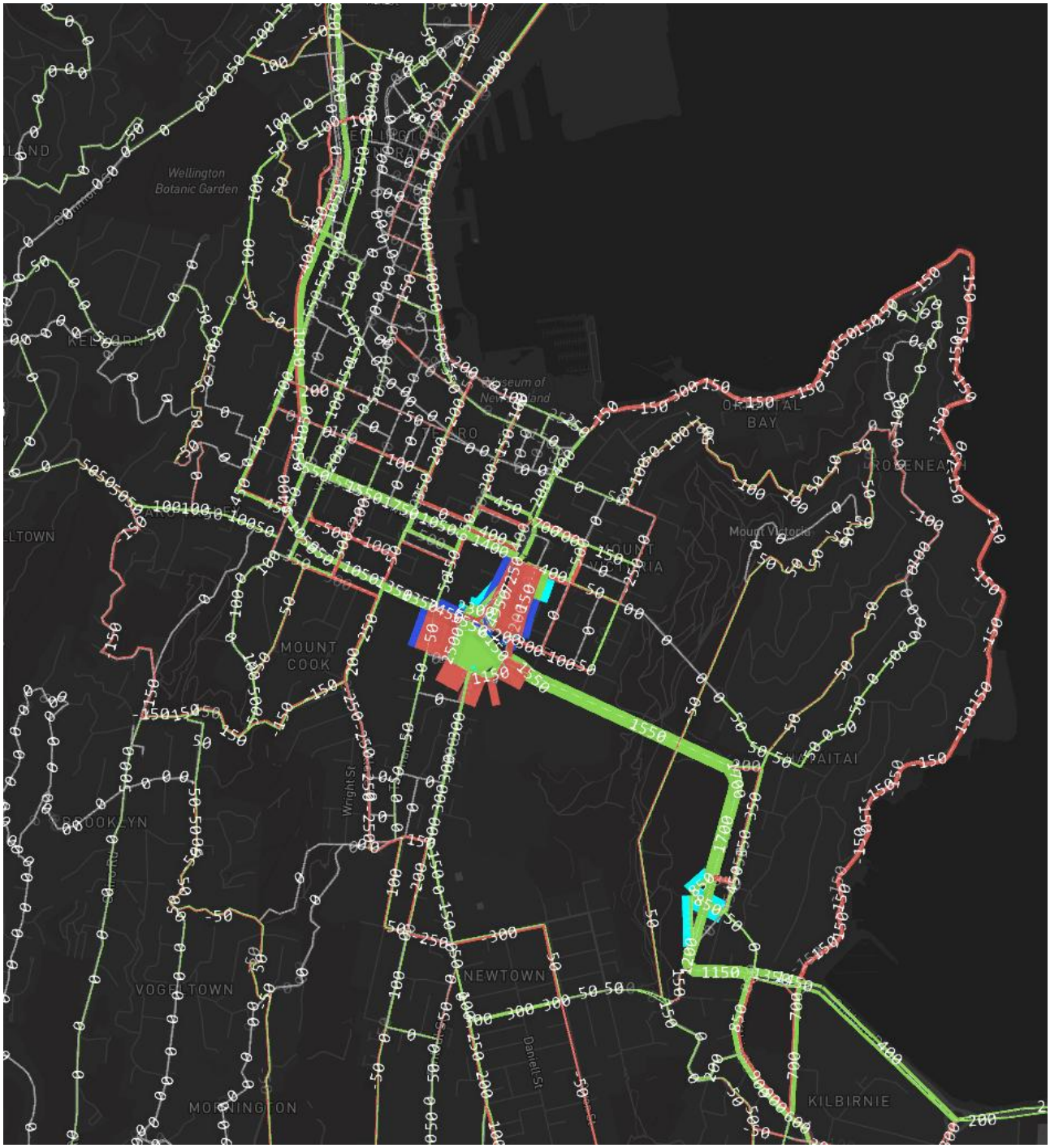


Figure 4 – Volume difference plot 2033 PM peak (3 pm to 6 pm) under a tolled scenario (WTSM)

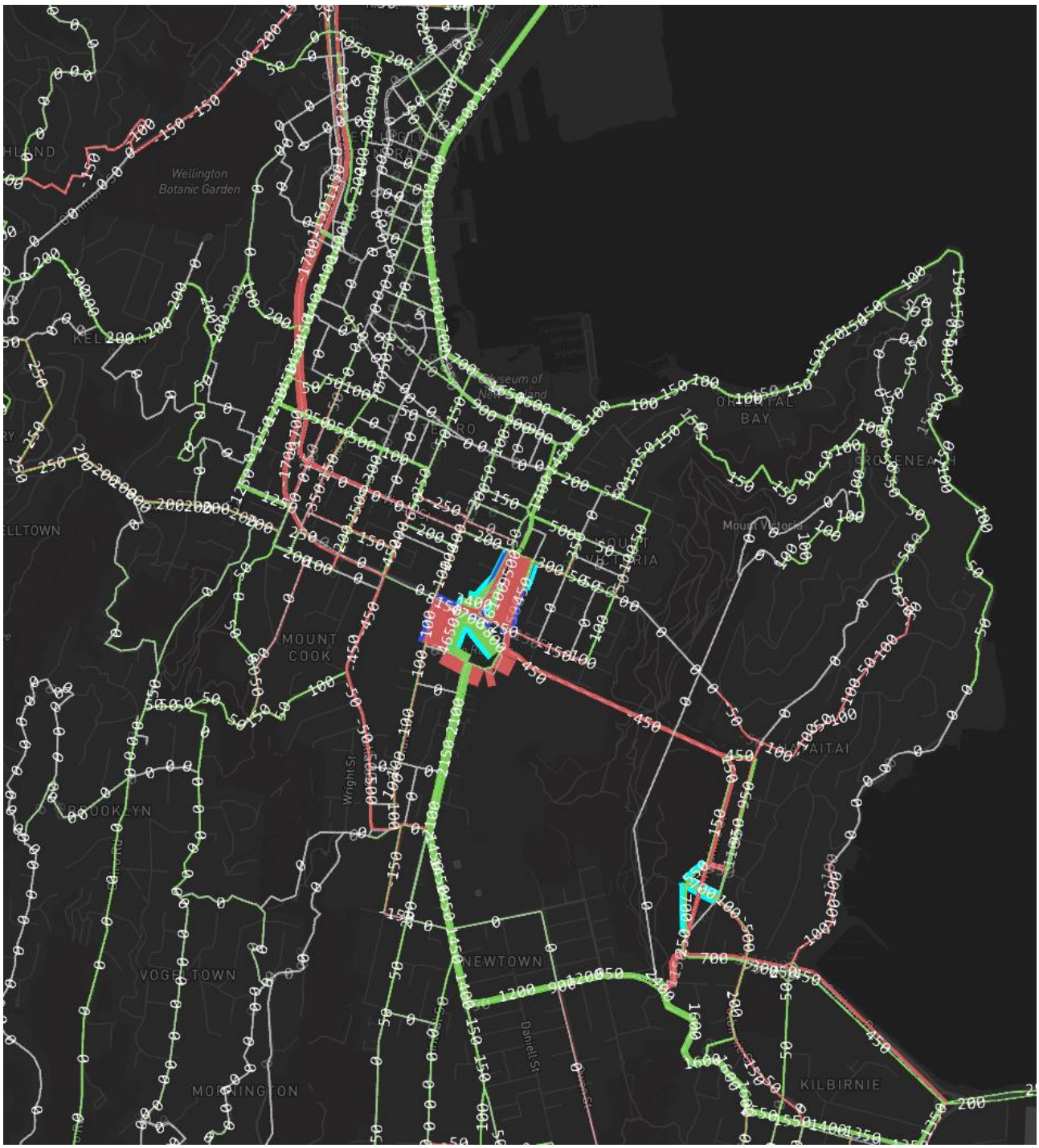


Figure 5 – Volume difference plot 2033 overnight under a tolled scenario (WTSM)

17. The volume difference plots shows that the traffic volume is predicted to increase on the state highway and the immediate approaches to the state highway due to the additional capacity the tolled Project will provide, while the traffic volumes on local roads are expected to remain relatively static or reduce as a result of the tolled Project. This is primarily seen on the southern extents of the Basin Reserve, Harbour Quays, and around the Bays.

18. The interpeak and overnight traffic volumes on the state highway are seen to decrease in volume relative to the Do Minimum, with travellers seen to utilise local roads, such as around the Bays and Constable Street.

19. The tables show that during the AM and PM peak periods SH1 is generally forecast to experience increased traffic in the tolled scenario compared with the Do Minimum, which helps to reduce traffic volumes on parts of the local road network, notably Evans Bay Parade.

20. The data does show a small increase in traffic volumes on several local roads in both the AM and PM peak periods, however, as shown in the journey time information below, this slight traffic volume increase is still expected to result in improved or neutral journey time impacts in the tolled scenario when compared with the Do Minimum, particularly at the Basin Reserve.

21. During the interpeak and overnight however, when the network is not congested then the data shows reduced traffic volumes on parts of SH1 in a tolled scenario and this traffic instead uses local roads. Given the network is uncongested and generally free flowing during these periods in my opinion the network would be able to cope with these traffic volume increases on the local road network.

22. Table 6Table 6 to

23. Table 10 present the anticipated daily, AM, interpeak, PM, and overnight volumes in 2053 under a tolled scenario at key points on both the state highway and local road networks.

Table 6 : Daily traffic volumes under a tolled scenario for 2053 (WTSM)

Location		Northbound			Southbound		
		Do Minimum	With Project (Tolled)	Difference	Do Minimum	With Project (Tolled)	Difference
SH1	Cobham Drive (East of Troy)	29,800	30,400	+2%	31,100	31,500	+1%
	Cobham Drive (West of Troy)	22,300	25,200	+13%	21,800	22,300	+2%
	Wellington Road (SH1 Section)	21,600	27,500	+27%	18,500	21,600	+17%
	Ruahine Street	20,700	23,900	+15%	19,500	21,600	+11%
	Mt Victoria Tunnel	22,200	27,400	+23%	24,100	26,400	+10%
	Vivian Street (Cuba to Victoria)	n/a	n/a	n/a	19,500	22,300	+14%
	Terrace Tunnel	31,500	28,400	-10%	25,300	27,000	+7%
Local Roads	Evans Bay Parade	2,500	1,200	-52%	2,600	1,800	-30%
	The Terrace	10,700	11,700	+19%	2,700	1,900	+2%
	Adelaide Road	13,400	14,100	+5%	4,200	4,300	+57%
	Constable Street	11,300	11,900	+5%	6,000	9,400	+11%

Table 7 : AM peak (6:00 am – 9:00 am) traffic volumes under a tolled scenario 2053 (WTSM)

Location		Northbound			Southbound		
		Do Minimum	With Project (Tolled)	Difference	Do Minimum	With Project (Tolled)	Difference
SH1	Cobham Drive (East of Troy)	4,900	5,100	+4%	5,000	5,100	+2%
	Cobham Drive (West of Troy)	3,600	4,200	+17%	3,500	3,800	+9%
	Wellington Road (SH1 Section)	3,600	4,700	+31%	3,000	3,800	+27%
	Ruahine Street	3,500	4,300	+23%	3,300	3,800	+15%
	Mt Victoria Tunnel	3,700	4,900	+32%	3,800	4,400	+16%
	Vivian Street (Cuba to Victoria)	n/a	n/a	n/a	3,500	4,800	+37%
	Terrace Tunnel	4,600	4,300	-7%	4,900	6,400	+31%
Local Roads	Evans Bay Parade	500	200	-60%	500	300	-40%
	The Terrace	1,400	1,600	+14%	1,000	900	-10%
	Adelaide Road	1,900	2,000	+5%	800	1,300	+63%
	Constable Street	1,900	2,000	+5%	1,900	2,000	+5%

Table 8 : Inter peak (9:00 am – 3:00 pm) traffic volumes under a tolled scenario 2053 (WTSM)

Location		Northbound			Southbound		
		Do Minimum	With Project (Tolled)	Difference	Do Minimum	With Project (Tolled)	Difference
SH1	Cobham Drive (East of Troy)	11,000	11,200	+2%	11,000	10,900	-1%
	Cobham Drive (West of Troy)	7,600	8,900	+17%	6,900	7,700	+12%
	Wellington Road (SH1 Section)	7,300	9,600	+32%	5,300	6,900	+30%
	Ruahine Street	7,200	8,200	+14%	6,200	6,900	+11%
	Mt Victoria Tunnel	7,500	9,500	+27%	8,000	8,400	+5%
	Vivian Street (Cuba to Victoria)	n/a	n/a	n/a	7,100	7,900	+11%
	Terrace Tunnel	11,000	9,600	-13%	8,500	8,500	+0%
Local Roads	Evans Bay Parade	1,200	500	-58%	1,000	1,000	+0%
	The Terrace	3,900	4,400	+13%	1,500	1,600	+7%
	Adelaide Road	5,500	5,500	+0%	2,100	3,400	+62%
	Constable Street	4,100	4,300	+5%	4,900	5,300	+8%

Table 9 : PM peak (3:00 pm – 6:00 pm) traffic volumes under a tolled scenario 2053 (WTSM)

Location		Northbound			Southbound		
		Do Minimum	With Project (Tolled)	Difference	Do Minimum	With Project (Tolled)	Difference
SH1	Cobham Drive (East of Troy)	5,700	5,900	+4%	6,100	6,300	+3%
	Cobham Drive (West of Troy)	4,400	4,900	+11%	3,900	4,300	+10%
	Wellington Road (SH1 Section)	4,100	5,600	+37%	3,300	4,800	+45%
	Ruahine Street	3,800	5,000	+32%	3,500	4,800	+37%
	Mt Victoria Tunnel	4,100	5,900	+44%	4,400	5,800	+32%
	Vivian Street (Cuba to Victoria)	n/a	n/a	n/a	4,000	5,700	+43%
	Terrace Tunnel	7,700	7,600	-1%	4,700	6,200	+32%
Local Roads	Evans Bay Parade	500	200	-60%	1,100	500	-55%
	The Terrace	2,800	3,000	+7%	900	1,000	+11%
	Adelaide Road	2,200	2,200	+0%	1,900	2,000	+5%
	Constable Street	2,100	2,000	-5%	2,400	2,400	+0%

Table 10: Overnight (6:00 pm – 6:00 am) traffic volumes under a tolled scenario 2053 (WTSM)

Location		Northbound			Southbound		
		Do Minimum	With Project (Tolled)	Difference	Do Minimum	With Project (Tolled)	Difference
SH1	Cobham Drive (East of Troy)	8,100	8,300	+2%	9,000	9,200	+2%
	Cobham Drive (West of Troy)	6,700	7,200	+7%	7,500	6,500	-13%
	Wellington Road (SH1 Section)	6,600	7,600	+15%	6,900	6,100	-12%
	Ruahine Street	6,200	6,400	+3%	6,500	6,100	-6%
	Mt Victoria Tunnel	6,900	7,000	+1%	7,900	7,700	-3%
	Vivian Street (Cuba to Victoria)	n/a	n/a	n/a	5,000	3,900	-22%
	Terrace Tunnel	8,300	6,900	-17%	7,200	5,900	-18%
Local Roads	Evans Bay Parade	300	300	+0%	200	200	+0%
	The Terrace	2,500	2,700	+8%	800	800	+0%
	Adelaide Road	3,700	4,400	+19%	1,200	2,800	+133%
	Constable Street	3,100	3,600	+16%	3,300	4,000	+21%

24. While traffic volumes increase on the state highway, in the majority of cases traffic volumes on the local road network are expected to either remain relatively static or reduce as a result of the Project.

25. Figure 6 to Figure 10 below, present a summary of differences traffic volumes in 2053 daily, AM, IP, PM, and overnight periods, respectively, under a tolling scenario, compared to the Do Minimum. The green lines demonstrate where there is an increase in demand, and red demonstrates where there is a decrease in demand. The thickness of the line and the numbers reflects the scale of difference.

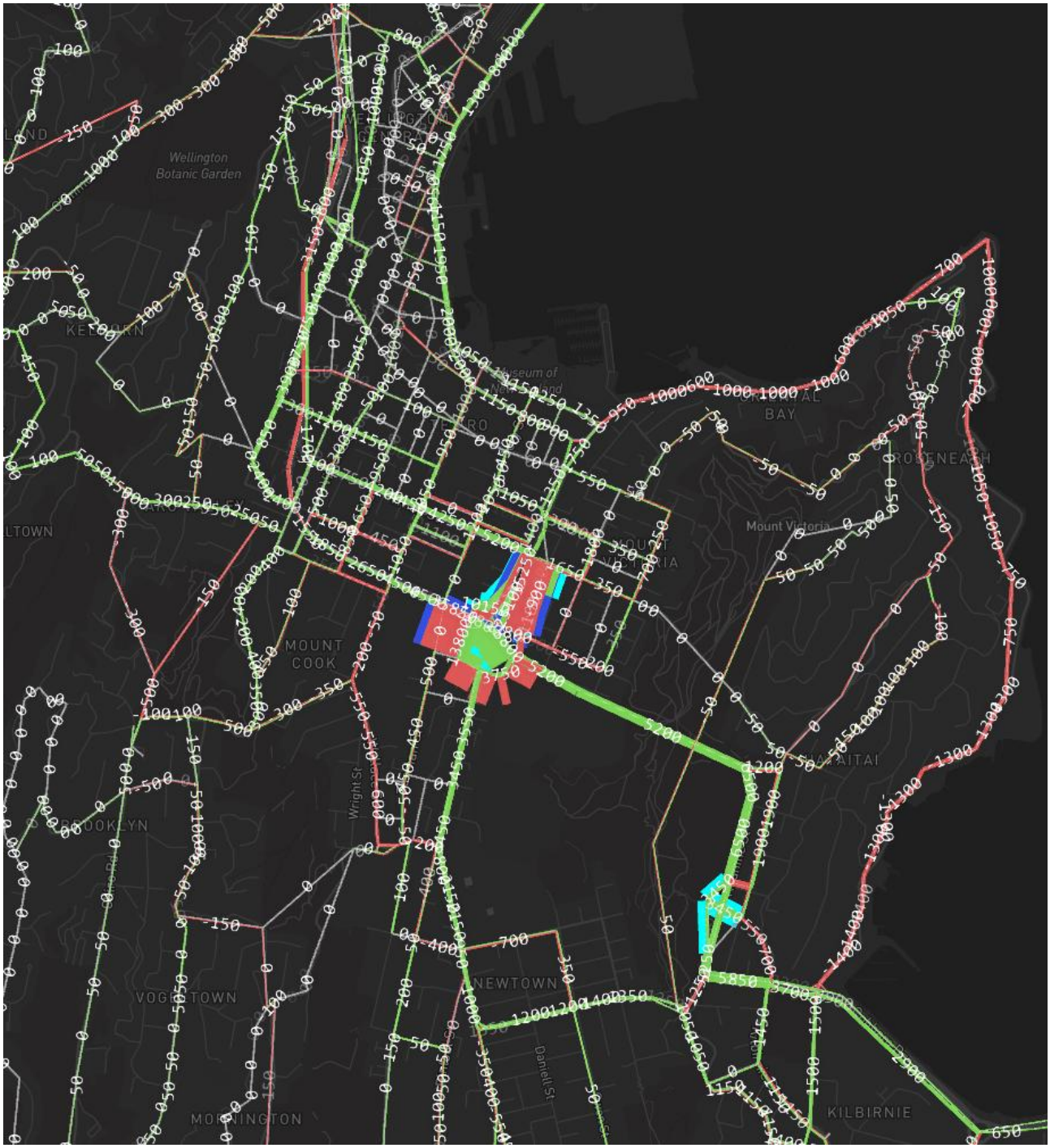


Figure 6 – Volume difference plot 2053 daily traffic under a tolled scenario (WTSM)

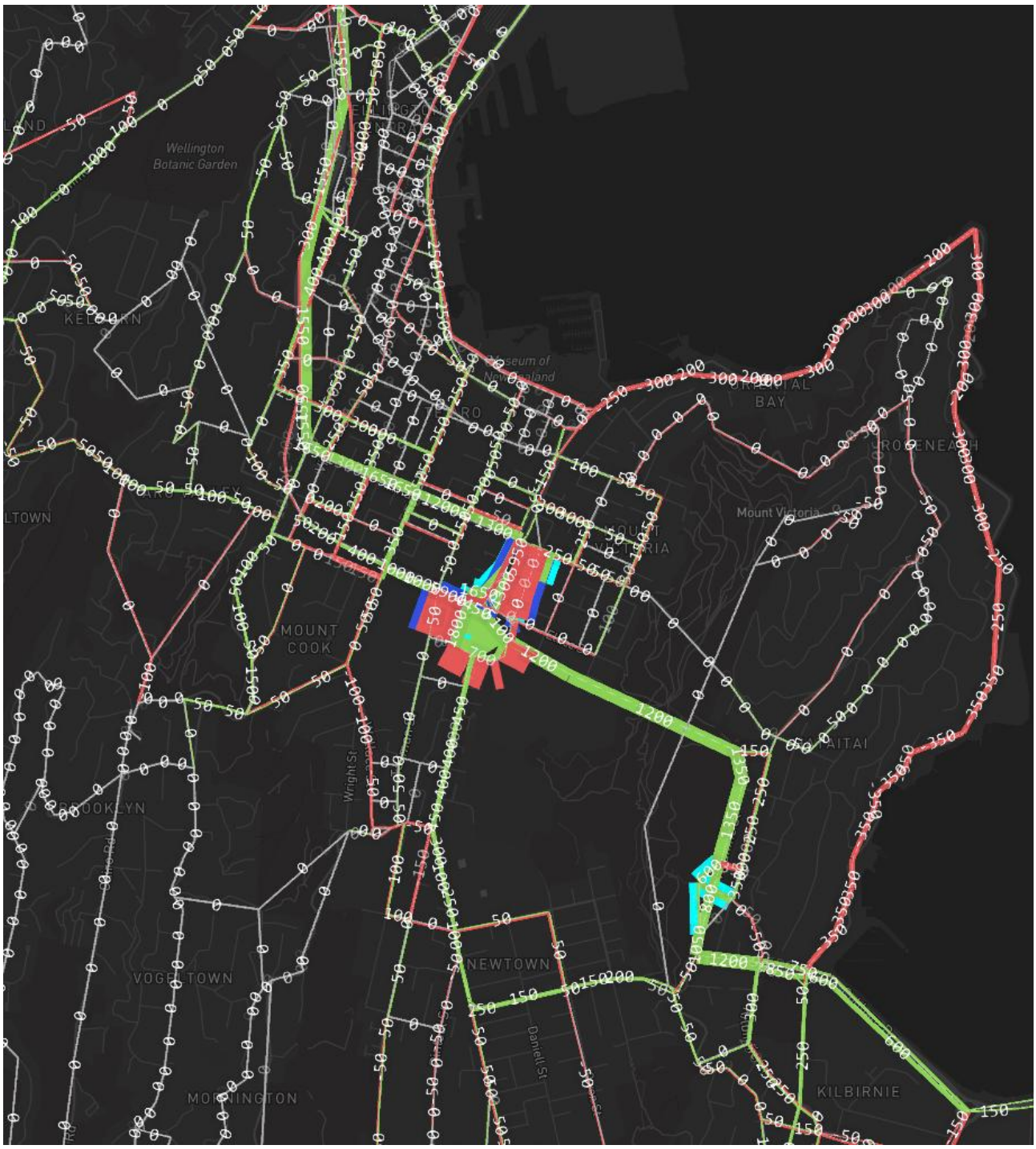


Figure 7 – Volume difference plot 2053 AM peak (6 am to 9 am) under a tolled scenario (WTSM)

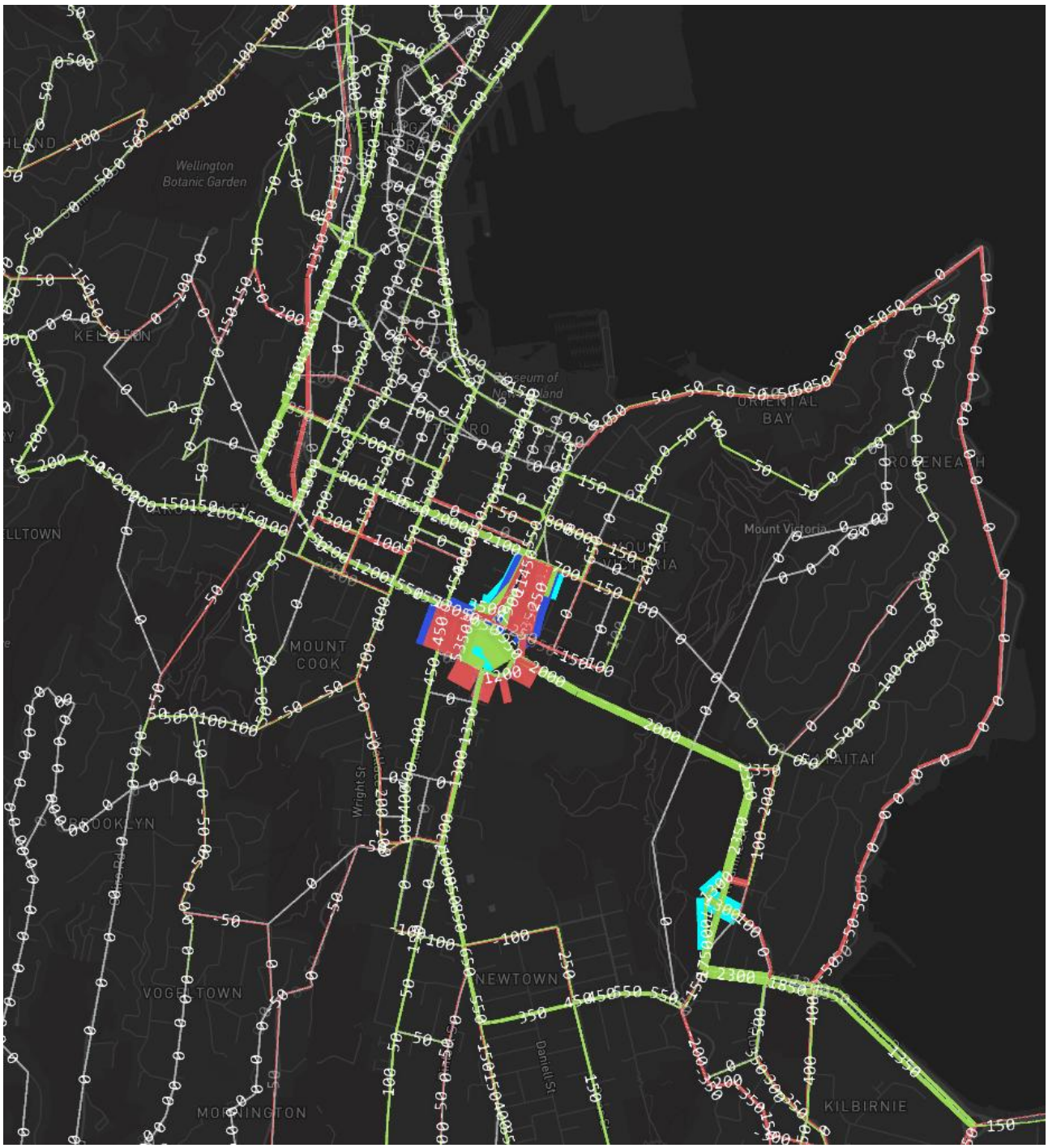


Figure 8 – Volume difference plot 2053 interpeak (9 am to 3 pm) under a tolled scenario (WTSM)

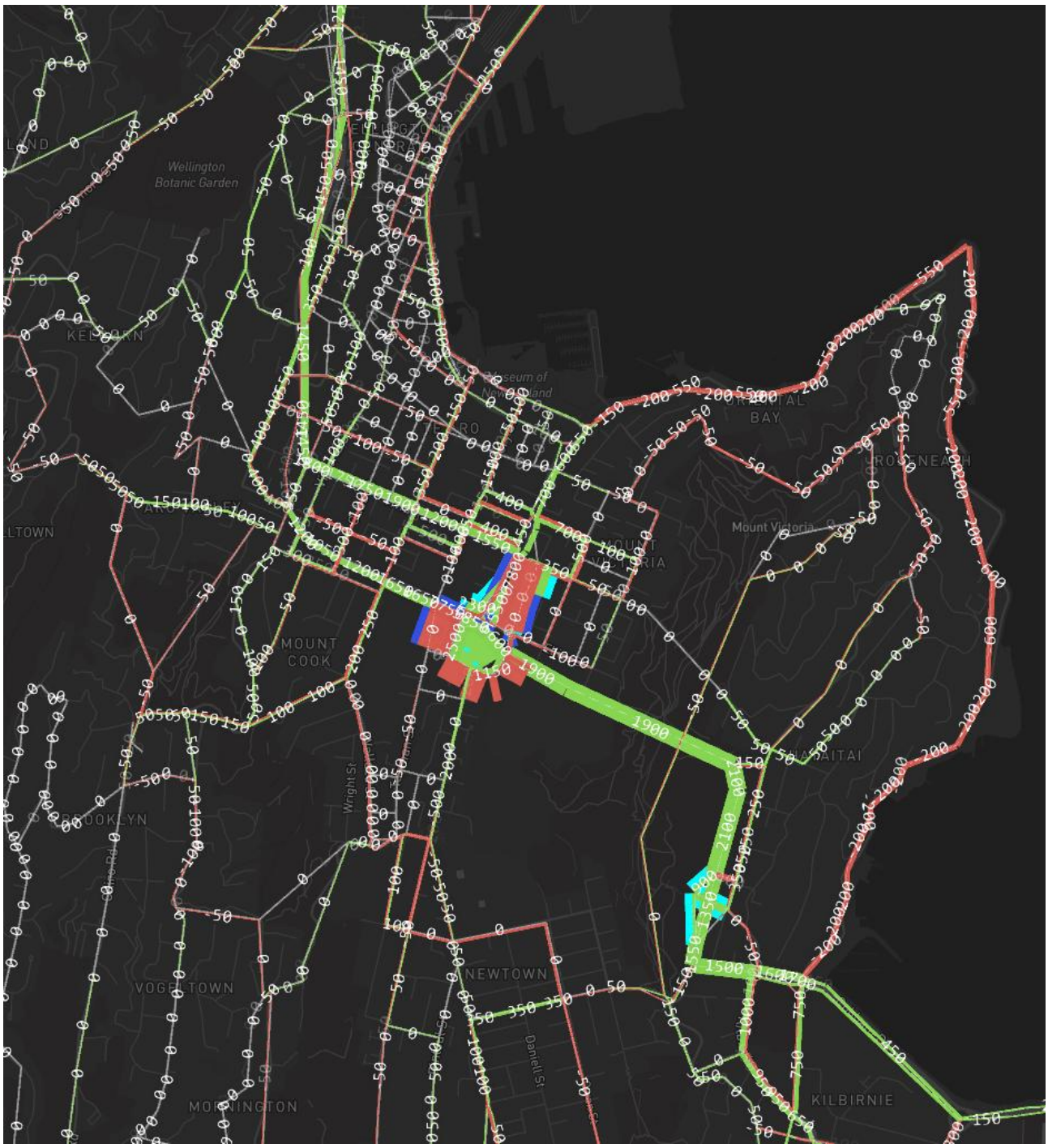


Figure 9 – Volume difference plot 2053 PM peak (3 pm to 6 pm) under a tolled scenario (WTSM)

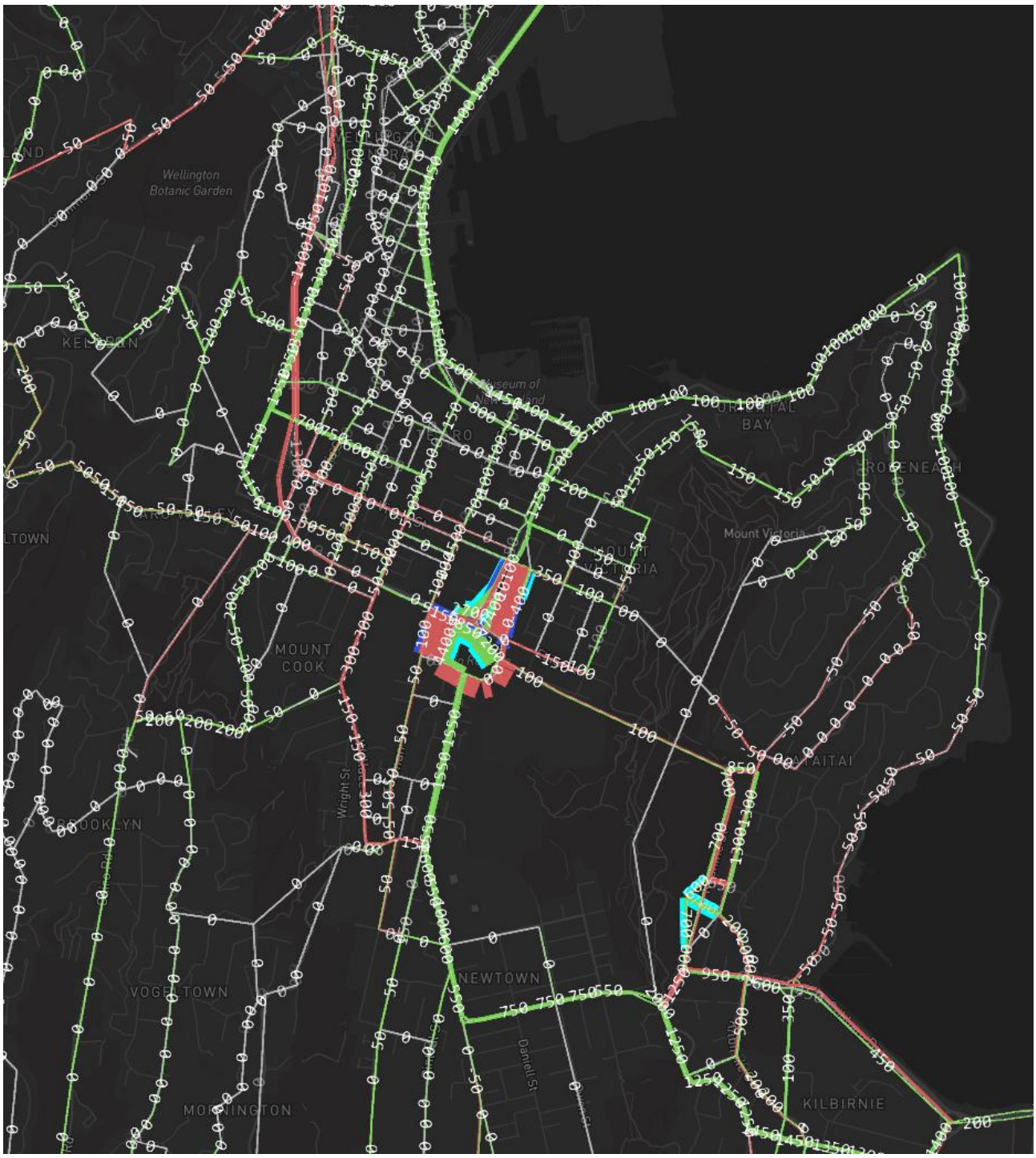


Figure 10 – Volume difference plot 2053 overnight under a tolled scenario (WTSM)

26. The volume difference plots shows that the traffic volume is predicted to increase in 2053 on the state highway in and the immediate approaches to the state highway due to the additional capacity the Project will provide. During peak periods, the traffic volumes on local roads (primarily around the Bays), are expected to reduce.

27. The tables show a similar pattern to 2033 data for the AM and PM peak periods, with SH1 generally forecast to experience increased traffic in the tolled scenario compared with the Do Minimum, which helps to reduce traffic volumes on parts of the local road network, notably Evans Bay Parade.

28. During the interpeak and overnight the data shows a smaller impact on the local road network when compared with the increases forecast in 2033. Similarly, traffic volumes are forecast to increase on both SH1 and local roads. Given the network is uncongested and generally free flowing during these

periods, in my opinion the network should be able to cope with these traffic volume increases on the local road network.

Local roads

29. In the 2033 AM peak traffic volumes on Evans Bay Parade are forecast to decrease by 50% (400 to 200 vehicles) northbound and 20% southbound (500 to 400 vehicles) in the tolled scenario when compared to the Do Minimum. The other three corridors are expected to see small increases in traffic volumes, with the largest increase forecast on Adelaide Road southbound, which is expected to increase 71% from 700 to 1,200 vehicles. This level of traffic volume is still lower than the Do Minimum flow Northbound in the same period so in my opinion can be adequately accommodated.

30. In both the 2033 interpeak and overnight period both northbound and southbound traffic volumes are forecast to increase in the tolled scenario on the local roads, with the exception of Evans Bay Parade that is expected to see no change in overnight volumes and a slight decrease in the inter peak period, when compared to the Do Minimum. Similar to the AM peak the level of increases forecast on the other local roads is relatively small, also noting the longer time span for the inter peak and overnight time periods.

31. The 2033 PM peak is similar to the AM peak data. With a small decrease in traffic volumes forecast in both directions on Evans Bay Parade and similar small increases on the other three local roads. The largest increase in volumes is forecast on Adelaide Road southbound, with a 18% increase in the tolled scenario compared to the Do Minimum, equating to an additional 300 vehicles. However, as noted in the AM peak, this level of traffic volume is still lower than the Do Minimum flow Northbound in the same period so in my opinion can be adequately accommodated.

32. In my opinion the scale of the increases forecast on the local road network is not expected to materially impact the operation of the network. The largest traffic volumes on are forecast during the interpeak and overnight when the network is less congested. During peak hours the majority of traffic is still expected to use the SH1 corridor in the tolled scenario. In addition, the journey time data presented below still shows overall travel time improvements or neutral impacts of these volume increases on the local roads that have been assessed.

Mode share

33. In Table 11 and Table 12 below I show the forecasts for the number of trips that will be made by each mode for 2033 both regionally and the CBD under a tolling scenario.

Table 11: Regional and CBD trip and mode share 2033

Mode	Regional				CBD only			
	Person Trips		Mode Share %		Person Trips		Mode Share %	
	Do Minimum	With Project (Tolled)	Do Minimum	With Project (Tolled)	Do Minimum	With Project (Tolled)	Do Minimum	With Project (Tolled)
Active	432,522	429,619	18%	18%	34,550	34,450	19%	19%
Light[1]	1,747,670	1,751,102	75%	75%	97,403	98,820	54%	55%
Bus	94,660	94,309	4%	4%	24,050	24,250	13%	13%
Rail	63,512	63,068	3%	3%	22,800	22,550	13%	13%

[1] Assumes occupancy of 1.35

Table 12: Regional and CBD trip and mode share 2053

Mode	Regional				CBD only			
	Person Trips		Mode Share Percentage		Person Trips		Mode Share Percentage	
	Do Minimum	With Project (Tolled)	Do Minimum	With Project (Tolled)	Do Minimum	With Project (Tolled)	Do Minimum	With Project (Tolled)
Active	483,715	480,554	19%	19%	36,850	36,750	20%	20%
Light[35]	1,857,423	1,861,123	74%	74%	96,660	98,213	52%	53%
Bus	102,078	101,754	4%	4%	25,100	25,050	14%	14%
Rail	72,741	72,268	3%	3%	25,700	25,400	14%	14%

34. Based on the modelling undertaken for the Project under a tolled scenario, I consider the effect of the tolling on the Project in relation to mode share to be **negligible.**

Table 13: Daily peak VKT and CO2-e

	2033 – Daily Peak			2053 – Daily Peak		
	Do Minimum	With Project	% Change	Do Minimum	With Project	% Change
Vehicle Kilometres Travelled (VKT)	11,742,224	11,834,111	0.8%	12,196,052	12,277,756	0.7%
Carbon Dioxide Equivalent (CO2-e)	2,341	2,353	0.5%	1,098	1,100	0.2%

35. As can be seen above, the tables also show that there is a **negligible** change in the total vehicle kilometres travelled and, by extension, I consider the effect on vehicle emissions to be **negligible**.

Journey times

36. The journey routes, local alternative roads, and key points of interest between the Airport and Johnsonville via SH1 and the Bays under a tolled scenario are shown in Figure 11**Error! Reference source not found.**.

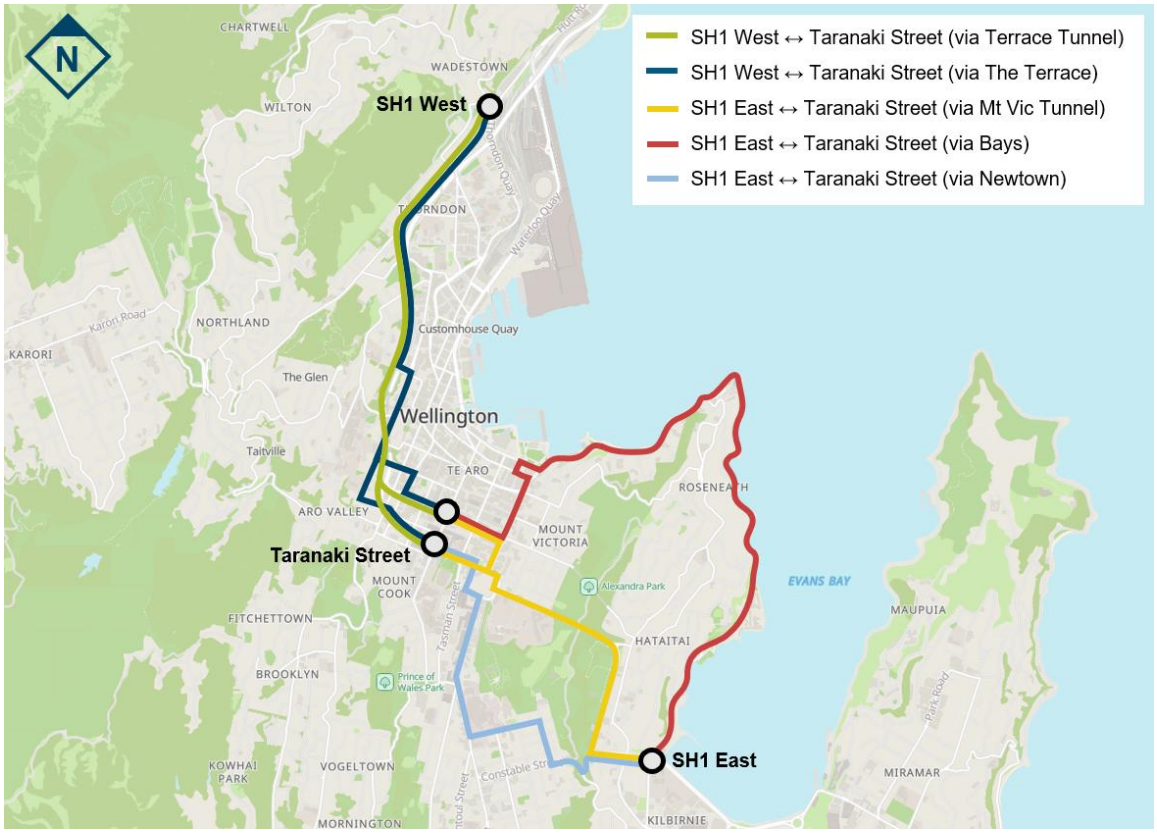


Figure 11 – Tolled and Non-Tolled Routes from SH1 West to SH1 East

37. Notwithstanding the increases in traffic volumes anticipated on SH1 which I discussed above, journey times on key routes are expected to decrease with the tolled Project, as shown below, AM and PM peak journey times for 2033 and 2053 are displayed in Table 14 and Table 15. Notably, journey times are expected to decrease between key points whether or not those journeys are on state highway or local roads. This indicates that the network as a whole is faster and that the benefits of the Project on journey time are experienced across the city.

Table 14: AM and PM journey time savings for 2033 (WTSM)

Route	2033 Journey Time (minutes)					
	AM peak			PM peak		
	Do Minimum	With Project (Non-Tolled)	With Project (Tolled)	Do Minimum	With Project (Non-Tolled)	With Project (Tolled)
Airport to Johnsonville (via SH1)	32	-6	-8	41	-7	-8
Johnsonville to Airport (via SH1)	48	-5	-9	41	-6	-9
Airport to Johnsonville (via Bays)	40	-7	-6	52	-4	-3
Johnsonville to Airport (via Bays)	48	-4	-5	43	-3	-4
Post Office Square to Johnsonville	12	0	0	25	0	2
Johnsonville to Post Office Square	28	-1	2	16	-1	3
Post Office Square to Airport (via SH1)	20	-3	-2	26	-2	-2
Airport to Post Office Square (via SH1)	28	-6	-2	27	-4	0
Post Office Square to Airport (via Bays)	20	-1	0	26	-2	1
Airport to Post Office Square (via Bays)	26	-2	1	24	2	3

Table 15: AM and PM journey time savings for 2053 (WTSM)

Route	2053 Journey Time (minutes)					
	AM peak			PM peak		
	Do Minimum	With Project (Non-Tolled)	With Project (Tolled)	Do Minimum	With Project (Non-Tolled)	With Project (Tolled)
Airport to Johnsonville (SH1)	35	-7	-9	45	-7	-9
Johnsonville to Airport (SH1)	56	-7	-9	46	-6	-9
Airport to Johnsonville (via Bays)	45	-7	-8	57	-5	-5
Johnsonville to Airport (via Bays)	57	-5	-5	48	-4	-5
Post Office Square to Johnsonville	12	0	0	28	0	1
Johnsonville to Post Office Square	32	-1	-1	17	-2	-1
Post Office Square to Airport (via SH1)	25	-3	-4	31	-2	-4
Airport to Post Office Square (via SH1)	32	-7	-8	29	-5	-6
Post Office Square to Airport (via Bays)	24	-1	-1	30	-3	-1
Airport to Post Office Square (via Bays)	29	-2	-1	26	2	2

38. Key destinations that benefit from tolling implemented on the Project include the Airport, which is expected to be up to 9 minutes faster to reach from Johnsonville in both the morning and evening peak, between 2 and 3 minutes faster than the un-tolled scenario, depending on the choice of route. The Airport to Post Office Square, to take another example, is expected to be 8 minutes faster in the morning peak, and 5 minutes faster in the evening peak. As can be seen these journeys are faster than the Project Option, and this is due to the lower traffic volumes on SH1 resulting in fewer delays

at intersections. So, whilst those traveling get greater travel time saving benefits, there are fewer people receiving those benefits.

39. Table 16 and Table 17 below display the absolute travel time difference (minutes) for the 2033 AM peak and PM peak under a tolling scenario between sectors in Wellington and adjacent region as a result of the Project compared to the Do Minimum scenario. A positive number represents an increase in travel time, and a negative number is a decrease in travel time.

Table 16: 2033 AM Peak absolute travel time difference between sectors under a tolled scenario (WTSM)

		Destination											
		CBD	Miramar/Airport	Lyall Bay	Hataitai	Newtown	Island Bay	Brooklyn	Karori	Wadestown	Johnsonville	Tawa and North	Petone and North
Origin	CBD	0	-4	-2	-2	0	0	0	0	0	0	0	0
	Miramar/Airport	-4	0	1	1	-1	0	-1	-6	-7	-7	-8	-8
	Lyall Bay	-4	0	0	0	-1	0	-1	-4	-7	-7	-7	-7
	Hataitai	-2	1	1	0	0	1	-2	-3	-2	-2	-3	-3
	Newtown	0	0	0	-1	0	0	0	0	-1	-1	-1	-1
	Island Bay	0	0	0	0	0	0	0	0	-1	-1	-1	-1
	Brooklyn	0	0	0	-1	0	0	0	0	0	0	0	0
	Karori	0	-3	-1	-3	0	0	0	0	0	0	0	0
	Wadestown	0	-6	-4	-3	-2	-1	-2	0	0	0	0	0
	Johnsonville	0	-8	-7	-3	-4	-4	-3	0	0	0	0	0
	Tawa and North	0	-9	-7	-4	-4	-4	-4	0	0	0	0	0
	Petone and North	1	-9	-7	-3	-4	-4	-3	1	1	1	0	0

40. Under the 2033 AM peak tolled scenario, the model indicates that the largest increase in absolute travel time between sectors is one minute for trips originating in Miramar/Airport concluding in Lyall Bay and Hataitai, also for trips originating in Hataitai and concluding in Miramar/Airport, Lyall Bay and Island Bay. The same travel time increase of one minute is expected for trips originating in Petone and North and concluding in CBD, Karori, Wadestown, and Johnsonville.

41. As outlined in Chapter 7 Assessment of Operational Effects – Network Level Effects, the increased travel times are likely to originate outside of the immediate Project area. The Project improves the attributes of SH1, making it a more attractive route for long distance or cross sector travellers to use, resulting in a slight increase in congestion along this route.

42. The largest decrease in absolute travel time under a tolled scenario for the 2033 AM peak is observed for trips originating in Tawa and North and Petone and North and concluding in Miramar/Airport, showing an absolute travel time decrease of nine minutes. The decrease in travel time is likely attributed by the improved efficiency of the upgraded SH1 corridor, with some users choosing this route in preference to alternative local roads, benefiting from a more direct and less uninterrupted travel route.

Table 17: 2033 PM Peak absolute travel time difference between sectors under a tolled scenario (WTSM)

		Destination											
		CBD	Miramar/Airport	Lyall Bay	Hataitai	Newtown	Island Bay	Brooklyn	Karori	Wadestown	Johnsonville	Tawa and North	Petone and North
Origin	CBD	0	-3	-2	-2	0	0	0	0	1	1	1	1
	Miramar/Airport	-5	0	1	2	-1	0	-1	-6	-8	-8	-8	-9
	Lyall Bay	-5	1	0	0	-1	0	-1	-5	-9	-8	-8	-8
	Hataitai	-3	2	1	0	0	1	-3	-4	-4	-6	-6	-6
	Newtown	0	1	0	-1	0	0	0	0	-2	-2	-2	-1
	Island Bay	0	1	0	0	0	0	0	0	-2	-1	-1	-1
	Brooklyn	0	1	0	-1	0	0	0	0	-1	-1	-1	0
	Karori	0	0	0	-3	0	0	0	0	0	0	0	1
	Wadestown	-1	-6	-5	-4	-4	-3	-3	0	0	0	0	1
	Johnsonville	-1	-8	-8	-5	-5	-5	-5	0	0	0	0	0
	Tawa and North	-1	-9	-9	-6	-5	-5	-5	0	0	0	0	0
	Petone and North	-1	-9	-8	-6	-5	-5	-4	1	0	0	0	0

43. Under the 2033 PM peak tolled scenario, the model indicates that the largest increase in absolute travel time is for trips that originate in Miramar/Airport and conclude in Hataitai at two minutes and also between Hataitai and Miramar/Airport.

44. Similar to the AM peak, the largest decrease in absolute travel time for the 2033 PM peak under a tolled scenario is for trips originating in Tawa and North and Petone and North and concluding in Miramar/Airport and Lyall Bay, showing an absolute travel time decrease of nine minutes present in trips originating from Lyall Bay, with a decrease in absolute travel time of nine minutes.

45. Table 18 and Table 19 below display the absolute travel time difference (minutes) for the 2053 AM peak and PM peak under a tolling scenario between sectors in Wellington and adjacent region as a result of the Project compared to the Do Minimum scenario.

Table 18: 2053 AM Peak absolute travel time difference between sectors under a tolled scenario (WTSM)

		Destination											
		CBD	Miramar/Airport	Lyall Bay	Hataitai	Newtown	Island Bay	Brooklyn	Karori	Wadestown	Johnsonville	Tawa and North	Petone and North
Origin	CBD	0	-4	-3	-2	0	-1	-1	0	0	0	0	0
	Miramar/Airport	-4	0	1	2	-1	0	-1	-7	-8	-8	-8	-9
	Lyall Bay	-5	1	0	0	-2	0	-2	-7	-8	-8	-8	-8
	Hataitai	-2	1	1	0	0	1	-3	-4	-3	-3	-3	-3
	Newtown	0	0	0	-1	0	0	0	0	-1	-1	-1	-1
	Island Bay	0	0	0	0	0	0	0	0	-1	-1	-1	-1
	Brooklyn	0	0	0	-1	0	0	0	0	0	0	0	0
	Karori	0	-3	-2	-3	-1	-1	-1	0	0	0	0	0
	Wadestown	0	-7	-5	-4	-3	-2	-2	0	0	0	0	0
	Johnsonville	0	-8	-6	-4	-5	-4	-4	0	0	0	0	0
	Tawa and North	0	-9	-7	-4	-5	-5	-4	0	0	0	0	0
	Petone and North	1	-9	-6	-4	-4	-4	-4	1	1	1	0	0

46. Under the 2053 AM peak tolled scenario, the model indicates that the largest increase in absolute travel time between sectors is for trips originating in Miramar/Airport concluding in Hataitai, with an expected increase of two minutes.

47. The largest decrease in absolute travel time under a tolled scenario for the 2053 AM peak is observed for trips originating in Miramar/Airport, Tawa and North and Petone and North and concluding in Petone and North, and Miramar/Airport, showing an absolute travel time decrease of nine minutes.

Table 19 (WTSM) **2053 PM Peak absolute travel time difference between sectors under a tolled scenario**

		Destination											
		CBD	Miramar/Airport	Lyall Bay	Hataitai	Newtown	Island Bay	Brooklyn	Karori	Wadestown	Johnsonville	Tawa and North	Petone and North
Origin	CBD	0	-3	-2	-2	0	0	-1	0	1	1	1	1
	Miramar/Airport	-6	0	1	2	-1	0	-2	-7	-9	-8	-9	-9
	Lyall Bay	-6	1	0	1	-2	0	-2	-7	-9	-9	-9	-9
	Hataitai	-3	2	1	0	0	1	-3	-5	-5	-6	-6	-6
	Newtown	0	1	0	-1	0	0	0	-1	-2	-2	-2	-1
	Island Bay	0	1	0	0	0	0	0	0	-2	-1	-1	-1
	Brooklyn	0	1	0	-1	0	0	0	0	-1	0	0	0
	Karori	0	0	-1	-3	0	0	0	0	0	0	0	1
	Wadestown	-1	-7	-6	-5	-4	-3	-3	0	0	0	0	0
	Johnsonville	-1	-8	-8	-6	-5	-5	-5	0	0	0	0	0
	Tawa and North	-1	-9	-8	-6	-5	-5	-5	0	0	0	0	0
	Petone and North	-1	-9	-8	-6	-5	-5	-5	1	0	0	0	0

48. Under the 2053 PM peak tolled scenario, the model indicates that the largest increase in absolute travel time between sectors is for trips originating in Miramar/Airport and concluding in Hataitai and between Hataitai and Miramar/Airport, with an increase of two minutes.

49. The largest decrease in absolute travel time under a tolled scenario for the 2053 PM peak is seen again in trips departing Miramar/Airport concluding in Wadestown, Tawa and North and Petone and North, with a decrease in 9 minutes. The same travel time saving is expected between Lyall Bay and Wadestown, Johnsonville, Tawa and North and Petone and North. Also, for trips between Tawa and North and Petone and North concluding at Miramar/Airport.

Reliability

50. As noted for my assessment of the untolled scenario, by increasing the capacity of SH1, and therefore increasing a buffer between the future demand and the capacity, there is the ability for the network to better cater for the daily fluctuations in demand that occur within, and for journeys through, the Project Area.

51. The resilience and reliability benefits broadly remain with the tolled scenario, as those are functions of the new infrastructure. I consider that in some ways the reliability for the tolled scenario is potentially even more beneficial, as for critical travel journeys people who normally elect not to pay a toll have the option to use the tolled route for that specific journey. I also consider that the reliability of the tolled route is particularly beneficial for the goods vehicles using that route.

ANNEXURE D Parking Occupancy Survey

Table 1 : Vivian Street Parking Occupancy

Number of parks occupied on Vivian Street (April 2026)									
Time Period	**Section Extents**	**No. Spaces**	**Mon**	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**	**Sun**
07:00 - 09:00 am	Victoria to Cuba	22	1	0	1	1	4	2	5
	Cuba to Taranaki	10	0	0	0	1	0	3	1
	Taranaki to Tory	22	8	13	4	19	9	9	7
	Tory to Cambridge	22	1	11	7	8	6	4	10
12:00 - 02:00 pm	Victoria to Cuba	22	5	8	15	13	14	20	16
	Cuba to Taranaki	10	6	7	8	10	8	10	10
	Taranaki to Tory	22	14	9	16	17	8	17	12
	Tory to Cambridge	22	9	12	9	9	11	9	10
05:00 - 07:00 pm	Victoria to Cuba	22	2	11	7	15	15	17	10
	Cuba to Taranaki	10	4	10	2	9	7	7	4
	Taranaki to Tory	22	6	11	7	10	9	10	5
	Tory to Cambridge	22	19	14	14	7	16	13	3

Table 2 : Vivian Street Surrounding Parking Availability

Number of parks available on surrounding streets (April 2026)									
Time Period	**Section Extents**	**No. Spaces**	**Mon**	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**	**Sun**
07:00 - 09:00 am	Victoria to Cuba	73	58	57	54	41	47	51	47
	Cuba to Taranaki	47	32	26	37	35	29	28	24
	Taranaki to Tory	25	12	17	18	19	15	13	14
	Tory to Cambridge	38	25	22	25	22	22	23	29
12:00 - 02:00 pm	Victoria to Cuba	73	18	33	25	12	17	8	27
	Cuba to Taranaki	47	10	15	7	10	14	4	4
	Taranaki to Tory	25	12	12	8	15	12	16	8
	Tory to Cambridge	38	21	20	11	12	10	14	8
05:00 - 07:00 pm	Victoria to Cuba	73	30	35	25	24	29	24	24
	Cuba to Taranaki	47	24	11	15	9	13	6	8
	Taranaki to Tory	25	20	14	19	12	16	9	15
	Tory to Cambridge	38	30	24	26	22	22	18	28

Table 3 : Vivian Street Surrounding Parking Availability with Project

Number of parks available on surrounding streets after redistribution of Vivian Street demand									
Time Period	**Section Extents**	**No. Spaces**	**Mon**	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**	**Sun**
07:00 - 09:00 am	Victoria to Cuba	73	57	57	53	40	43	49	42
	Cuba to Taranaki	47	32	26	37	34	29	25	23
	Taranaki to Tory	25	4	4	14	0	6	4	7
	Tory to Cambridge	38	24	11	18	14	16	19	19
12:00 - 02:00 pm	Victoria to Cuba	73	13	25	10	-1	3	-12	11
	Cuba to Taranaki	47	4	8	-1	0	6	-6	-6
	Taranaki to Tory	25	-2	3	-8	-2	4	-1	-4
	Tory to Cambridge	38	12	8	2	3	-1	5	-2
05:00 - 07:00 pm	Victoria to Cuba	73	28	24	18	9	14	7	14
	Cuba to Taranaki	47	20	1	13	0	6	-1	4
	Taranaki to Tory	25	14	3	12	2	7	-1	10
	Tory to Cambridge	38	11	10	12	15	6	5	25

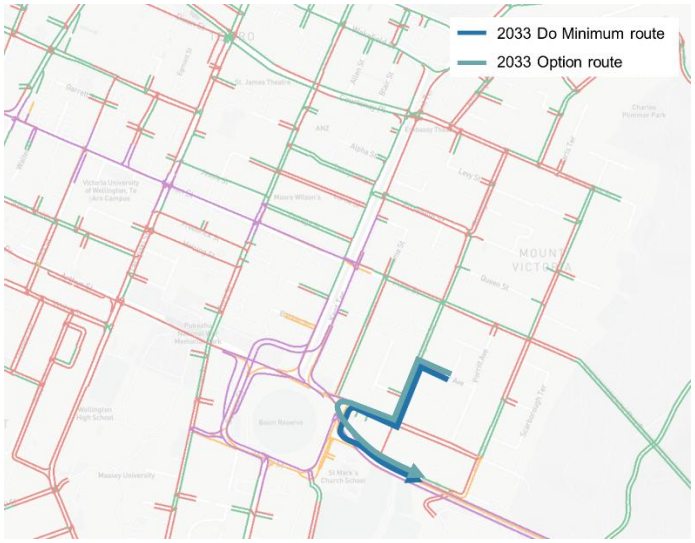
ANNEXURE E Local Access Operational Journey Times

This Annex contains assessments of journey times for local access taken from the Aimsun model for 2033. Whilst there are some increases, in general the data I present below shows that the journey times for local access would reduce with the Project compared to the Do Minimum. This includes cases where the network has changed and requires a longer journey distance, which would be on uncongested roads as opposed to the current congested routes.

Mount Victoria

Journey times outbound from Mt Victoria

Journey times from Armour Avenue to Mt Victoria Tunnel



	2033 DM AM Peak	2033 Option AM Peak	2033 DM PM Peak	2033 Option PM Peak
Local roads (sec)	84	75	105	100
SH (sec)	40	11	61	11
Total (sec)	**124**	**86**	**166**	**111**
Total (min)	**2.1**	**1.4**	**2.8**	**1.9**

Journey times from Armour Avenue to Adelaide Road



	2033 DM AM Peak	2033 Option AM Peak	2033 DM PM Peak	2033 Option PM Peak
Local roads (sec)	150	250	119	144
SH (sec)	54	115	56	135
Adelaide Rd (sec)	8	13	8	13
Total (sec)	**212**	**378**	**183**	**292**
Total (min)	**3.5**	**6.3**	**3.1**	**4.9**

Journey times from Armour Avenue to Cambridge Terrace



	2033 DM AM Peak	2033 Option AM Peak	2033 DM PM Peak	2033 Option PM Peak
Local roads (sec)	169	248	280	142
Cambridge Tce (sec)	86	52	125	62
Total (sec)	**255**	**300**	**405**	**204**
Total (min)	**4.2**	**5.0**	**6.8**	**3.4**

Journey times from Hania Street to Mt Victoria Tunnel



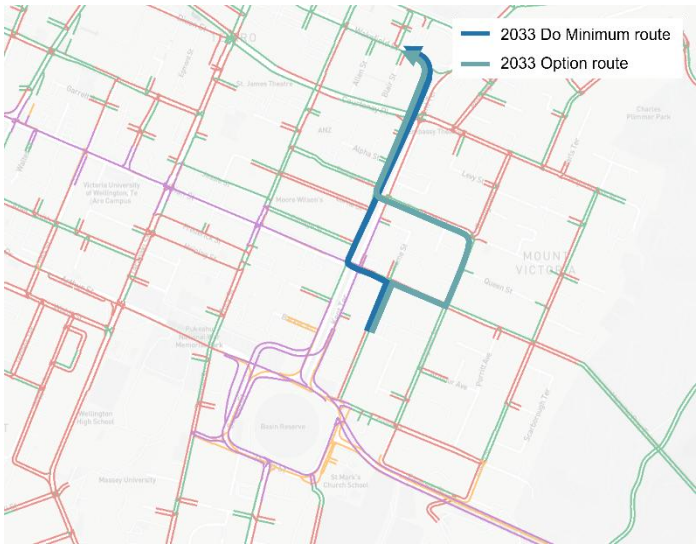
	2033 DM AM Peak	2033 Option AM Peak	2033 DM PM Peak	2033 Option PM Peak
Local roads (sec)	207	150	217	162
SH (sec)	44	11	70	11
Total (sec)	**251**	**160**	**287**	**174**
Total (min)	**4.2**	**2.7**	**4.8**	**2.9**

Journey times from Hania Street to Adelaide Road



	2033 DM AM Peak	2033 Option AM Peak	2033 DM PM Peak	2033 Option PM Peak
Local roads (sec)	207	280	217	164
SH (sec)	53	115	55	135
Adelaide Rd (sec)	8	13	8	13
Total (sec)	**267**	**407**	**280**	**312**
Total (min)	**4.5**	**6.8**	**4.7**	**5.2**

Journey times from Hania Street to Cambridge Terrace



	2033 DM AM Peak	2033 Option AM Peak	2033 DM PM Peak	2033 Option PM Peak
Local roads (sec)	335	280	373	164
Cambridge Tce (sec)	186	95	219	106
Total (sec)	**521**	**375**	**592**	**270**
Total (min)	**8.7**	**6.2**	**9.9**	**4.5**

Journey times inbound from Mt Victoria

Journey times from Mt Victoria Tunnel to Armour Avenue



	2033 DM AM Peak	2033 Option AM Peak	2033 DM PM Peak	2033 Option PM Peak
SH (sec)	225	292	244	242
Local roads (sec)	55	84	56	83
Total (sec)	**280**	**376**	**300**	**325**
Total (min)	**4.7**	**6.3**	**5.0**	**5.4**

Journey times from Adelaide Road to Armour Avenue



	2033 DM AM Peak	2033 Option AM Peak	2033 DM PM Peak	2033 Option PM Peak
Adelaide Rd (sec)	19	12	19	15
SH (sec)	87	250	140	201
Local roads (sec)	55	84	56	83
Total (sec)	**161**	**346**	**216**	**299**
Total (min)	**2.7**	**5.8**	**3.6**	**5.0**

Journey times from Kent Terrace to Armour Avenue



	2033 DM AM Peak	2033 Option AM Peak	2033 DM PM Peak	2033 Option PM Peak
Cambridge Tce (sec)	121	142	126	139
Local roads (sec)	89	84	189	83
Total (sec)	**210**	**225**	**315**	**222**
Total (min)	**3.5**	**3.8**	**5.3**	**3.7**

Journey times from Mt Victoria Tunnel to Hania Street



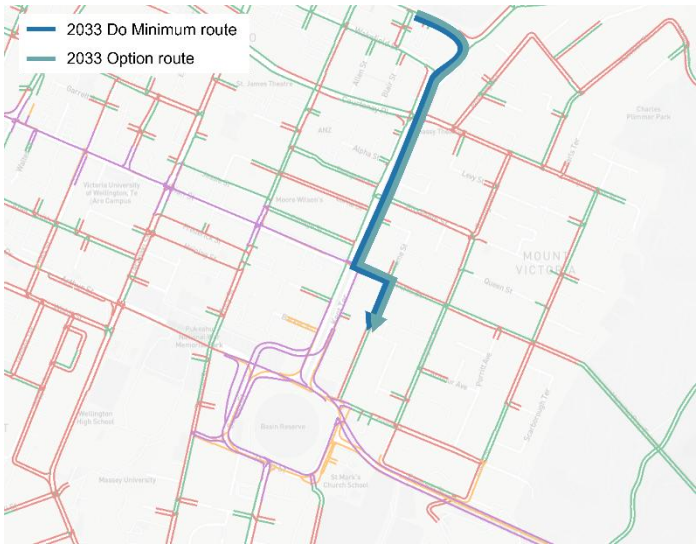
	2033 DM AM Peak	2033 Option AM Peak	2033 DM PM Peak	2033 Option PM Peak
SH (sec)	225	292	244	242
Local roads (sec)	31	87	31	85
Total (sec)	**256**	**379**	**275**	**327**
Total (min)	**4.3**	**6.3**	**4.6**	**5.5**

Journey times from Adelaide Road to Hania Street



	2033 DM AM Peak	2033 Option AM Peak	2033 DM PM Peak	2033 Option PM Peak
Adelaide Rd (sec)	19	12	19	15
SH (sec)	87	250	140	201
Local roads (sec)	31	87	31	85
Total (sec)	**137**	**349**	**191**	**301**
Total (min)	**2.3**	**5.8**	**3.2**	**5.0**

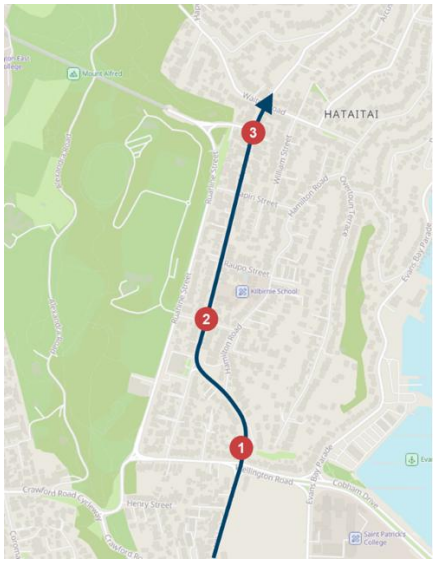
Journey times from Kent Terrace to Hania Street



	2033 DM AM Peak	2033 Option AM Peak	2033 DM PM Peak	2033 Option PM Peak
Cambridge Tce (sec)	167	183	170	191
Local roads (sec)	25	25	42	23
Total (sec)	**192**	**209**	**212**	**214**
Total (min)	**3.2**	**3.5**	**3.5**	**3.6**

Eastern Connections

Moxham Avenue



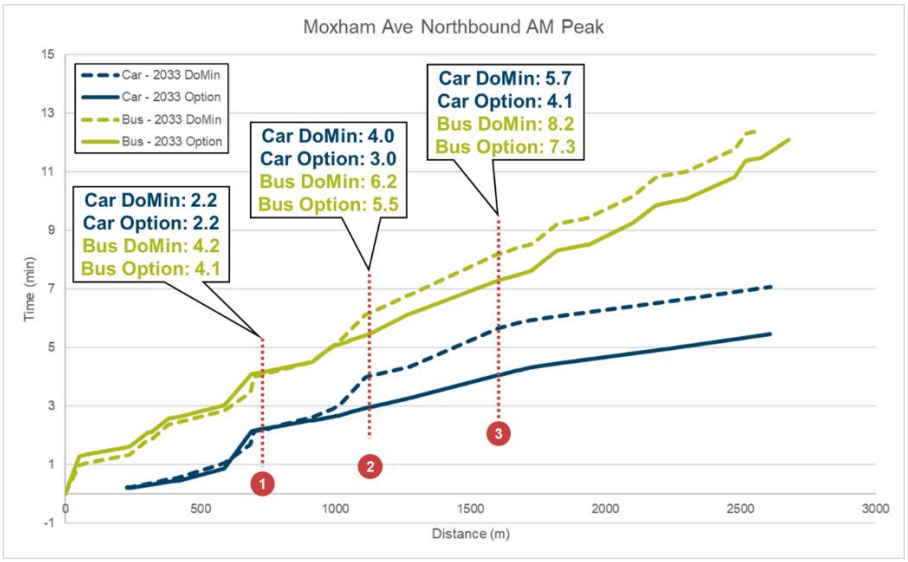
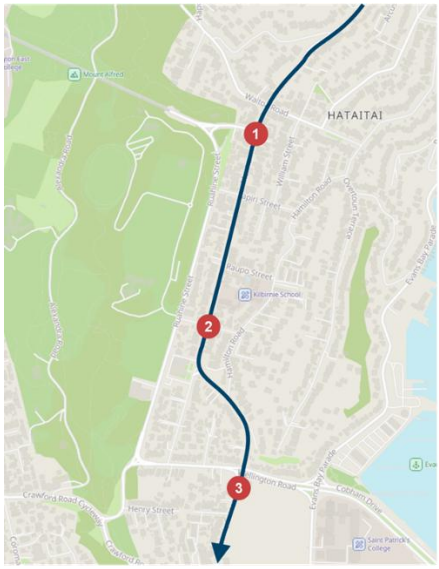


Figure 1 – Northbound AM Peak



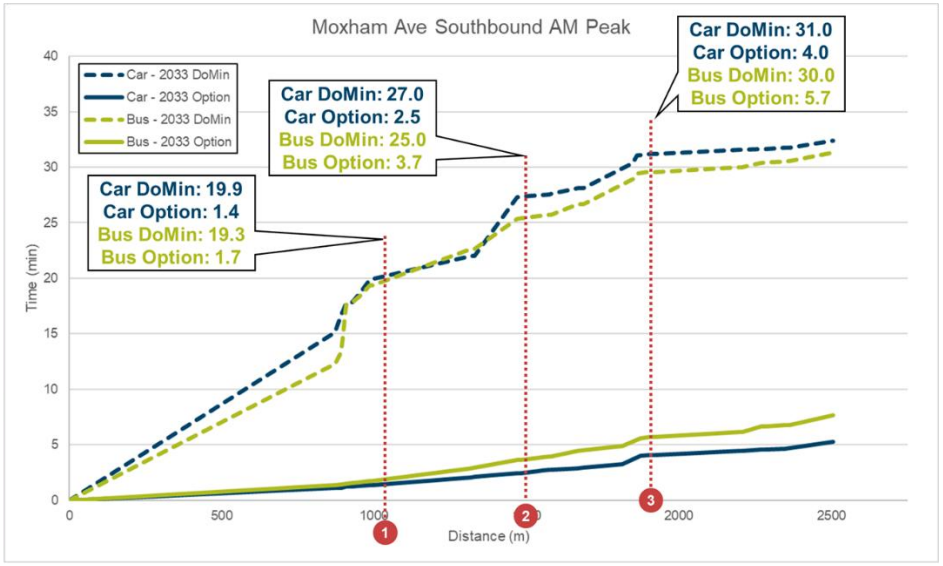
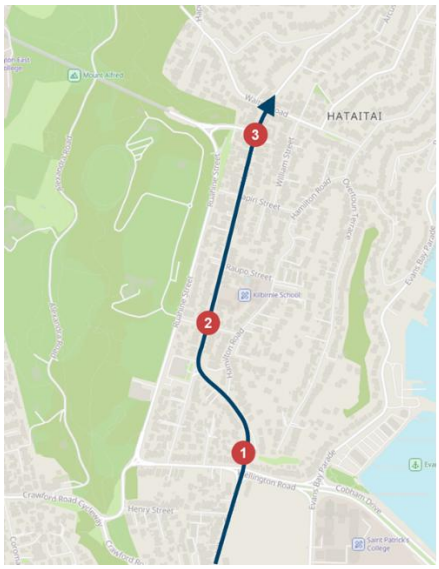


Figure 2 – Southbound AM Peak



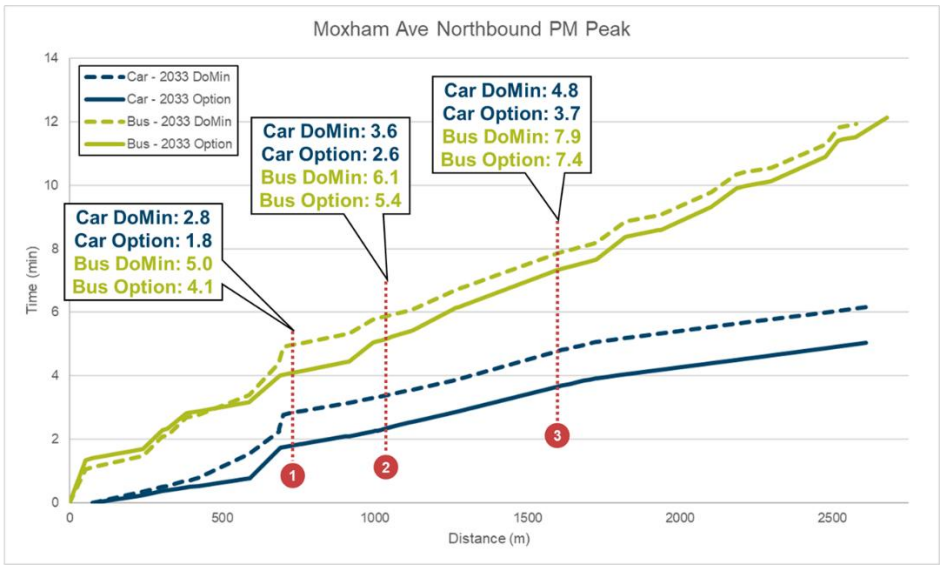
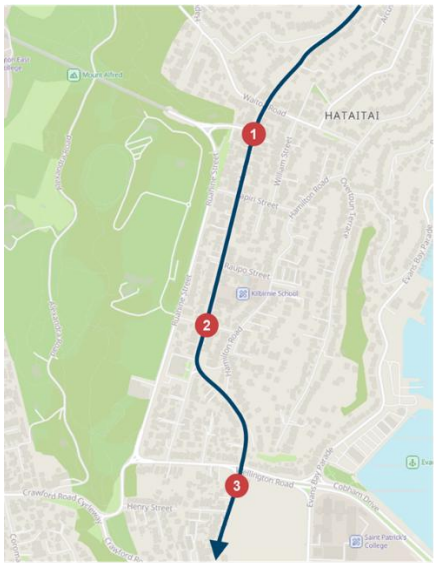


Figure 3 – Northbound PM Peak



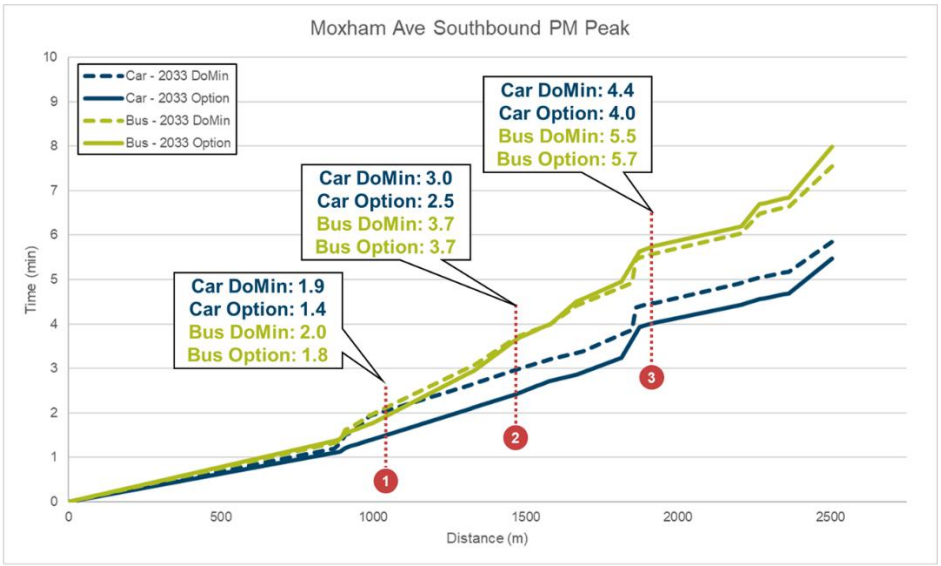
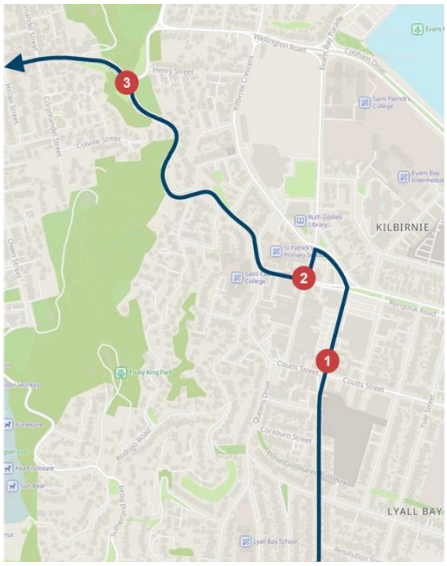


Figure 4 – Southbound PM Peak

Kilbirnie



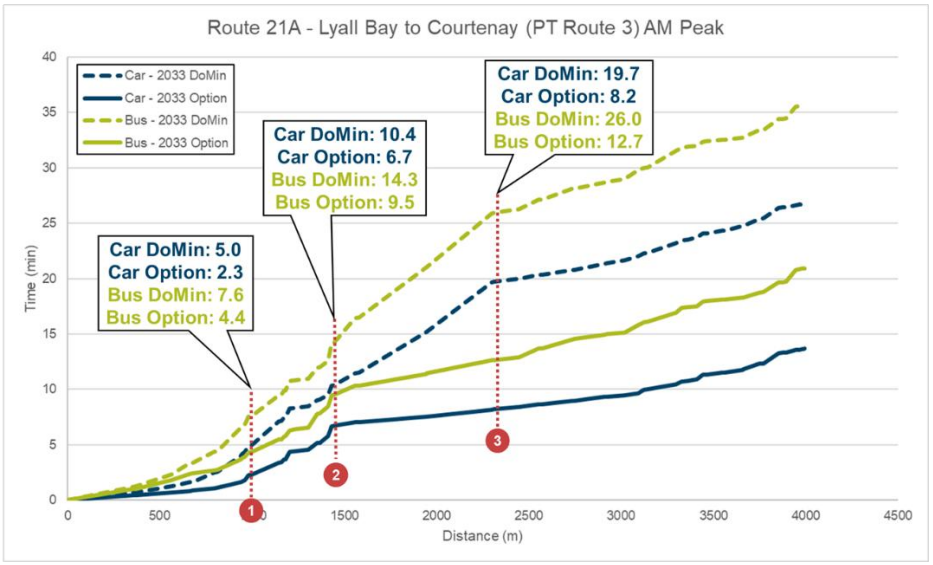
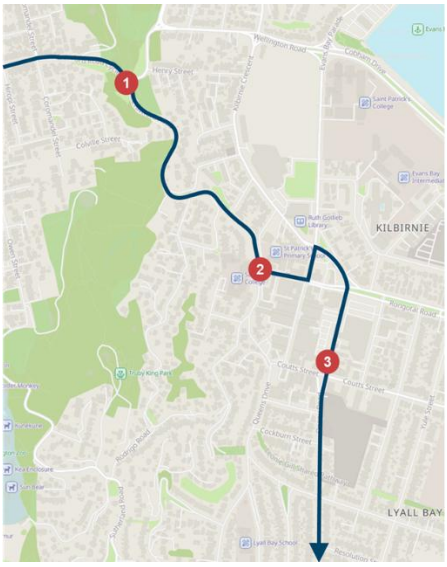


Figure 5 – Northbound AM Peak



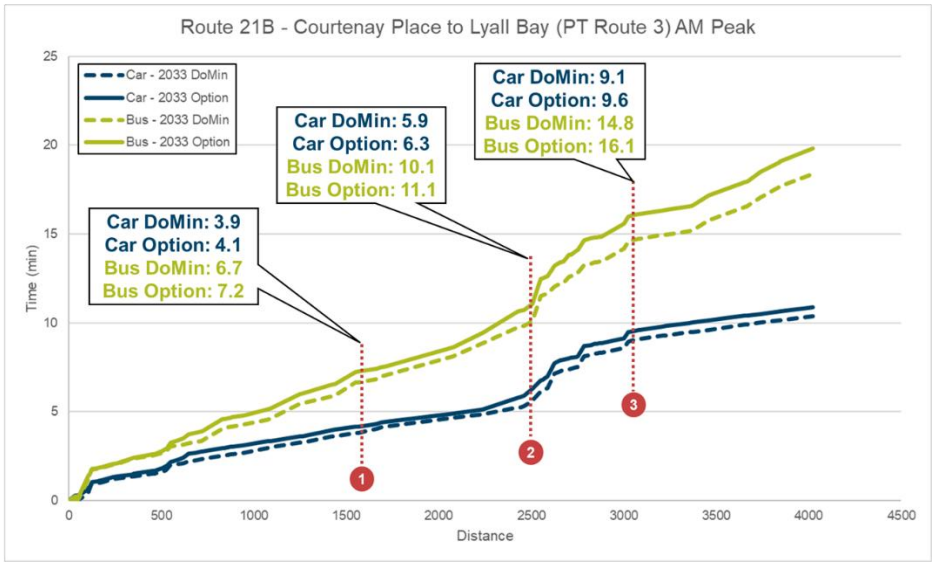
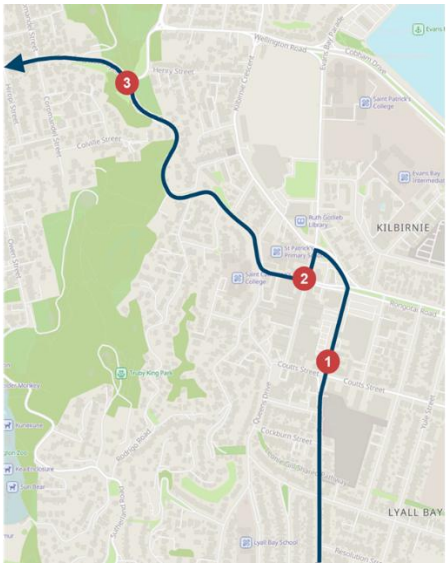


Figure 6 – Southbound AM Peak



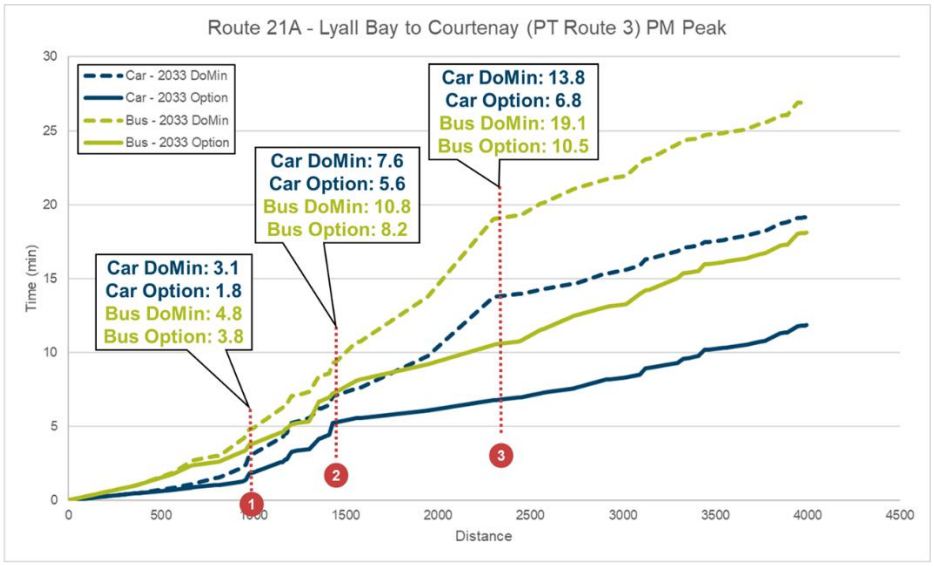
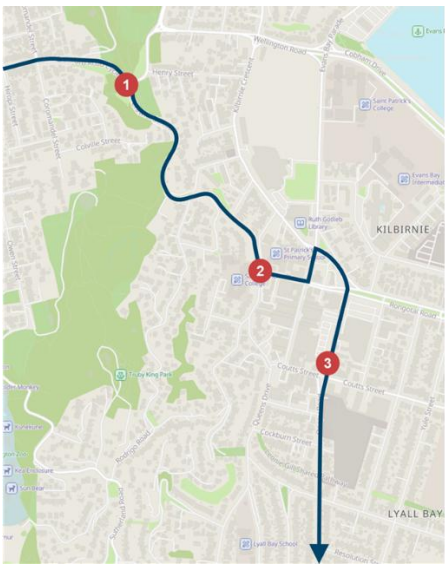


Figure 7 – Northbound PM Peak



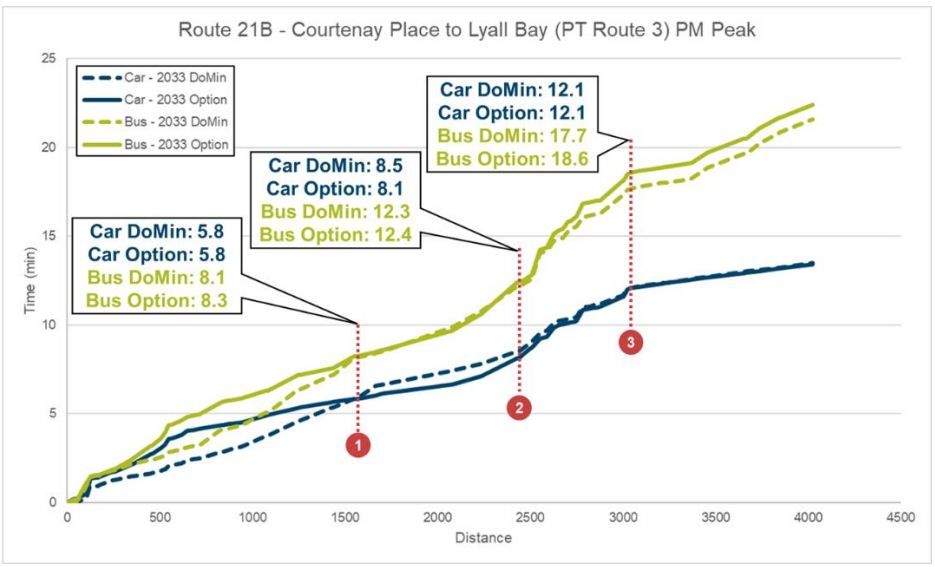


Figure 8 – Southbound PM Peak

ANNEXURE F Detailed Assessment of Bus Journey times

In this Annexure, where routes are stated, these are partial lengths of the full route, further reported in segments. These routes and segments were developed by GWRC in order to demonstrate the effect of the project on the bus network.

Route 1

1. Bus route 1 (Island Bay Johnsonville West / Churton Park / Grenada Village) direction has been divided into two segments, as visualised in Figure 1.

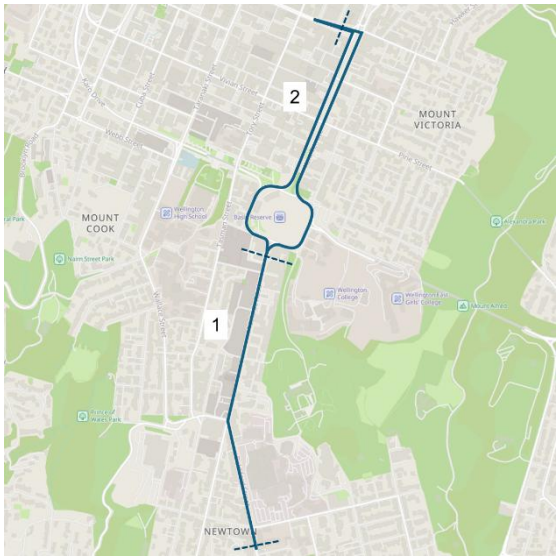


Figure 1 – Bus route 1 and segments

2. Table 1 and Table 2 below display the travel time (mins) of bus Route 1 along these two segments, with time distance graphs in Figure 2 and Figure 3 for both morning peak (8-9am) and PM peak (5-6pm) in both inbound and outbound directions.

Table 1: Route 1 inbound AM (8-9am) and PM (5-6pm) peak bus travel times (mins)

Route Segment	Inbound AM			Inbound PM		
	Do Minimum (2033)	With Project (2033)	Difference	Do Minimum (2033)	With Project (2033)	Difference
1	04:23	04:16	-00:08	03:55	04:03	00:08
2	04:59	04:20	-00:39	05:24	03:40	-01:45
Total	09:22	08:36	-00:47	09:19	07:42	-01:37

Table 2: Route 1 outbound AM (8-9am) and PM (5-6pm) peak bus travel times (mins)

Route Segment	Outbound AM			Outbound PM		
	Do Minimum (2033)	With Project (2033)	Difference	Do Minimum (2033)	With Project (2033)	Difference
2	04:29	04:42	00:13	04:05	04:31	00:26
1	03:43	04:12	00:29	03:40	05:06	01:26
Total	08:12	08:55	00:42	07:46	09:37	01:51

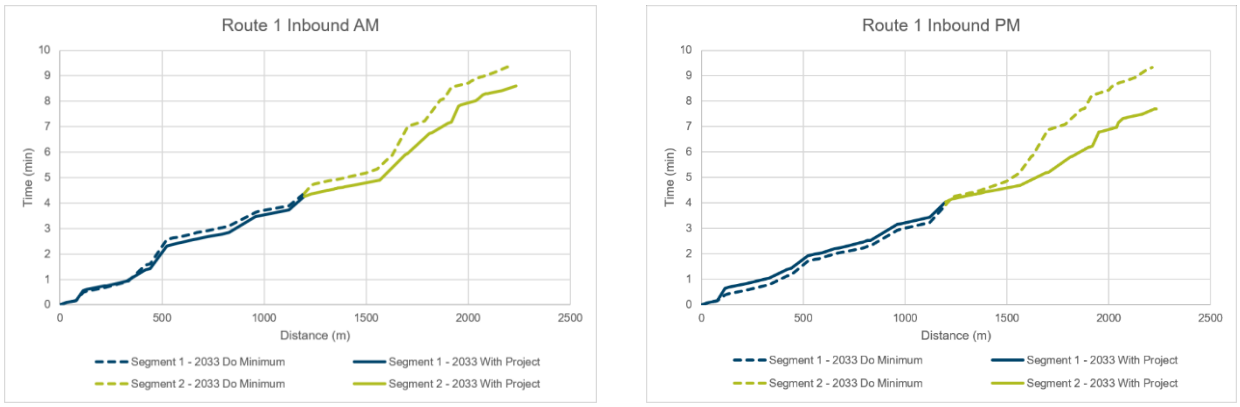


Figure 2 – Route 1 inbound AM (8-9am) and PM (5-6pm) peak bus time distance graphs

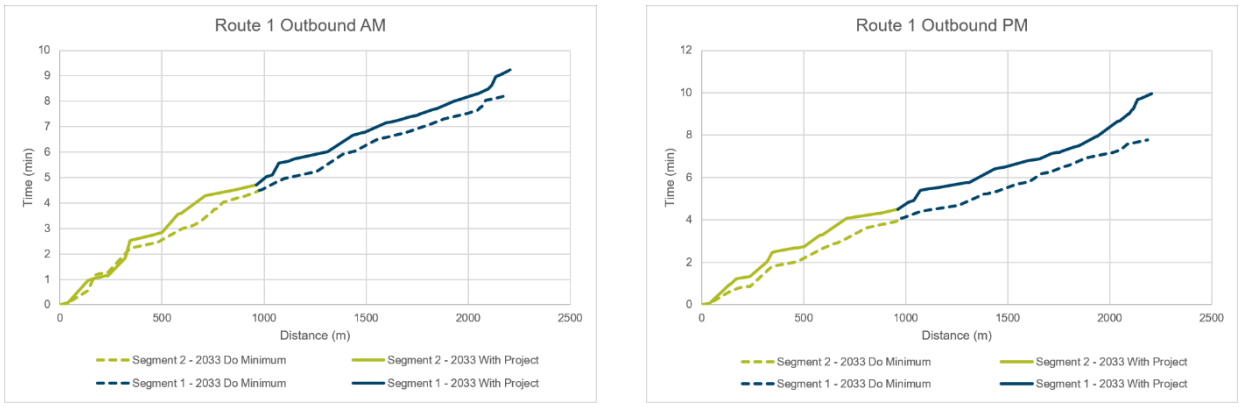


Figure 3 – Route 1 outbound AM (8-9am) and PM (5-6pm) peak bus time distance graphs

3. The travel time assessment indicates mixed travel time outcomes across the two segments once the Project is operational compared to the Do Minimum. Travel time reductions are observed in both inbound periods, while increases in travel time are observed in both outbound directions compared to the Do Minimum.

4. Segment level results display a clear difference in performance between the two segments. Segment 2, located on the State Highway of the Basin Reserve and Cambridge/Kent Terrace, demonstrates consistent reductions in travel time for inbound travel (one minute 45 seconds in the PM peak, and 39 seconds in the AM peak), but increases in travel time in both outbound directions (26 seconds in the PM peak, and 13 seconds in the AM peak). Segment 1 shows a smaller reduction in travel time compared to the Do Minimum in the inbound AM peak leg (eight seconds), but an increase in travel time for both outbound periods and inbound PM peak periods. As a result, Segment 2 shows an overall net reduction in travel time of one minute 45 seconds, whereas Segment 1 has an overall net increase in travel time of one minute 59 seconds.

5. The patterns indicate that the Project benefits are concentrated in Segment 2, largely limited to the direction, while the local road segment (Segment 1) is more mixed. I consider that the observed results reflect the Project's direct focus on improving conditions along the State Highway, with Segment 2 benefiting from targeted changes and network improvements. The increases in travel time observed in the outbound direction, particularly in Segment 1, indicates that the benefits are not uniformly realised across focus area of Route 1 pertaining to the local road network. In particular, the increase in travel time on the outbound PM peak of Segment 1 suggests that congestion or operational constraints may be shifted to local streets as a result of the improved performance of the State Highway. Generally, the Project appears to improve travel time on the State Highway for north-

south movements around the Basin Reserve compared to the Do Minimum, with more variable results on the local road network.

Route 2

6. Bus route 2 (Miramar / Seatoun Hataitai Wellington Karori) direction has been divided into six segments, as visualised in Figure 4.

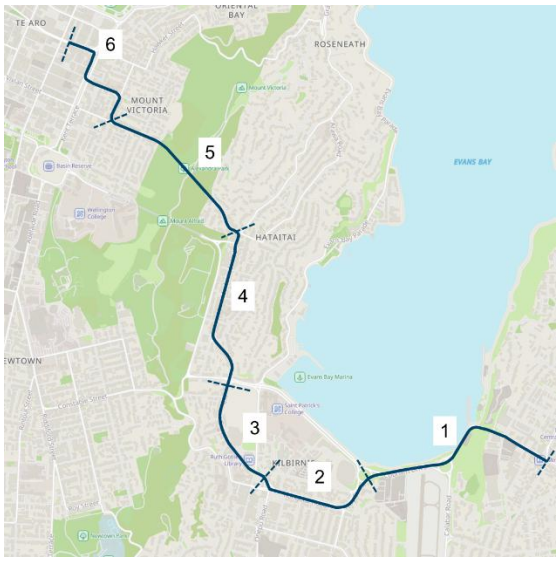


Figure 4 – Bus Route 2 and segments

7. Table 3 and Table 4 below display the travel time (mins) of bus Route 2 along these six segments, with time distance graphs in Figure 5 and Figure 6 for both morning peak (8-9am) and PM peak (5-6pm) in both inbound and outbound directions.

Table 3: Route 2 inbound AM (8-9 am) and PM (5-6 pm) peak bus travel times (mins)

Route Segment	Inbound AM			Inbound PM		
	Do Minimum (2033)	With Project (2033)	Difference	Do Minimum (2033)	With Project (2033)	Difference
1	04:08	03:05	-01:03	02:39	02:41	00:02
2	04:22	02:32	-01:51	03:04	02:12	-00:52
3	03:21	02:34	-00:48	05:28	02:39	-02:49
4	04:48	04:19	-00:29	04:02	04:13	00:12
5	04:31	04:44	00:13	05:35	05:36	00:02
6	03:09	04:40	01:31	03:43	02:43	-01:00
Total	24:20	21:53	-02:27	24:31	20:06	-04:25

Table 4: Route 2 outbound AM (8-9 am) and PM (5-6 pm) peak bus travel times (mins)

Route Segment	Outbound AM			Outbound PM		
	Do Minimum (2033)	With Project (2033)	Difference	Do Minimum (2033)	With Project (2033)	Difference
6	02:54	02:40	-00:14	02:47	02:36	-00:11
5	11:44	05:30	-06:14	05:06	05:26	00:20
4	17:57	04:55	-13:02[1]	06:00	04:48	-01:12
3	02:11	02:25	00:14	02:43	02:45	00:02
2	02:01	02:08	00:07	02:08	02:13	00:06
1	02:31	01:57	-00:33	02:32	01:56	-00:37
Total	39:17	19:35	-19:42	21:16	19:44	-01:32

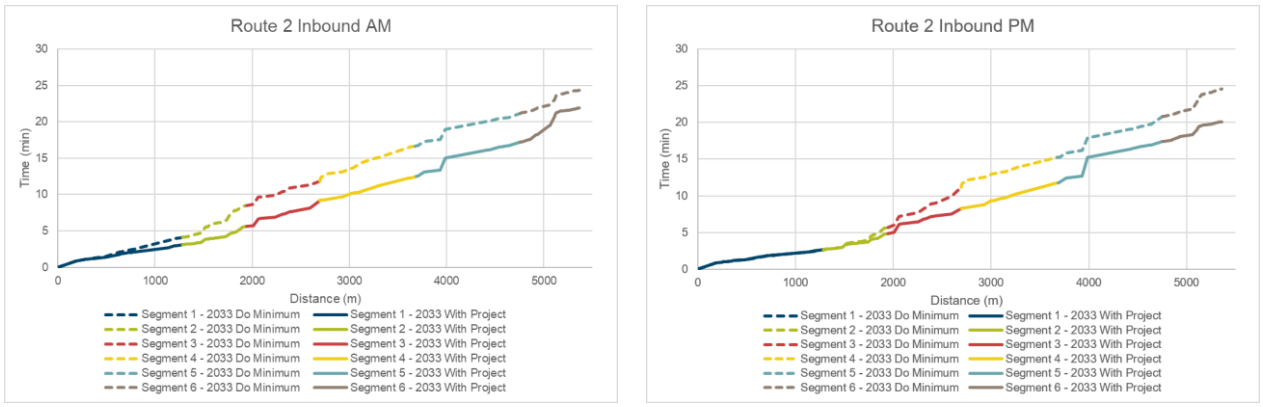


Figure 5 – Route 2 inbound AM (8-9am) and PM (5-6pm) peak bus time distance graphs

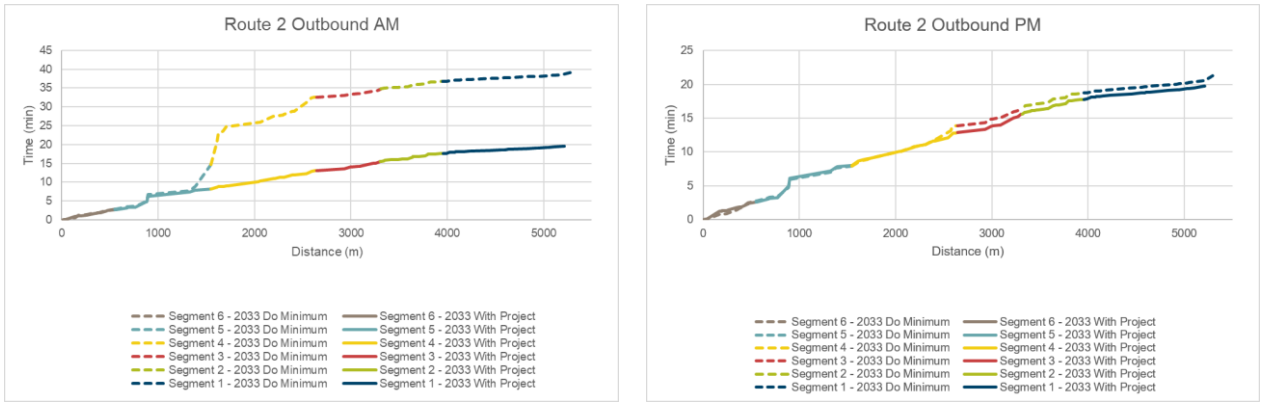


Figure 6 – Route 2 outbound AM (8-9am) and PM (5-6pm) peak bus time distance graphs

8. The travel time assessment indicates that once operational, the Project is expected to reduce total bus travel times across all assessed scenarios relative to the Do Minimum, with the exception of isolated increases at segment level. The magnitude of improvement varies by direction and time of day, with the most significant reduction in travel time observed in the outbound AM peak period, where travel time is reduced by 6 minutes and 41 seconds[2] disregarding the outbound AM segment. Notable

[1] The travel time difference for this segment is considered unusually high and is not consistent with expected operational conditions. This is likely attributed to the limitations or anomalies within the transport model. Accordingly, this value has been excluded from the assessment of overall travel times.

[2] Segment 5 through Hataitai Bus Tunnel records the largest time travel reduction, however, this arises from the do minimum journey time showing an excessive delay that I consider overstates the likely future environment. As such I have manually adjusted the do minimum journey time downwards to ignore this delay which could otherwise be leading to an overstatement of the Project benefits.

reductions are also evident in the inbound AM and PM peaks periods, while the outbound PM peak period shows smaller, but still positive reduction in travel time. While the Project does not deliver travel time savings in every segment, the cumulative effect across the corridor assessed displays a consistent reduction in travel journey time for all scenarios assessed.

9. The segment-level results indicate that the benefits of the Project are concentrated within specific parts of the corridor and vary by direction, rather than being uniformly distributed. Segments 1 and 4 demonstrate consistent travel time reductions across three scenarios, with Segment 4 providing the largest cumulative benefit overall compared to the Do Minimum. Segments 2 and 3 exhibit clear directional patterns, with reductions in the inbound direction and small increases in the outbound direction. Segment 6 displays the most variable time travel, with a moderate increase in travel time in the inbound AM peak, and minor decreases in other travel times. These patterns indicate that the Project delivers targeted improvements, rather than uniform changes across the corridor.

10. I consider that the observed results reflect the ability of the Project to address key constraints within specific sections of the corridor; such as the approach to the approach to the Hataitai bus Tunnel and Taurima Street, as well as the intersection of Kilbirnie Crescent and Wellington Road. The reduction in travel time against the Do Minimum of Segment 4 reflects the bottleneck nature of Moxham Avenue and Taurima Street during peak periods and suggests that the Project is particularly effective in relieving congestion under peak directional flows on local roads.

Route 3

11. Bus route 3 (Lyall Bay / Rongotai Kilbirnie Newtown Wellington) has been divided into five segments, as visualised in Figure 7.

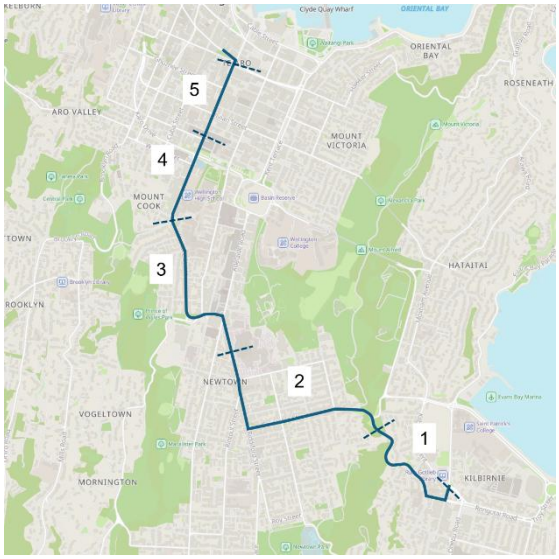


Figure 7 – Bus route 3 and segments

12. Table 5 and Table 6 below display the travel time (mins) of bus Route 3 along these five segments, with time distance graphs in Figure 8 and Figure 9 for both morning peak (8-9am) and PM peak (5-6pm) in both inbound and outbound directions.

Table 5: Route 3 inbound AM (8-9am) and PM (5-6pm) peak bus travel times (mins

Route Segment	Inbound AM			Inbound PM		
	Do Minimum (2033)	With Project (2033)	Difference	Do Minimum (2033)	With Project (2033)	Difference
1	13:55	05:02	-08:54	09:17	03:40	-05:37
2	06:44	05:37	-01:07	06:04	05:53	-00:11
3	05:44	05:19	-00:25	04:50	04:32	-00:19
4	03:07	03:13	00:07	02:30	02:35	00:05
5	03:20	03:52	00:32	04:02	03:35	-00:27
Total	32:49	23:03	-09:47	26:42	20:13	-06:29

Table 6: Route 3 outbound AM (8-9am) and PM (5-6pm) peak bus travel times (mins)

Route Segment	Outbound AM			Outbound PM		
	Do Minimum (2033)	With Project (2033)	Difference	Do Minimum (2033)	With Project (2033)	Difference
5	03:36	03:59	00:24	06:22	05:07	-01:14
4	01:40	02:06	00:26	01:40	01:43	00:03
3	05:05	06:18	01:12	04:38	04:47	00:09
2	04:57	05:32	00:35	06:01	06:18	00:17
1	01:06	01:10	00:04	01:22	01:10	-00:12
Total	16:25	19:05	02:40	20:03	19:05	-00:58

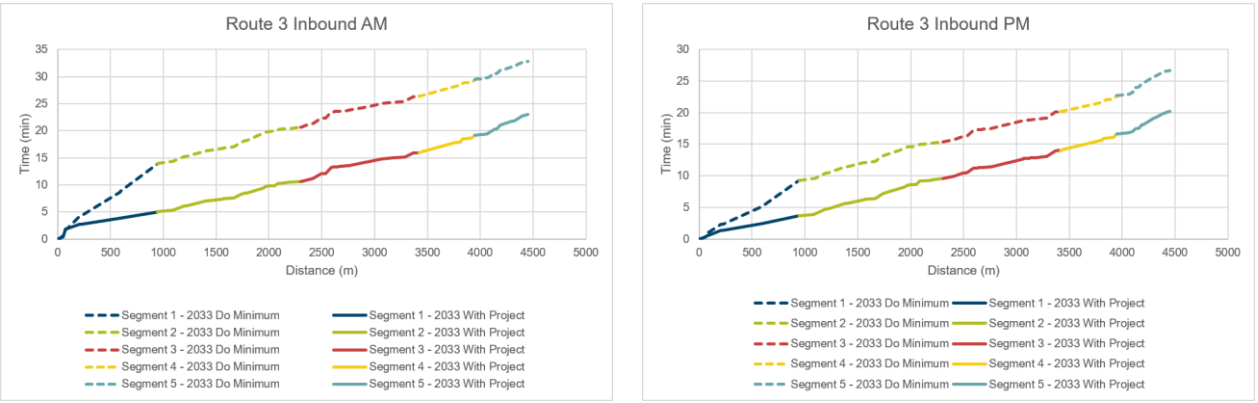


Figure 8 – Route 3 inbound AM (8-9am) and PM (5-6pm) peak bus time distance

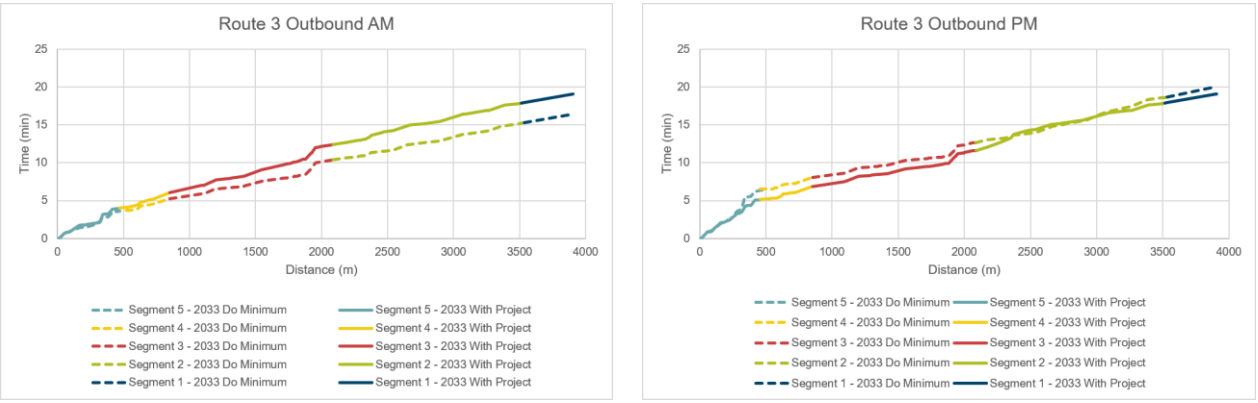


Figure 9 – Route 3 outbound and outbound PM (5-6pm) peak bus time distance graphs

13. The bus travel time indicates that the Project results in mixed travel time outcomes across all five segments of Route 3 compared to the Do Minimum. The most notable reductions occur during the inbound AM and inbound PM peaks, with a smaller improvement in the outbound PM peak period. In contrast, the outbound AM peak period shows an increase in travel time, indicating that the Projects benefits are limited to the direction of travel.

14. The segment-level results indicate that the benefits of the Project are unevenly distributed across the route and vary by both direction and segment, evident of outliers within the data. Segment 1 demonstrates the strongest improvement overall, with a reduction in travel time in the inbound AM and PM peak of eight minutes 54 seconds and five minutes and 37 seconds respectively. Segment 1 of the inbound AM peak travel time contributes significantly to the overall reduction in travel time of the inbound AM peak travel time of nine minutes 47 second. Notably, the inbound PM peak shows a total travel time reduction of six minutes 29 seconds, with all bar Segment 4 having reductions in travel time. The outbound AM peak displays an increase in travel time of two minutes 45 seconds, driven primarily by the travel time observed in Segment 3.

15. I consider that the observed results positively reflect the indirect influence of the Project on the surrounding local road network. The substantial reductions observed in Segment 1, and to a lesser extent Segment 2, suggest that improved flow and reduced congestion on the wider network are delivering network-wide benefits, particularly for inbound movements. The comparatively smaller and more variable results observed in Segments 4 and 5, where the route interacts with the state highway indicate that the most substantial travel time changes are occurring outside of the immediate Project interface. Overall, the effects of the Project on Route 3 suggest broader network improvements outside of the immediate footprint, while the interaction with the state highway remain more moderate and variable.

Route 7

16. Bus route 7 (Kingston Brooklyn Wellington) direction has been divided into two segments, as visualised in Figure 10.

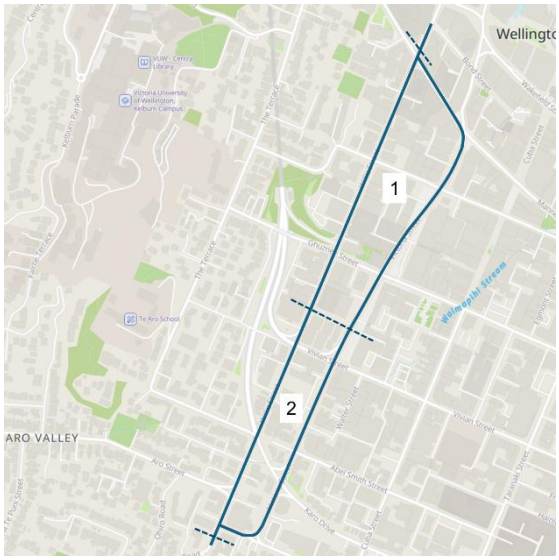


Figure 10 – Bus route 7 and segments

17. Table 7 and Table 8 below display the travel time (mins) of bus Route 7 along these two segments, with time distance graphs in Figure 11 and Figure 12 for both morning peak (8-9am) and PM peak (5-6pm) in both inbound and outbound directions.

Table 7: Route 2 inbound AM (8-9am) and PM (5-6pm) peak bus travel times (mins)

Route Segment	Inbound AM			Inbound PM		
	Do Minimum (2033)	With Project (2033)	Difference	Do Minimum (2033)	With Project (2033)	Difference
2	03:55	05:01	01:06	04:53	02:58	-01:54
1	03:09	03:05	-00:04	03:42	03:12	-00:30
Total	07:05	08:06	01:01	08:34	06:10	-02:24

Table 8: Route 2 outbound AM (8-9am) and PM (5-6pm) peak bus travel times (mins)

Route Segment	Outbound AM			Outbound PM		
	Do Minimum (2033)	With Project (2033)	Difference	Do Minimum (2033)	With Project (2033)	Difference
1	08:02	05:01	-03:01	05:47	04:20	-01:27
2	02:39	02:15	-00:23	03:12	02:08	-01:04
Total	10:41	07:16	-03:25	08:58	06:27	-02:31

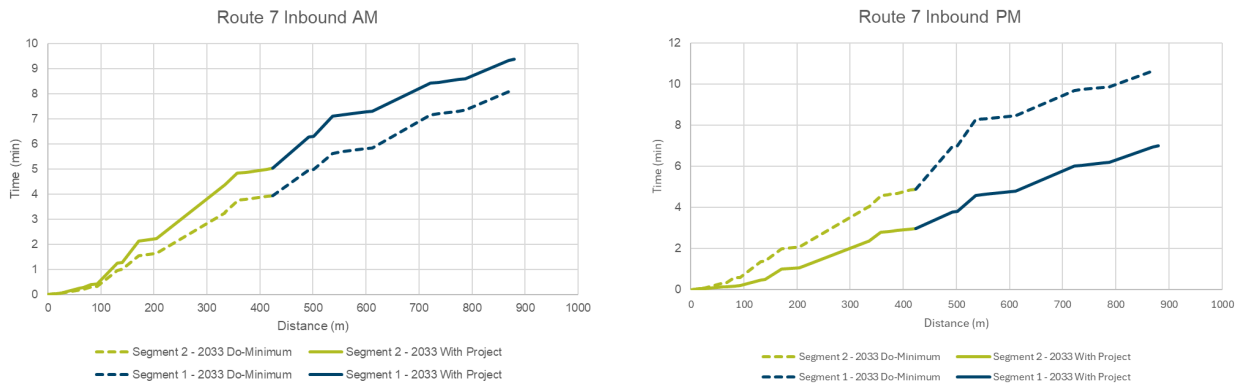


Figure 11 – Route 7 inbound AM (8-9am) and PM (5-6pm) peak bus time distance graphs

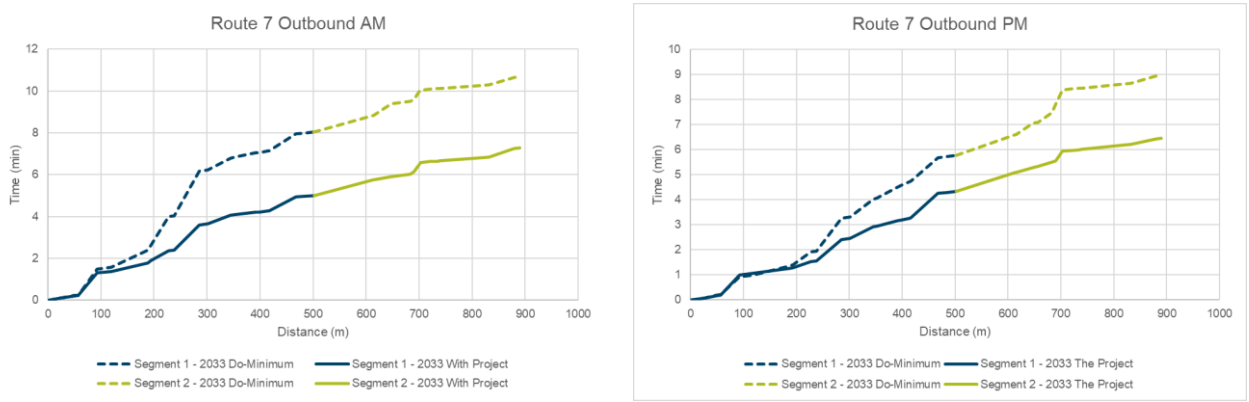


Figure 12 – Route 7 outbound AM (8-9am) and PM (5-6pm) peak bus time distance graphs

18. The bus travel time assessment in Route 7 over the two segments indicate that once operational, the Project is expected to reduce travel times across the majority of the assessed scenarios relative to the Do Minimum. The reductions are observed in both outbound peak periods, and the inbound PM peak period, with the most substantial decrease in travel time occurring in the outbound PM peak period.

The inbound AM peak period shows an increase in travel time relative to the Do Minimum. Overall, the results indicate that the Project provides consistent travel time benefits across all periods.

19. Segment-level results show consistent and clear patterns across both segments, with Segment 1 providing the greatest reduction in time travel compared to the Do Minimum. The largest improvements occur in the outbound AM period, where reductions of approximately three minutes and one second (Segment 1) and 23 seconds (Segment 2) are observed.

20. The reduction in travel time in the outbound AM, inbound PM, and outbound peak PM periods suggests that the Project is indirectly improving the performance on local streets by reducing congestion and improving network efficiency within the project extents. Conversely, the increase in travel time observed on Willis Street travelling from Webb Street to Vivian Street suggests that the benefits of the Project are less direct and may be offset by altered movements, or interaction with Karo Drive.

Route 18

21. Bus route 18 (Karori Kelburn Newtown Miramar) has been divided into three segments, as visualised in Figure 13.

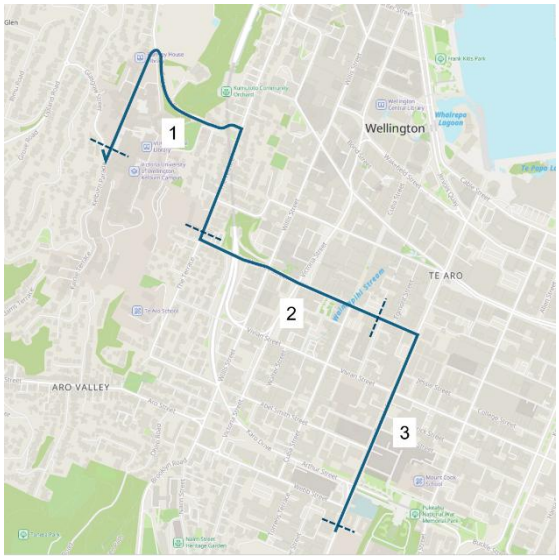


Figure 13 – Bus route 18 and segments

22. Table 9 and Table 10 below display the travel time (mins) of bus Route 18 along these three segments, with time distance graphs in Figure 14 and Figure 15 for both morning peak (8-9am) and PM peak (5-6pm) in both inbound and outbound directions.

Table 9 : Route 18 inbound AM (8-9am) and PM (5-6pm) peak bus travel times (mins)

Route Segment	Inbound AM			Inbound PM		
	Do Minimum (2033)	With Project (2033)	Difference	Do Minimum (2033)	With Project (2033)	Difference
1	07:35	06:06	-01:28	04:34	03:12	-01:22
2	04:47	03:14	-01:33	05:41	03:11	-02:30
3	05:14	05:16	00:02	07:33	05:22	-02:11
Total	17:36	14:37	-02:59	17:48	11:45	-06:03

Table 10: Route 18 outbound AM (8-9am) and PM (5-6pm) peak bus travel times (mins)

Route Segment	Outbound AM			Outbound PM		
	Do Minimum (2033)	With Project (2033)	Difference	Do Minimum (2033)	With Project (2033)	Difference
3	03:56	04:20	00:24	04:39	04:02	-00:36
2	05:25	05:11	-00:14	04:10	04:47	00:37
1	03:49	03:51	00:02	03:47	03:55	00:08
Total	13:10	13:22	00:12	12:36	12:44	00:08

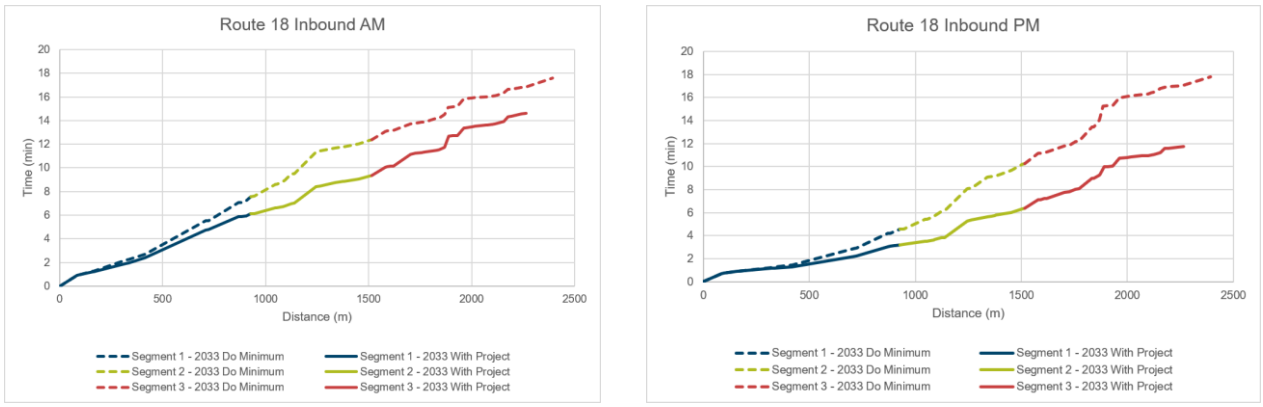


Figure 14 – Route 18 inbound AM (8-9am) and PM (5-6pm) peak bus time distance graphs

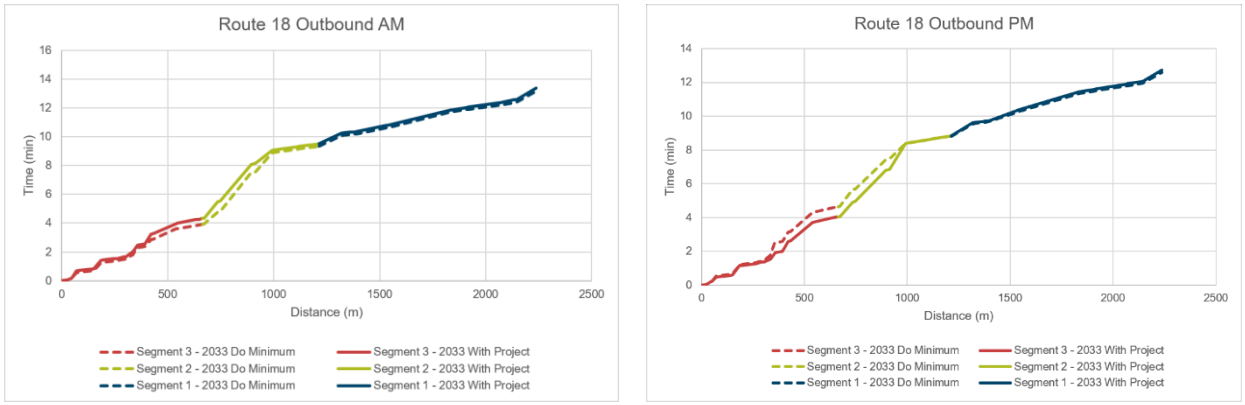


Figure 15 – Route 18 outbound and outbound PM (5-6pm) peak bus time distance graphs

23. The travel time assessment indicates that once operational, the Project results in mixed travel time savings and disbenefits across the route compared to the Do Minimum. Overall, a reduction in travel time is observed, primarily driven by improvements in the inbound AM and PM peak periods. The most notable reduction in travel time occurs in the outbound PM peak, with the outbound direction showing increased travel time, indicating that the Projects benefits are not uniformly realised across all segments and times.

24. The segment-level results indicate that the benefits of the Project are concentrated within specific parts of the route and vary by direction. Segment 2 demonstrates the greatest reduction in travel time, with decreases of approximately two minutes 30 seconds in the inbound PM period and one minute 33 seconds in the inbound AM period. In contrast, the outbound AM and PM peak periods shows an overall increase in travel time of 13 seconds and eight seconds. These results indicate that the Project provides the greatest benefit in the inbound direction, while outcomes in the outbound direction are more mixed.

25. I consider that the observed results reflect the positive indirect influence of the Project on the surrounding local network, with consistent reductions observed in Segment 2 and 3. While generally the models and graphs indicate consistency in where delay is occurring where the route intersects with the state highway (outbound distance 60 m and 360 m, and inbound distance 1800 m and 2100 m), the model indicates that there are cumulative time savings across the remainder of the segments. Overall, the Project appears to improve travel times on local roads where the influence of the Project is less direct, while outcomes remain relatively the same as the Do Minimum where the Project is more connected to the state highway.

Route 30X and 31X

26. Bus route 30X and 31X (Scorching Bay / Moa Point Wellington (Express) and Miramar North Wellington (Express)) has been divided into five segments, as visualised in Figure 16.

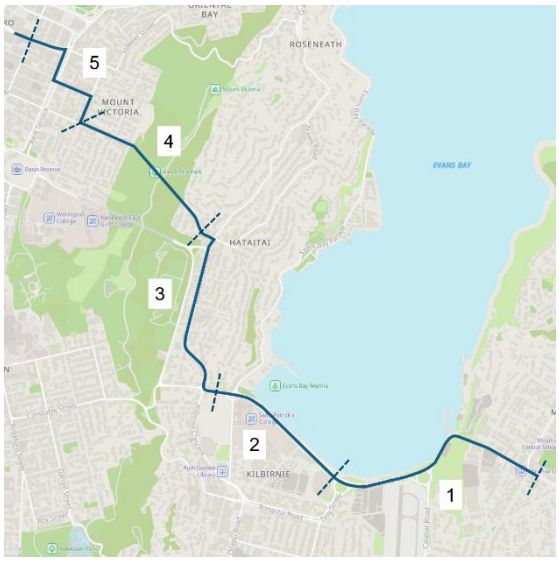


Figure 16 – Bus route 30X and 31X segments

27. Table 11 and Table 12 below display the travel time (mins) of bus Route 30X and 31X along these two segments, with time distance graphs in Figure 17 and Figure 18 for both morning peak (8-9am) and PM peak (5-6pm) in both inbound and outbound directions.

Table 11: Route 30X and 31X inbound AM (8-9am) and PM (5-6pm) peak bus travel times (mins)

Route Segment	Inbound AM			Inbound PM		
	Do Minimum (2033)	With Project (2033)	Difference	Do Minimum (2033)	With Project (2033)	Difference
1	04:17	03:12	-08:54	02:47	02:47	00:00
2	05:39	03:44	-01:07	04:54	03:38	-01:16
3	05:06	04:12	-00:25	06:13	03:57	-02:16
4	03:54	03:52	00:07	04:01	04:52	00:51
5	05:20	06:50	00:32	06:32	04:48	-01:44
Total	24:17	21:49	-09:47	24:27	20:02	-04:25

Table 12: Route 30X and 31X outbound AM (8-9am) and PM (5-6pm) peak bus travel times (mins)

Route Segment	Outbound AM			Outbound PM		
	Do Minimum (2033)	With Project (2033)	Difference	Do Minimum (2033)	With Project (2033)	Difference
5	02:54	02:40	-00:14	02:47	02:36	-00:11
4	11:44	05:30	-06:14	05:06	05:26	00:20
3	17:56	04:55	-13:01[1]	05:58	04:49	-01:09
2	02:18	01:43	-00:34	01:48	02:11	00:23
1	02:22	02:23	00:01	02:30	02:25	-00:05
Total	37:13	17:11	-20:02	18:10	17:28	-00:42

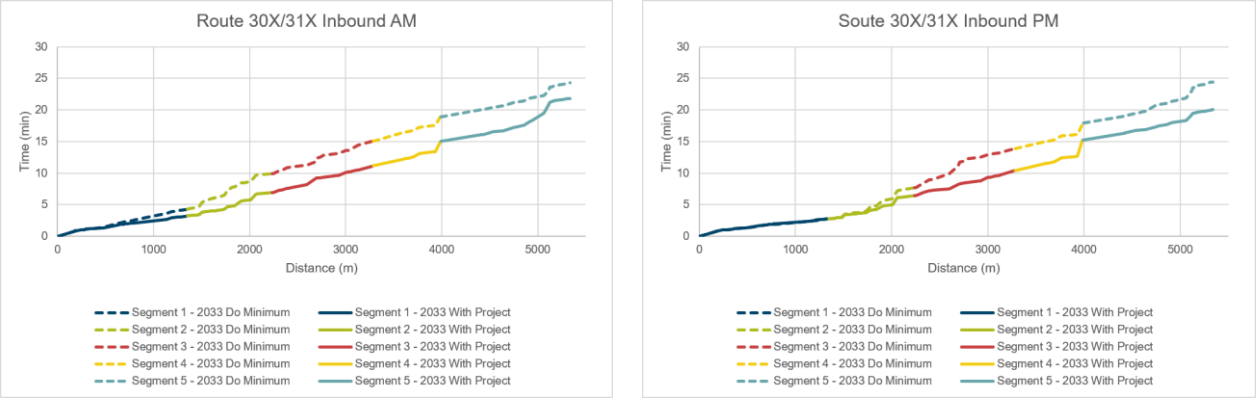


Figure 17 – Route 30X and 31X inbound AM (8-9am) and PM (5-6pm) peak bus time distance

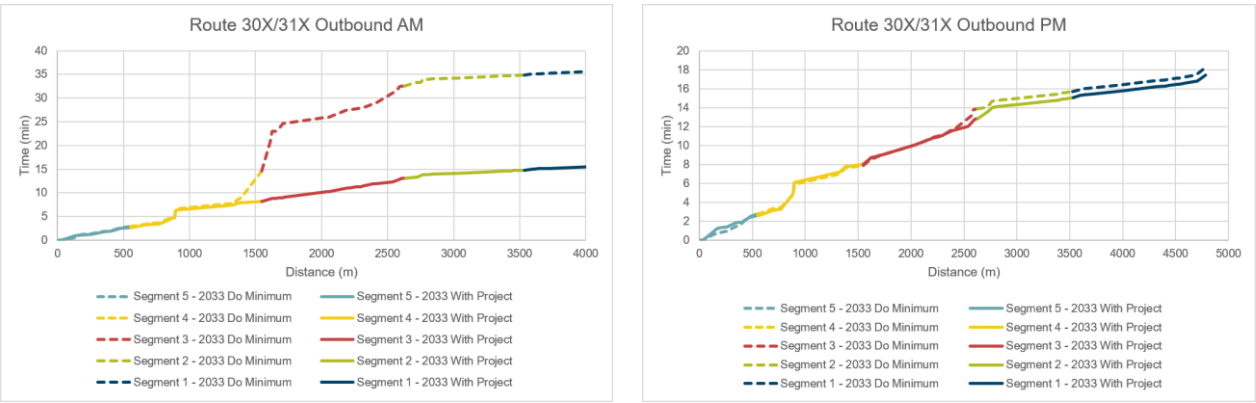


Figure 18 – Route 30X and 31X outbound and outbound PM (5-6pm) peak bus time distance graphs

28. The travel time assessment for both Route 30 Express and Route 31 Express indicates that, once operational, the Project results in an overall reduction in travel time across the route compared to the Do Minimum. Reductions in total travel time are observed across all peak periods, with the most significant reduction occurring in the outbound AM peak (seven minutes and one second)3. This is followed by a reduction in the inbound PM peak of four minutes and 25 seconds.

29. The segment-level results indicate that the Project benefits are concentrated within key segments of the route, rather than being uniformly distributed. Segment 43 provides the most substantial cumulative reduction in travel time compared to the Do Minimum of five minutes and six seconds,

[3] Segment 3 through Hataitai Bus Tunnel records the largest time travel reduction, however, this arises from the do minimum journey time showing an excessive delay that I consider overstates the likely future environment. As such I have manually adjusted the do minimum journey time downwards to ignore this delay which could otherwise be leading to an overstatement of the Project benefits.

while Segment 5 provides the smallest cumulative travel time saving (39 seconds). Segment 4 in the outbound AM peak displays the greatest individual travel time saving of six minutes and 14 second) but also includes increases in the inbound PM and outbound PM peaks of 52 seconds and 21 seconds, respectively. In contrast, Segment 5 shows the largest increase in travel time of one minute and 32 seconds in the inbound AM peak, although this is offset by reductions in travel time during the remaining periods. Overall, these patterns indicate that the greatest benefits occur in the inbound direction and within selected segments under peak conditions.

30. The observed results reflect the differing levels of direct influence of the Project across the route. Segments 1 and 2, which are located on the state highway, demonstrate reductions in travel time (with some minor increases), indicating that the Project is effective in improving throughput and reducing delay across the corridor. In contrast, the cumulative reductions observed in Segments 3, 4, and 5 represent the more indirect effects of the Project relative to the Do Minimum. The substantial reductions in travel time, particularly in the outbound AM period, suggest that improvements on the state highway are improving flow and reducing congestion on adjacent routes. However, the smaller increases in travel time observed in Segments 4 and 5 indicate that some delay may be redistributed to the local road network as conditions adjust. Overall, the Project appears to deliver its greatest and most consistent benefits within the state highway corridor, while impacts on the connected local road network are more variable and reflect broader changes in traffic patterns.

Route AX

31. Bus route AX (Airport Expresses Airport to Wellington) has been divided into six segments, as visualised in Figure 16.

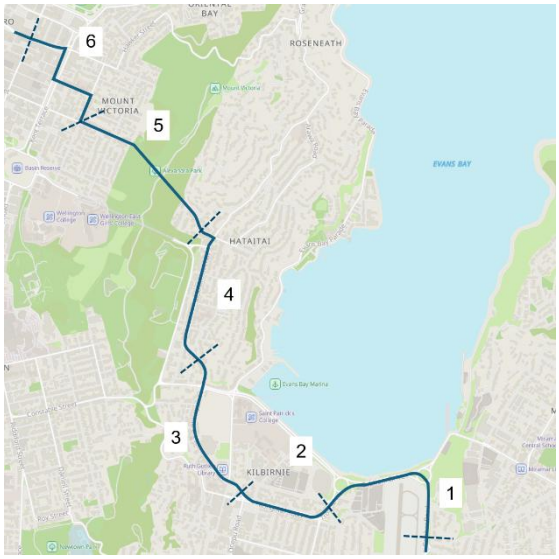


Figure 19 – Bus route 30X and 31X segments

32. Table 11 and Table 12 below display the travel time (mins) of bus Route 1 along these two segments, with time distance graphs in Figure 17 and Figure 18 for both morning peak (8-9am) and PM peak (5-6pm) in both inbound and outbound directions.

Table 13: Route AX inbound AM (8-9am) and PM (5-6pm) peak bus travel times (mins)

Route Segment	Inbound AM			Inbound PM		
	Do Minimum (2033)	With Project (2033)	Difference	Do Minimum (2033)	With Project (2033)	Difference
1	02:04	00:40	-01:24	00:36	00:35	-00:01
2	06:09	03:39	-02:30	04:03	03:02	-01:01
3	04:09	03:35	-00:33	06:14	03:26	-02:47
4	03:55	03:12	-00:43	03:04	03:22	00:18
5	04:27	04:43	00:16	05:31	05:35	00:05
6	03:04	04:34	01:30	03:37	02:38	-00:59
Total	23:48	20:23	-03:25	23:05	18:39	-04:26

Table 14: Route AX outbound AM (8-9am) and PM (5-6pm) peak bus travel times (mins)

Route Segment	Outbound AM			Outbound PM		
	Do Minimum (2033)	With Project (2033)	Difference	Do Minimum (2033)	With Project (2033)	Difference
6	02:54	02:40	-00:14	02:47	02:36	-00:11
5	11:44	05:30	-06:14	05:06	05:26	00:20
4	14:13	03:12	-11:01[14]	03:50	03:03	-00:47
3	05:55	04:08	-01:47	04:52	04:29	-00:23
2	02:15	02:27	00:11	02:19	02:30	00:11
1	01:23	01:22	-00:00	01:23	01:22	-00:01
Total	38:23	19:18	-19:05	20:18	19:27	-00:51

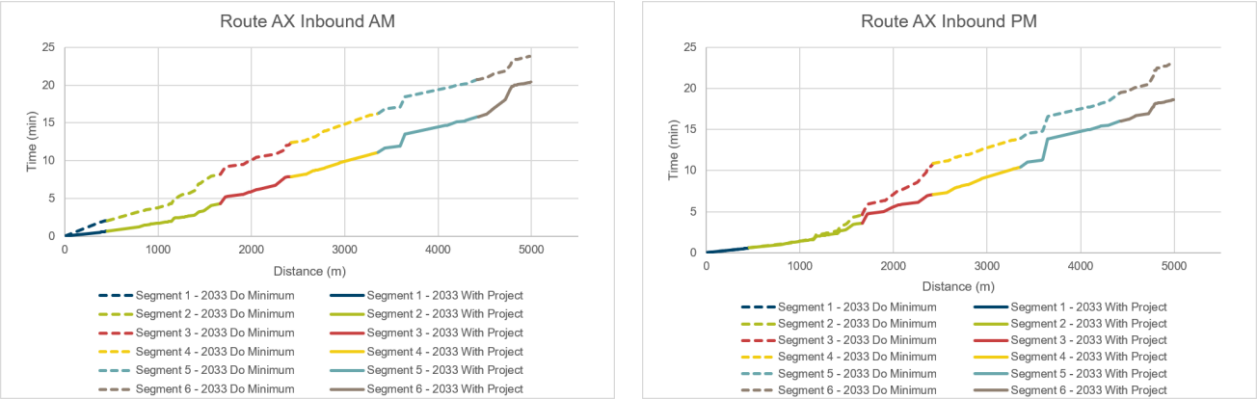


Figure 20 – Route AX inbound AM (8-9am) and PM (5-6pm) peak bus time distance

[4] Segment 4 through Hataitai Bus Tunnel records the largest time travel reduction, however, this arises from the do minimum journey time showing an excessive delay that I consider overstates the likely future environment. As such I have manually adjusted the do minimum journey time downwards to ignore this delay which could otherwise be leading to an overstatement of the Project benefits.

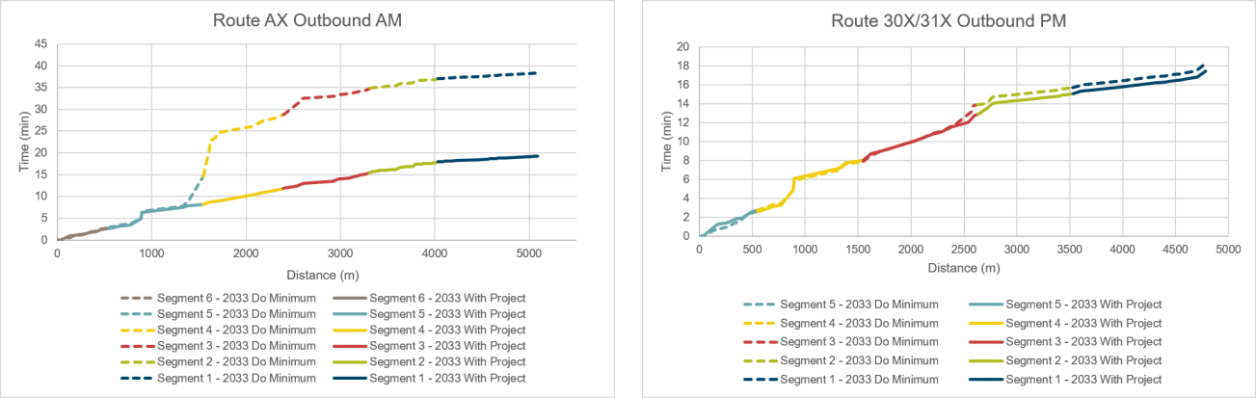


Figure 21 – Route AX outbound and outbound PM (5-6pm) peak bus time distance graphs

33. The travel time assessment for the Airport Express route indicates that, once operational, the Project results in an overall reduction in travel time across the route compared to the Do Minimum. Reductions are observed in all peak periods, with the greatest reduction occurring in the outbound AM peak5 (eight minutes and four seconds), followed by the inbound PM peak (four minutes and 26 seconds) and the inbound AM peak (three minutes and 25 seconds). The smallest reduction in travel time is observed in the outbound PM peak period (51 seconds). These results indicate that the Project delivers strong and consistent travel time benefits across most operating conditions, with the most pronounced improvement occurring under outbound AM peak conditions.

34. The segment-level results indicate that the Project's benefits are concentrated within specific segments of the route and vary by segment and direction. Segments 2 and 3 provide the most significant reductions in travel time overall, with Segment 3 demonstrating consistent reductions across all time periods, including two minutes 47 seconds in the inbound PM peak and one minute 47 seconds in the outbound AM peak, alongside smaller reductions in the remaining periods. In contrast, Segment 5 displays more variable performance, with increases in travel time in three of the four periods, although this is partially offset by a significant reduction in the inbound AM peak (six minutes 14 seconds). Overall, these patterns indicate that the greatest travel time savings are driven by Segments 3 and 5, particularly under peak conditions.

35. I consider that the observed results reflect the differing levels of direct influence of the Project across the route. Segment 1, which is located on the state highway, demonstrates consistent reductions (with some minor increases) in travel time relative to the Do Minimum, indicating that the Project is effective in improving throughput and reducing delay along this section of the corridor. In contrast, Segments 2 to 6 are primarily located on the surrounding local road network and therefore reflect the more indirect effects of the Project. The consistent reductions observed in Segment 3 suggest that movements along Kilbirnie Drive and Hamilton Road benefit from improved flow on the state highway, particularly where these routes interact with the corridor. Segment 5, which largely comprises the Hataitai Bus Tunnel, shows more variable results, indicating that performance in this section is influenced by its specific operating conditions and its interaction with the wider network. The smaller increases observed in Segments 5 and 6 in certain periods suggest that some delay may be redistributed to the local road network as overall conditions improve.

ANNEXURE G Modelled Construction Journey Times

Scenarios Modelled

1. As per the Constructability Report, there are multiple construction activities that are able to occur independently of activities within the Project. Some of these activities could occur in parallel to allow the total construction period to be reduced. In undertaking an assessment of the potential effects of the construction modelling was undertaken of the potentially more disruptive stages of each package.

2. I summarise these tests in Table 1 below. For each test an AIMSUN model was prepared that provides a forecast of traffic flows and journey times for general traffic and buses, which I have then analysed and reported within this Annexure. The routes reported here are as defined in Annexure B for general traffic and Annexure F for buses.

Table 1: Aimsun construction modelling scenarios

Construction area	Construction test	Description
Package 1 – Terrace Tunnel	Test A	Westbound closure of Ghuznee Street Overbridge for all traffic. Westbound traffic is diverted via MacDonald Crescent.
Package 1 – Terrace Tunnel	Test B	Westbound closure of Ghuznee Street Overbridge for general traffic only. Westbound general traffic is diverted via MacDonald Crescent. Single lane operates bidirectionally between eastbound traffic and buses westbound.
Package 2 – Te Aro	Test C	Speed reduction to 30km/hr along Vivian Street and Karo Drive.
Package 3 – Basin Reserve	Test D	Basin Reserve Construction Stage 3
Package 3 – Basin Reserve	Test E	Basin Reserve Construction Stage 5
Package 5 – Eastern Connections	Test F	Closure of Taurima St access to SH1 / Ruahine St. Closure of Wellington Road southeast access to/from SH1 / Ruahine St. Speed reduction to 30km/hr through these locations for SH1 / Ruahine St.

Package 1 - Terrace Tunnel

Test A - Ghuznee Street overbridge westbound closure for ALL vehicles

3. In Table 2, I present the change in journey times for the bus routes and general traffic routes assessed. The subsequent sections provide a more detailed view of the routes primarily affected by test A.

Table 2: Changes in journey time as a result of Test A

Route		AM peak			PM peak		
		Do Min (minutes)	Const. (minutes)	Difference (minutes)	Do Min (minutes)	Constr. (minutes)	Difference (minutes)
Bus route 1 Island Bay to Crtny Pl	Car	16	18	+2	15	14	-1
	Bus	23	24	+1	23	22	-1
Bus route 1 Crtny Pl to Island Bay	Car	13	13	No change	14	13	-1
	Bus	23	23	No change	23	23	No change
Bus route 2 Miramar to Courtenay Pl (via Kilbirnie and tunnel)	Bus	24	25	+1	22	23	+1
Bus route 2 Courtenay Pl to Miramar (via Kilbirnie and tunnel)	Bus	30	34	+4	21	20	-1
Bus route 3	Car	32	36	+4	22	27	+5

Route		AM peak			PM peak		
		Do Min (minutes)	Const. (minutes)	Difference (minutes)	Do Min (minutes)	Constr. (minutes)	Difference (minutes)
Kilbirnie to Manners	Bus	46	49	+3	34	39	+5
Bus route 3 Manners to Kilbirnie	Car	17	17	No change	20	21	+1
	Bus	28	27	-1	32	34	+2
Bus route 7 Brooklyn to Manners St	Bus	12	11	-1	14	21	+7
Bus route 7 Manners St to Brooklyn	Bus	12	11	-1	12	12	No change
Bus route 14 Kilbirnie to Wilton	Bus	67	69	+2	67	67	No change
Bus route 18 Webb St to Victoria Uni	Car	9	13	+4	8	10	+2
	Bus	13	17	+4	13	14	+1
Bus route 18 Victoria Uni to Webb St	Car	16	9	-7	13	11	-2
	Bus	19	12	-7	16	15	-1
Bus route 24 Miramar to Ctny Pl (via Kilbirnie & bays)	Car	20	20	No change	26	26	No change
Bus route 24 Ctny Pl to Miramar (via Kilbirnie & bays)	Car	18	18	No change	58	46	-12
Bus route 31x Miramar to Ctny Pl Express (via tunnel)	Bus	23	23	No change	24	24	No change
Bus route 31x Ctny Pl to Mirarmar Express (via tunnel)	Bus	37	31	-6	17	17	No change
AX Airport Express Airport to Courtenay	Bus	23	24	+1	21	22	+1
AX Airport Express Courtenay to Airport	Bus	38	33	-5	19	19	No change
General traffic Airport to Jvl (Quays)	Car	33	33	No change	29	28	-1
General traffic Jvl to Airport (Quays)	Car	40	41	+1	28	28	No change
General traffic Airport to Jvl (TT)	Car	32	32	No change	25	23	-2
General traffic Jvl to Airport (TT)	Car	36	37	+1	29	27	-2

Bus route 18 – Webb St ←→ Victoria University

4. Figure 1, Figure 2, Figure 3 and Figure 4 provide a more detailed view of the bus route 18.

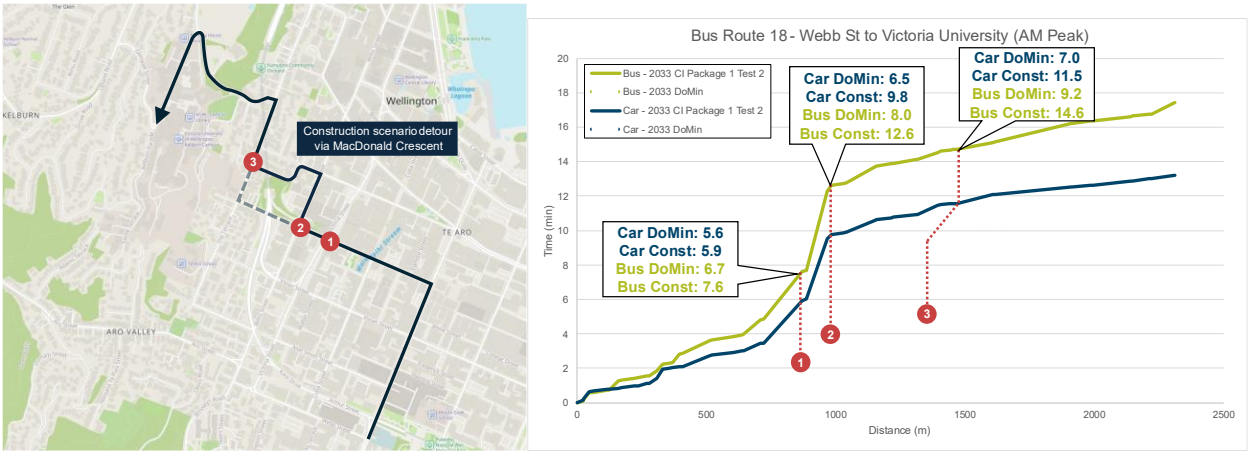


Figure 1 – Change in journey time for bus route 18 in the westbound direction (AM peak)

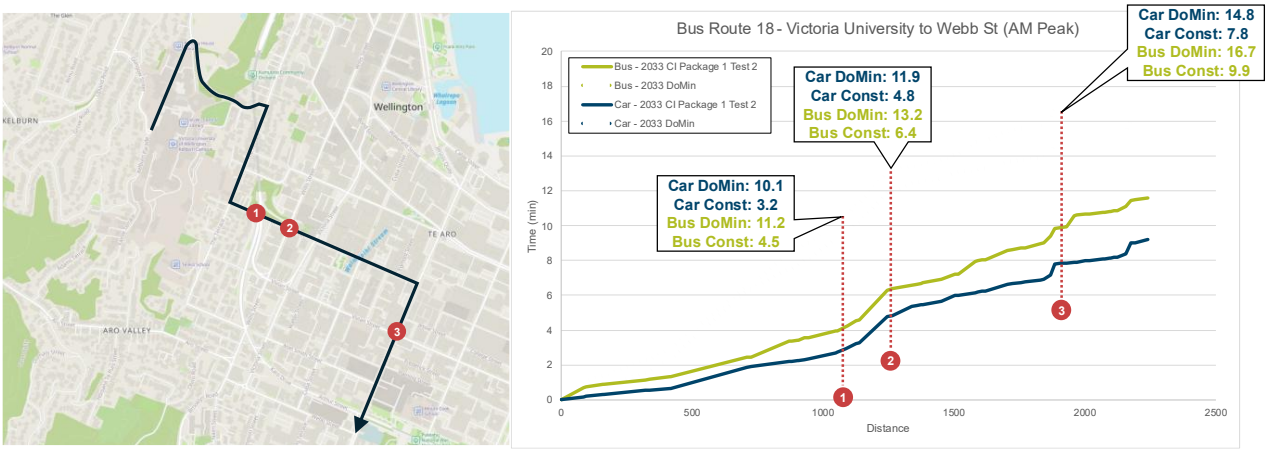


Figure 2 – Change in journey time for bus route 18 in the eastbound direction (AM peak)

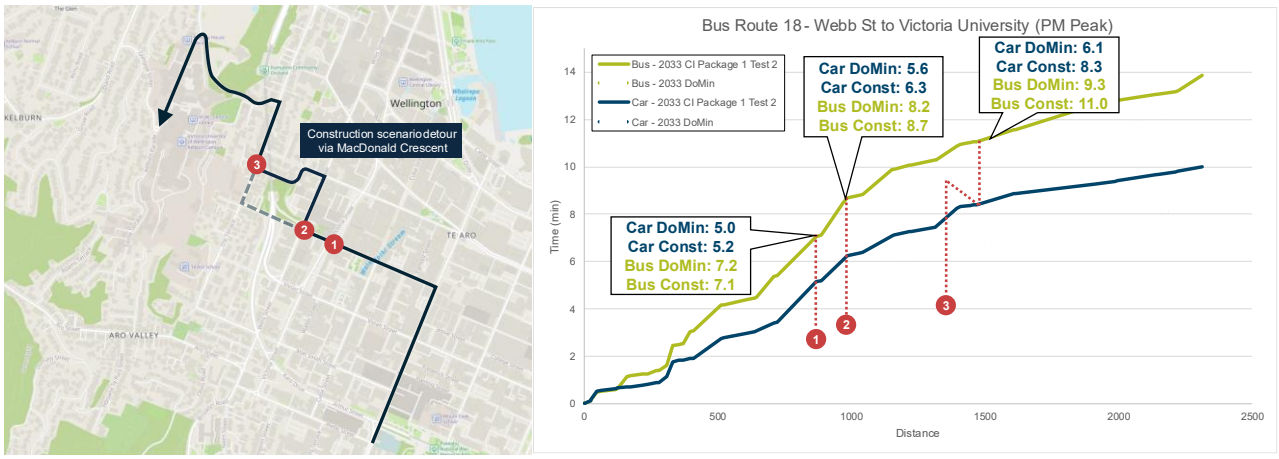


Figure 3 – Change in journey time for bus route 18 in the westbound direction (PM peak)

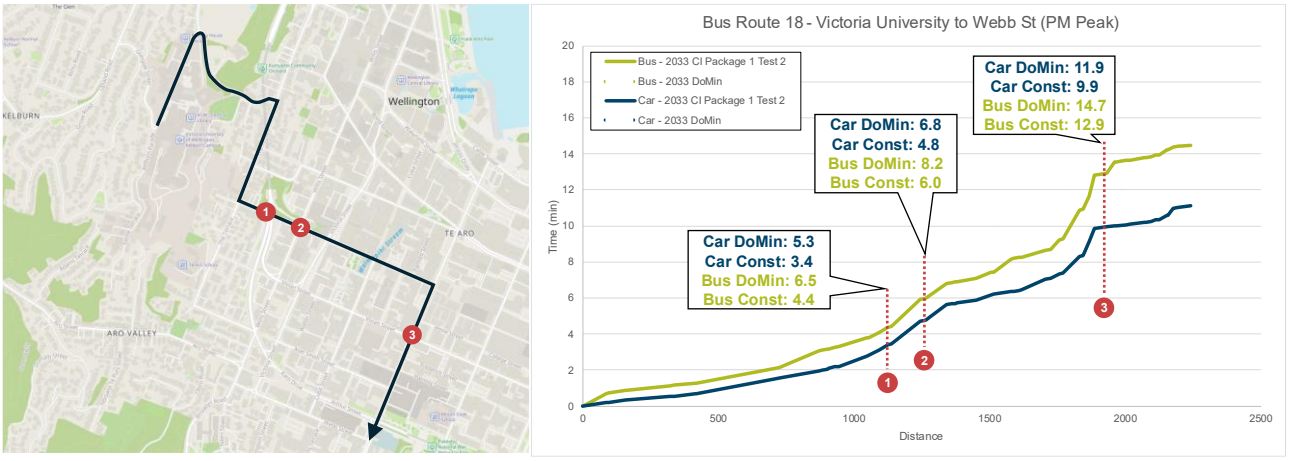


Figure 4 – Change in journey time for bus route 18 in the eastbound direction (PM peak)

General traffic – Airport ←→ Jvl (via Quays)

5. Figure 5, Figure 6, Figure 7 and Figure 8 provide a more detailed view of general traffic travelling between the airport and Johnsonville via the Quays.

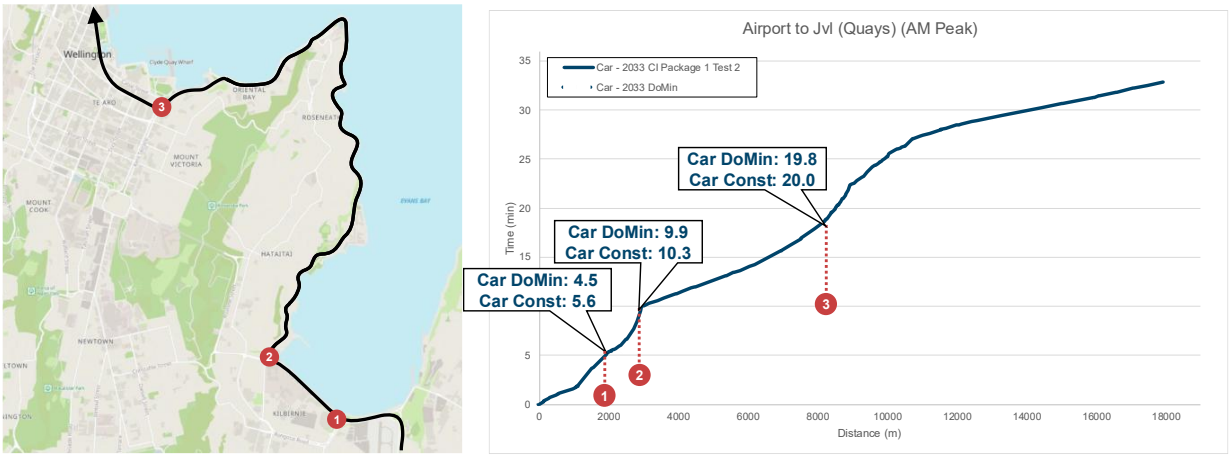


Figure 5 – Change in journey time for general traffic travelling between Johnsonville and the airport (via the quays) in the westbound direction (AM peak)

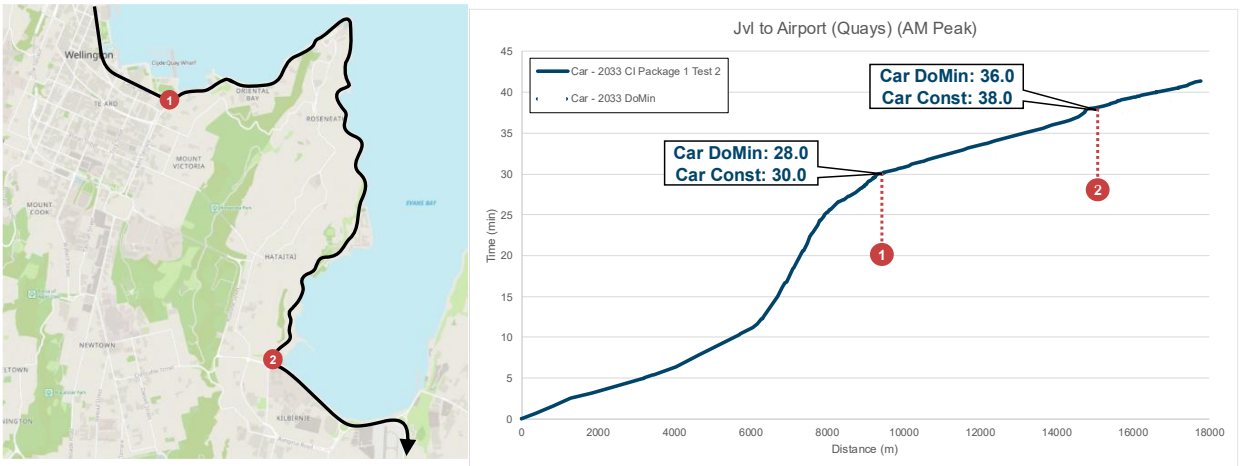


Figure 6 – Change in journey time for general traffic travelling between Johnsonville and the airport (via the quays) in the eastbound direction (AM peak)

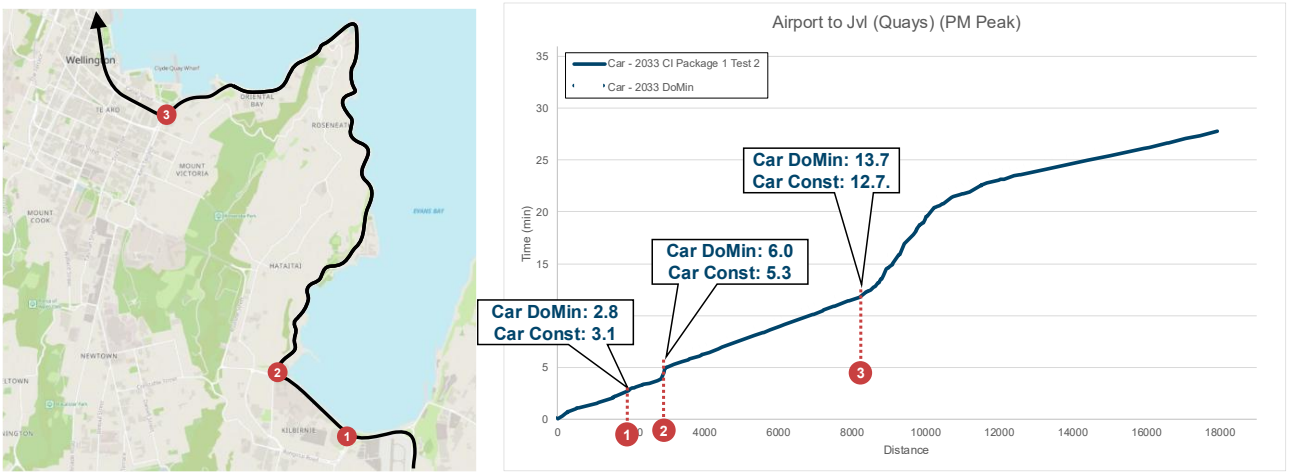


Figure 7 – Change in journey time for general traffic travelling between Johnsonville and the airport (via the quays) in the westbound direction (PM peak)

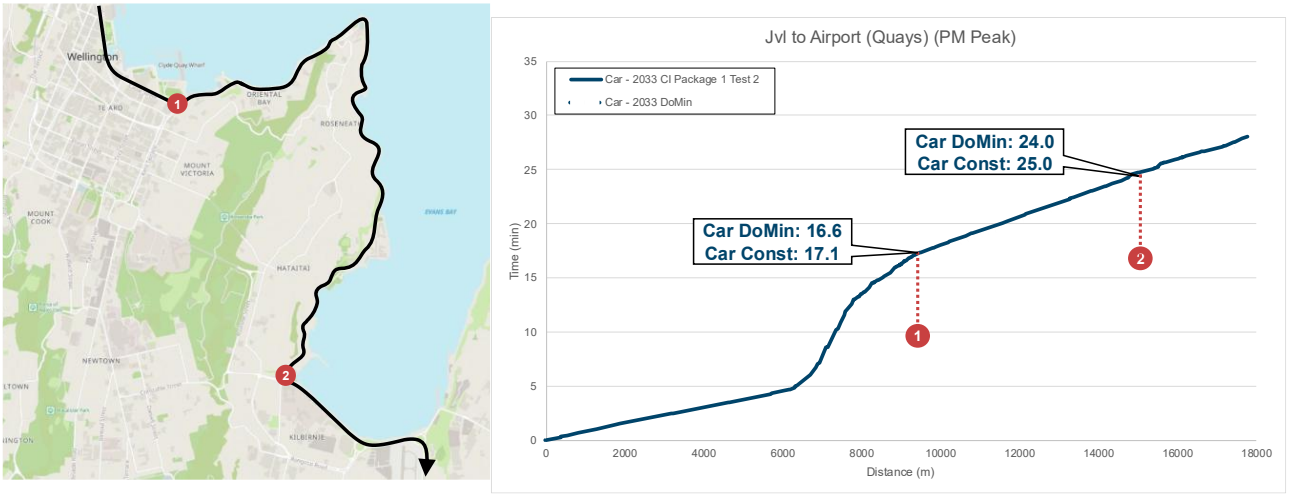


Figure 8 – Change in journey time for general traffic travelling between Johnsonville and the airport (via the quays) in the eastbound direction (PM peak)

General traffic – Airport ←→ Jvl (via Terrace Tunnel)

6. Figure 9, Figure 10, Figure 11 and Figure 12 provide a more detailed view of general traffic travelling between the airport and Johnsonville via the Terrace Tunnel.

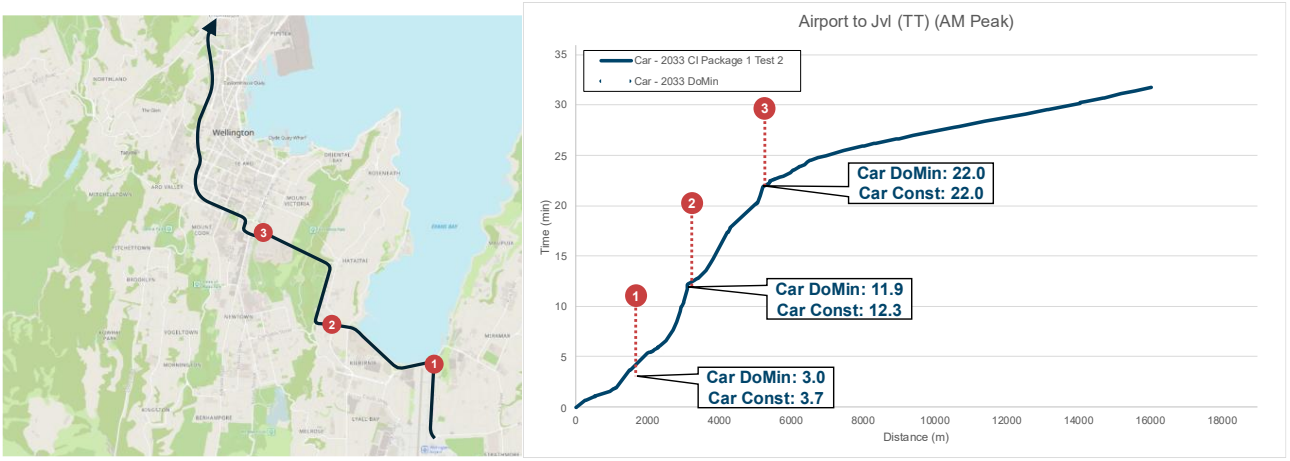


Figure 9 – Change in journey time for general traffic travelling between Johnsonville and the airport (via Terrace Tunnel) in the westbound direction (AM peak)

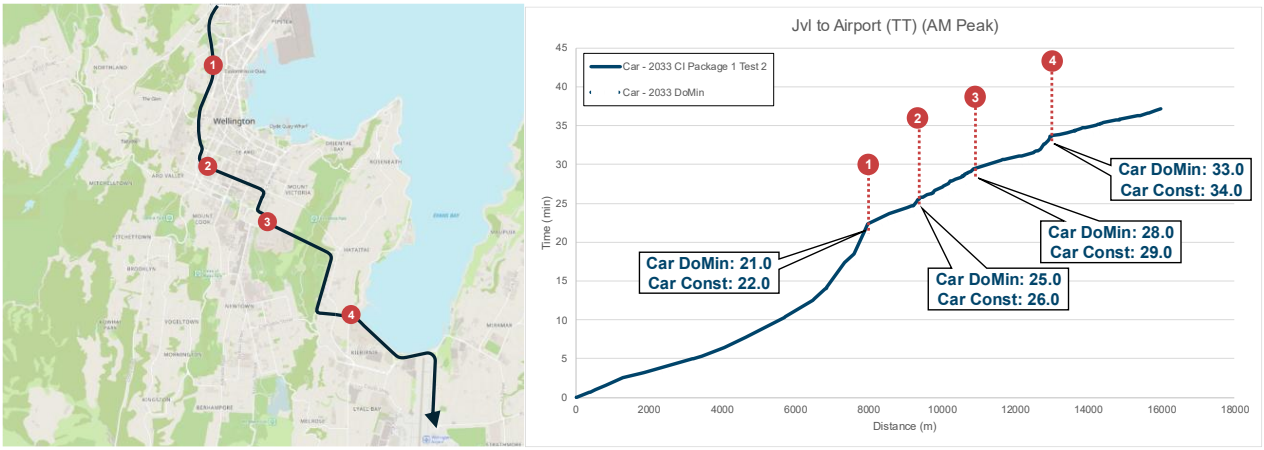


Figure 10 – Change in journey time for general traffic travelling between Johnsonville and the airport (via Terrace Tunnel) in the eastbound direction (AM peak)



Figure 11 – Change in journey time for general traffic travelling between Johnsonville and the airport (via Terrace Tunnel) in the westbound direction (PM peak)

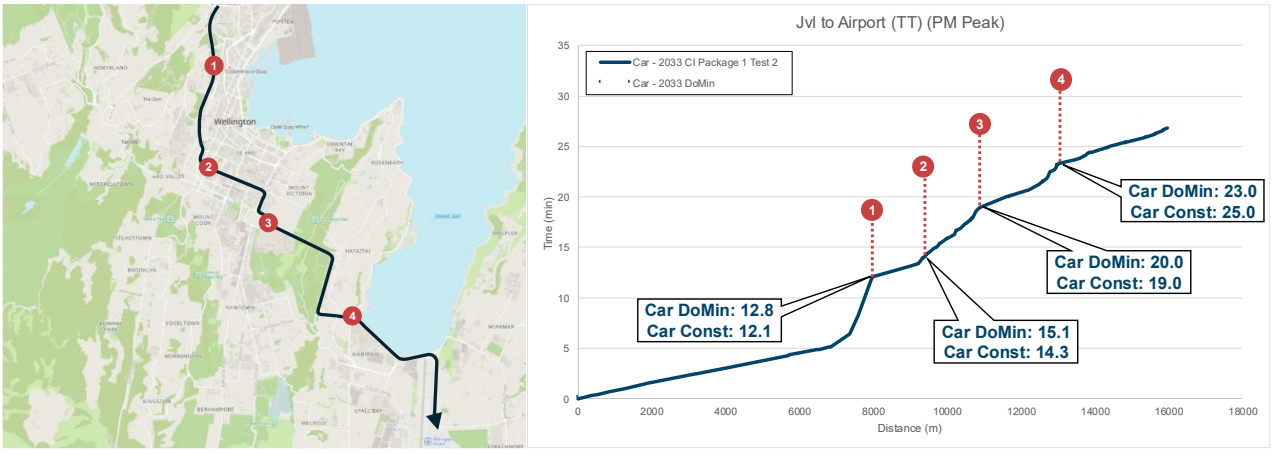


Figure 12 – Change in journey time for general traffic travelling between Johnsonville and the airport (via Terrace Tunnel) in the eastbound direction (PM peak)

Test B - Ghuznee Street overbridge westbound closure for general traffic only

7. In Table 3, I present the change in journey times for the bus routes and general traffic routes assessed. The subsequent sections provide a more detailed view of the routes primarily affected by test B.

Table 3: Changes in journey time as a result of Test B

Route		AM peak			PM peak		
		Do Min (minutes)	Const. (minutes)	Difference (minutes)	Do Min (minutes)	Constr. (minutes)	Difference (minutes)
Bus route 1 Island Bay to Crtny Pl	Car	16	17	+1	15	15	No change
	Bus	23	23	No change	23	24	+1
Bus route 1 Crtny Pl to Island Bay	Car	13	13	No change	14	14	No change
	Bus	23	24	+1	23	23	No change
Bus route 2 Miramar to Courtenay Pl (via Kilbirnie and tunnel)	Bus	24	25	+1	22	22	No change
Bus route 2 Courtenay Pl to Miramar (via Kilbirnie and tunnel)	Bus	30	37	+7	21	19	-2
Bus route 3 Kilbirnie to Manners	Car	32	34	+2	22	21	-1
	Bus	46	47	+1	34	33	-1
Bus route 3 Manners to Kilbirnie	Car	17	17	No change	20	20	No change
	Bus	28	27	-1	32	32	No change
Bus route 7 Brooklyn to Manners St	Bus	12	11	-1	14	18	+4
Bus route 7 Manners St to Brooklyn	Bus	12	12	No change	12	13	+1
Bus route 14 Kilbirnie to Wilton	Bus	67	68	+1	67	66	-1
Bus route 18 Webb St to Victoria Uni	Car	9	12	+3	8	10	+2
	Bus	13	14	+1	13	11	-2
Bus route 18 Victoria Uni to Webb St	Car	16	11	-5	13	13	No change
	Bus	19	13	-6	16	16	No change
Bus route 24 Miramar to Ctny Pl (via Kilbirnie & bays)	Car	20	20	No change	26	27	+1
Bus route 24 Ctny Pl to Mirarmar (via Kilbirnie & bays)	Car	18	18	No change	58	56	-2
Bus route 31x Miramar to Ctny Pl Express (via tunnel)	Bus	23	23	No change	24	28	+4
Bus route 31x Ctny Pl to Mirarmar Express (via tunnel)	Bus	37	35	-2	17	16	-1
AX Airport Express Airport to Courtenay	Bus	23	25	+2	21	21	No change
AX Airport Express Courtenay to Airport	Bus	38	37	-1	19	18	-1
General traffic Airport to Jvl (Quays)	Car	33	34	+1	29	30	+1
General traffic Jvl to Airport (Quays)	Car	40	39	-1	28	28	No change
General traffic Airport to Jvl (TT)	Car	32	32	No change	25	25	No change
General traffic Jvl to Airport (TT)	Car	36	36	No change	29	29	No change

Bus route 18 – Webb St ←→ Victoria University

8. Figure 13, Figure 14, Figure 15, Figure 16 provide a more detailed view of the bus route 18.

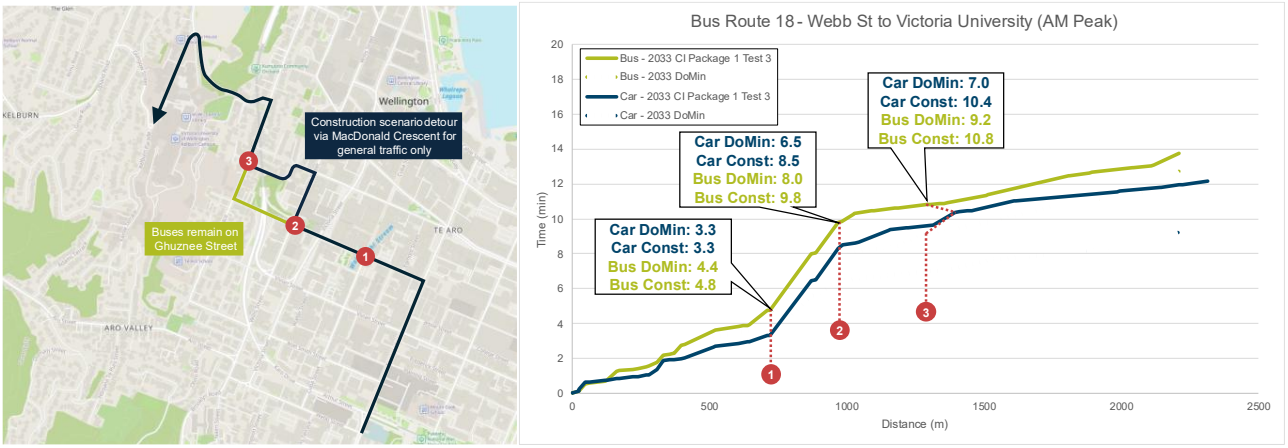


Figure 13 – Change in journey time for bus route 18 in the westbound direction (AM peak)

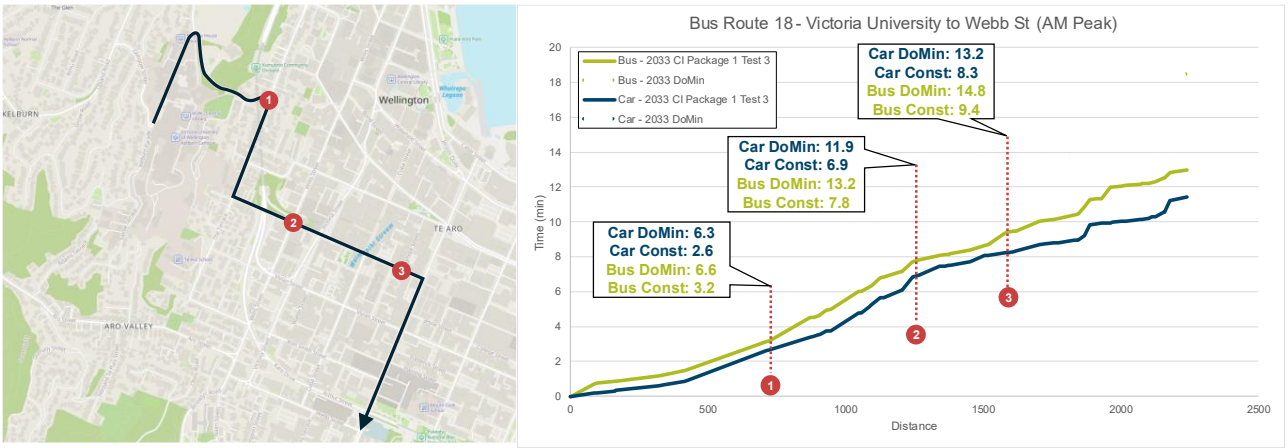


Figure 14 – Change in journey time for bus route 18 in the eastbound direction (AM peak)

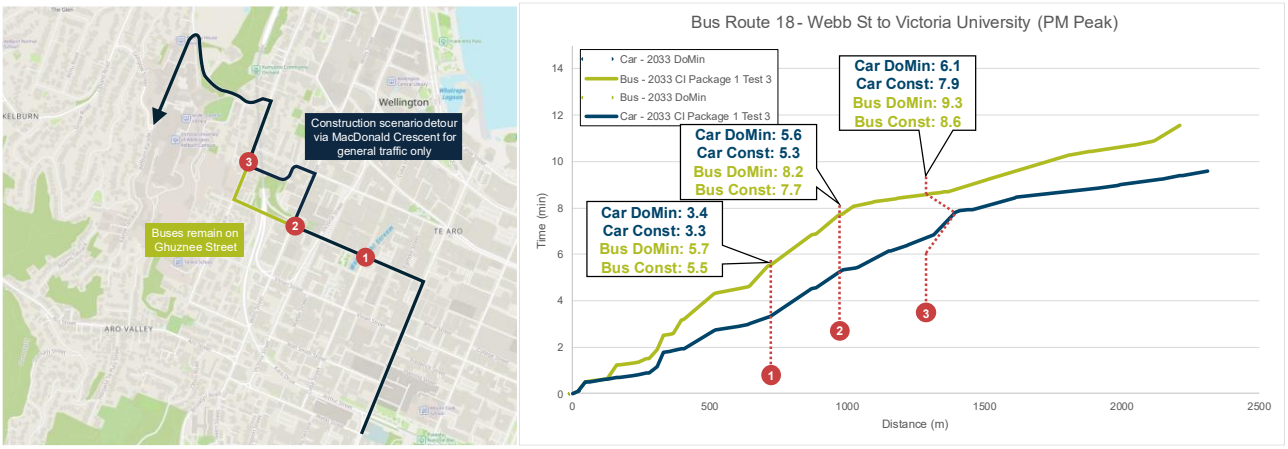


Figure 15 – Change in journey time for bus route 18 in the westbound direction (PM peak)

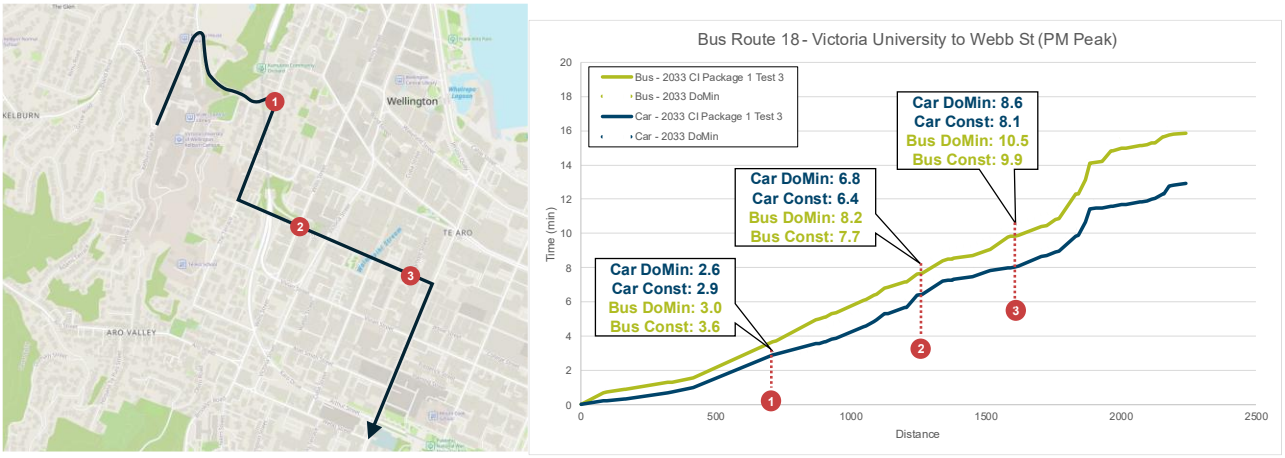


Figure 16 – Change in journey time for bus route 18 in the eastbound direction (PM peak)

General traffic – Airport ←→ Jvl (via Quays)

9. Figure 17, Figure 18, Figure 19 and Figure 20 provide a more detailed view of general traffic travelling between the airport and Johnsonville via the Quays.

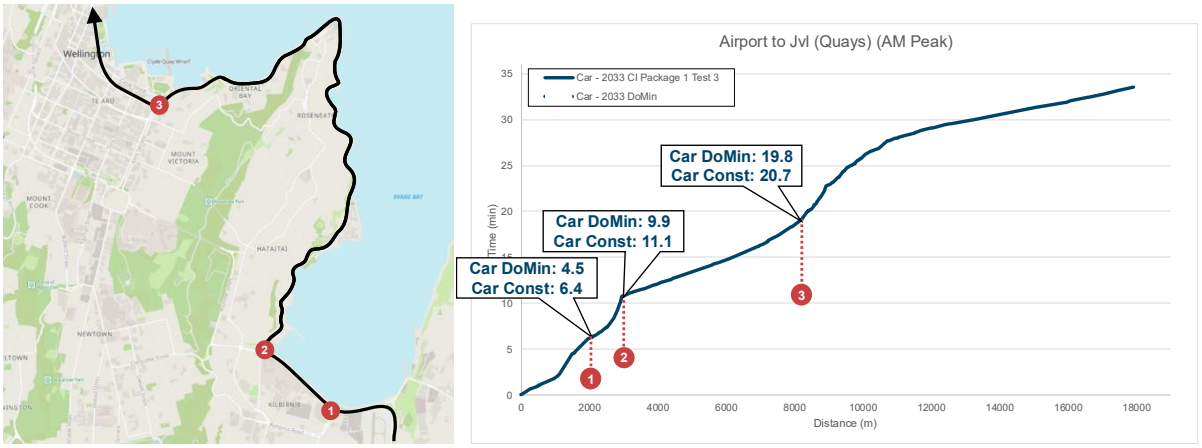


Figure 17 – Change in journey time for general traffic travelling between Johnsonville and the airport (via the quays) in the westbound direction (AM peak)

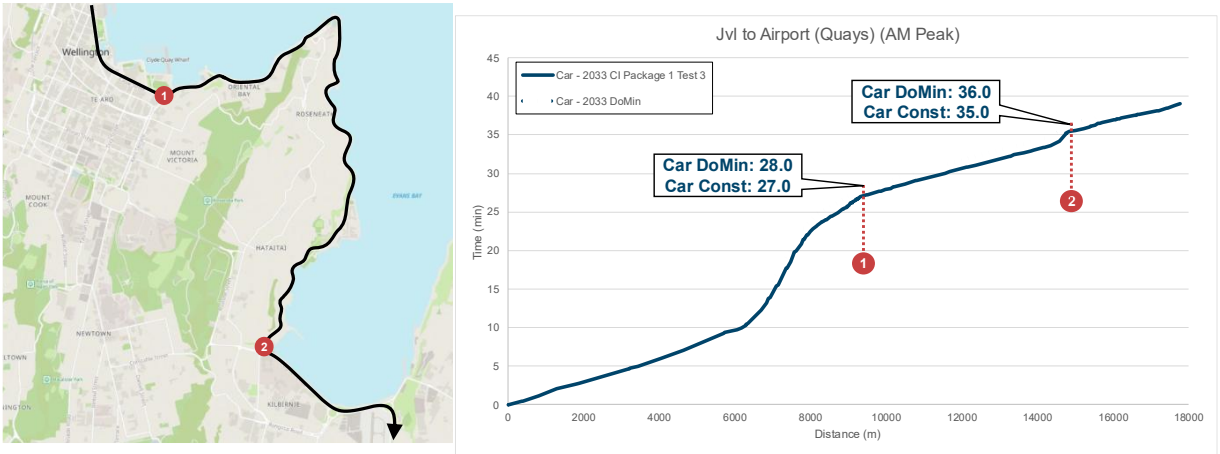


Figure 18 – Change in journey time for general traffic travelling between Johnsonville and the airport (via the quays) in the eastbound direction (AM peak)

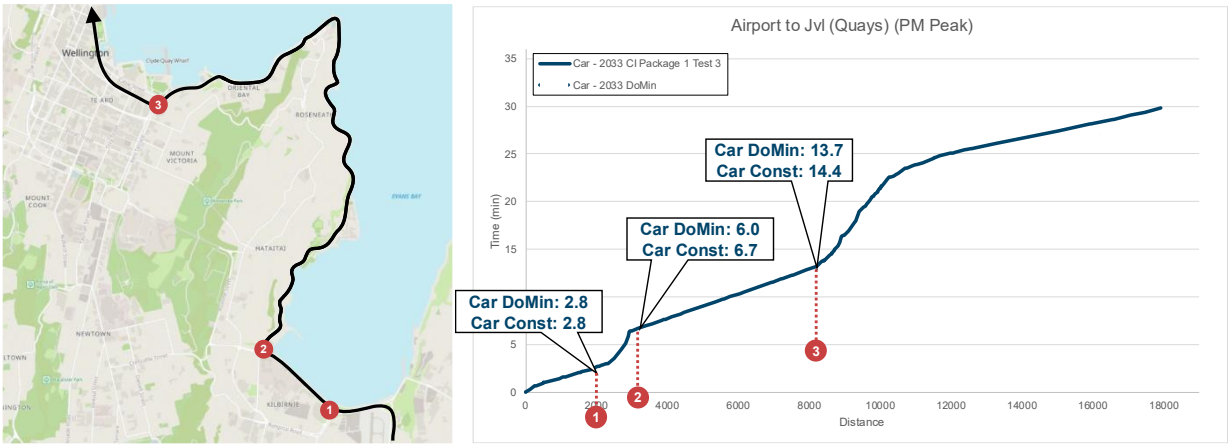


Figure 19 – Change in journey time for general traffic travelling between Johnsonville and the airport (via the quays) in the westbound direction (PM peak)

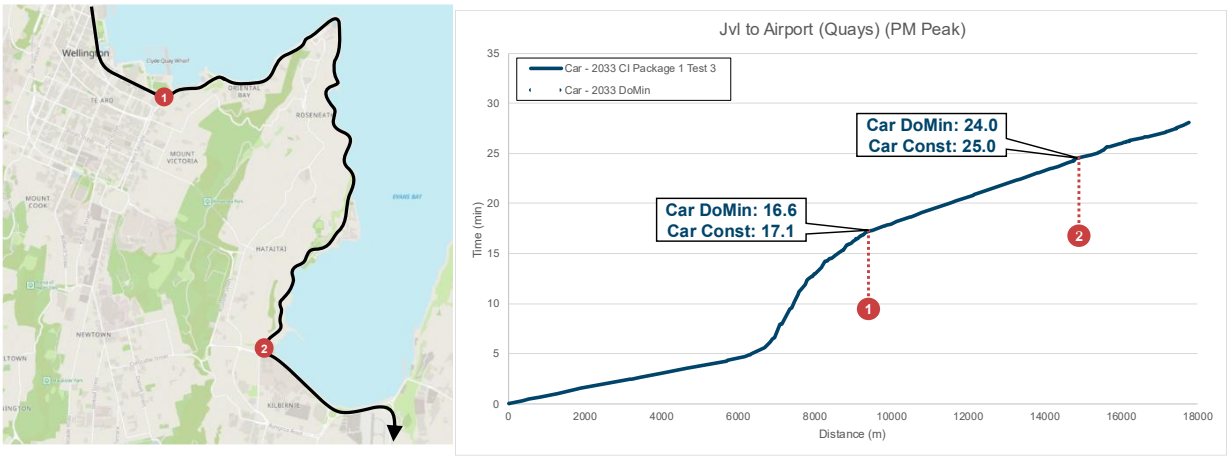


Figure 20 – Change in journey time for general traffic travelling between Johnsonville and the airport (via the quays) in the eastbound direction (PM peak)

General traffic – Airport ←→ Jvl (via Terrace Tunnel)

10. Figure 21, Figure 22, Figure 23 and Figure 24 provide a more detailed view of general traffic travelling between the airport and Johnsonville via the Terrace Tunnel.

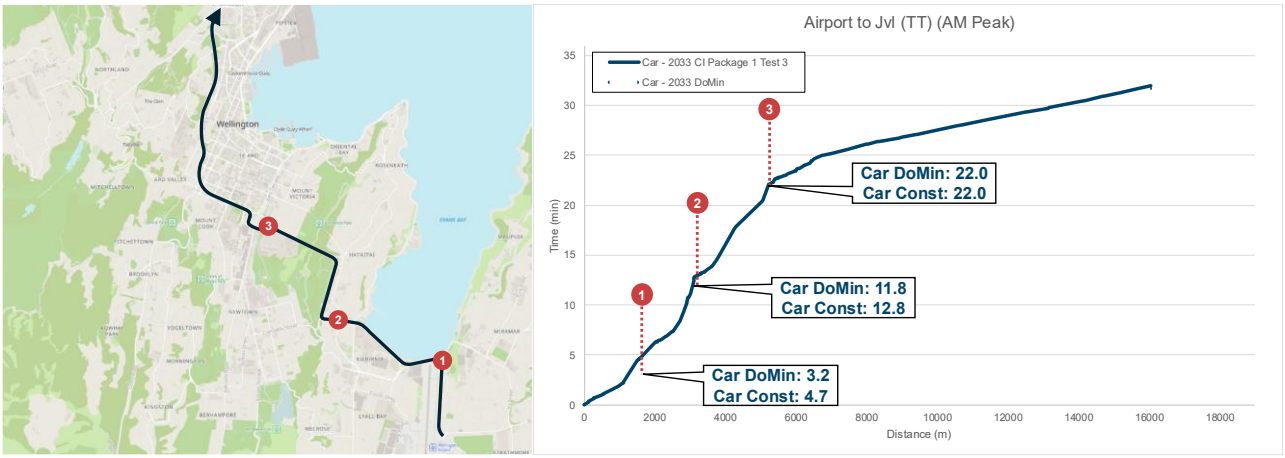


Figure 21 – Change in journey time for general traffic travelling between Johnsonville and the airport (via Terrace Tunnel) in the westbound direction (AM peak)

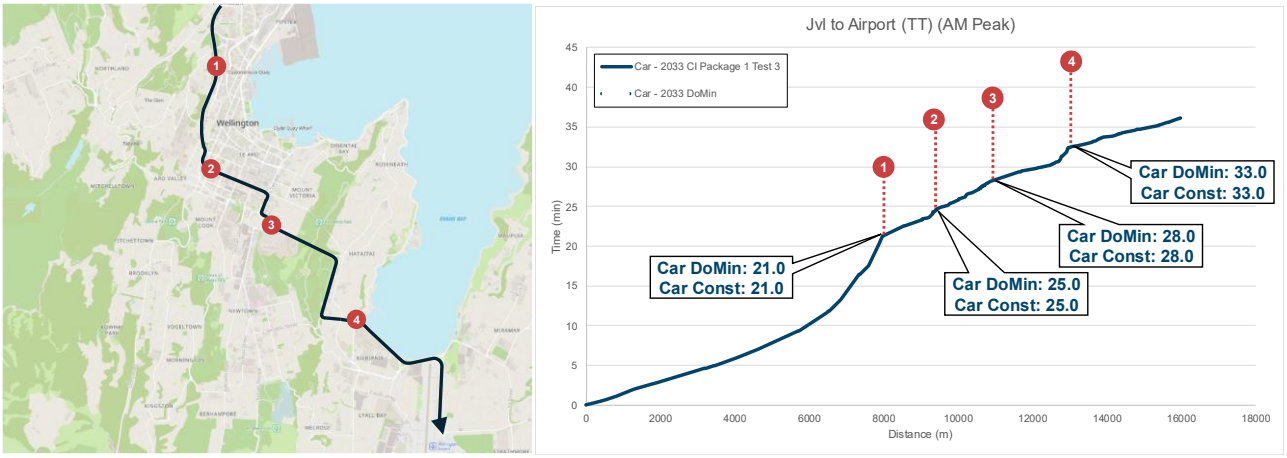


Figure 22 – Change in journey time for general traffic travelling between Johnsonville and the airport (via Terrace Tunnel) in the eastbound direction (AM peak)

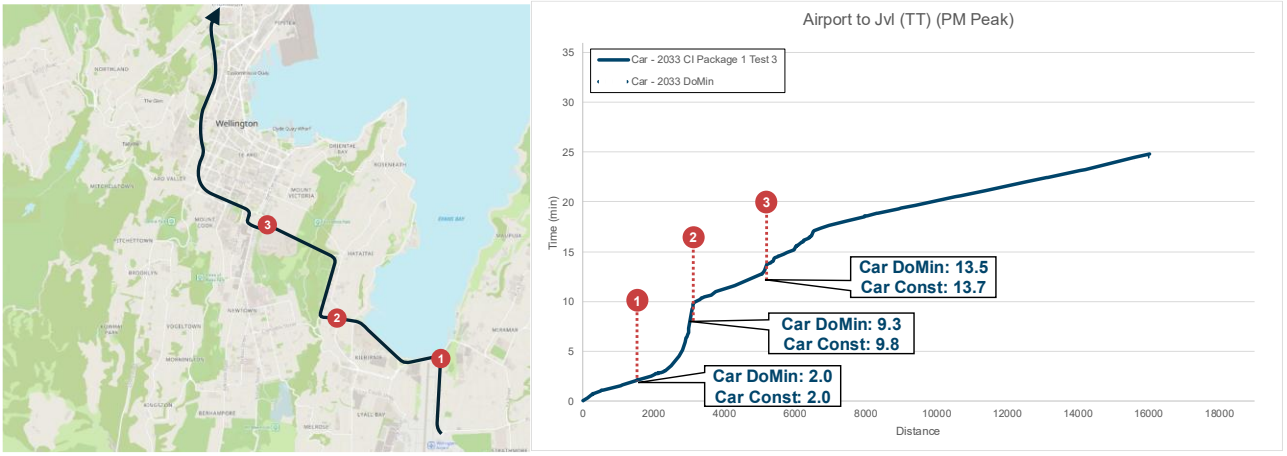


Figure 23 – Change in journey time for general traffic travelling between Johnsonville and the airport (via Terrace Tunnel) in the westbound direction (PM peak)

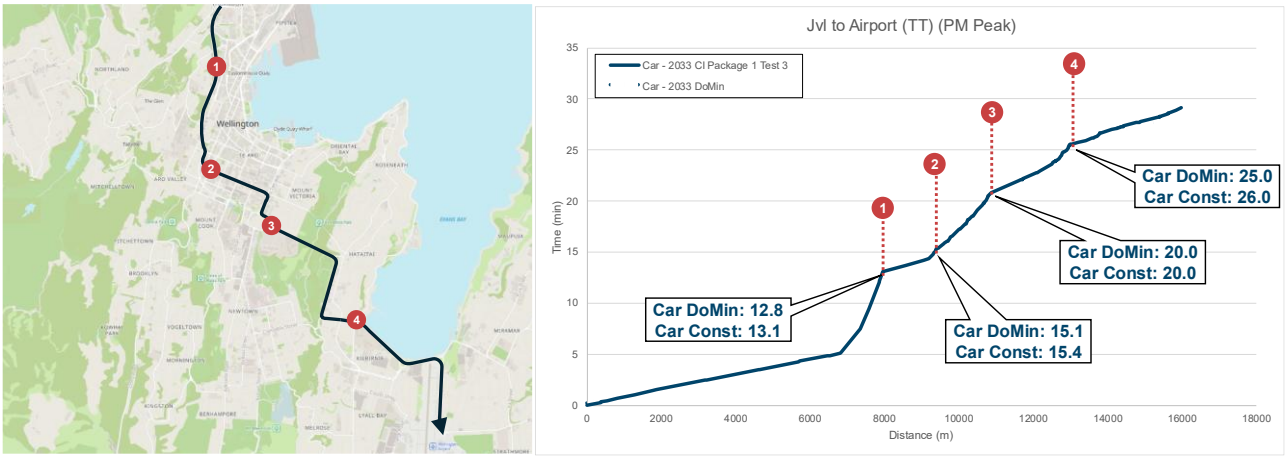


Figure 24 – Change in journey time for general traffic travelling between Johnsonville and the airport (via Terrace Tunnel) in the eastbound direction (AM peak)

Package 2 - Te Aro

Test C – Speed reduction to 30 km/h along Karo Drive and Vivian Street between Victoria Street and the Terrace Tunnel

11. In Table 4Table 2, I present the change in journey times for the bus routes and general traffic routes assessed. The subsequent sections provide a more detailed view of the routes primarily affected by test C.

Table 4: Changes in journey time as a result of Test C

Route		AM peak			PM peak		
		Do Min (minutes)	Const. (minutes)	Difference (minutes)	Do Min (minutes)	Constr. (minutes)	Difference (minutes)
Bus route 1 Island Bay to Crtny Pl	Car	16	18	+2	15	17	+2
	Bus	23	25	+2	23	25	+2
Bus route 1 Crtny Pl to Island Bay	Car	13	13	No change	14	14	No change
	Bus	23	23	No change	23	22	-1
Bus route 2 Miramar to Courtenay Pl (via Kilbirnie and tunnel)	Bus	24	22	-2	22	23	+1
Bus route 2 Courtenay Pl to Miramar (via Kilbirnie and tunnel)	Bus	30	36	+6	21	20	-1
Bus route 3 Kilbirnie to Manners	Car	32	33	+1	22	23	+1
	Bus	46	45	-1	34	35	+1
Bus route 3 Manners to Kilbirnie	Car	17	16	-1	20	21	+1
	Bus	28	26	-2	32	34	+2
Bus route 7 Brooklyn to Manners St	Bus	11.5	11	-0.5	14.2	13.4	-0.8
Bus route 7 Manners St to Brooklyn	Bus	12	14	+2	12.1	11.7	-0.4
Bus route 14 Kilbirnie to Wilton	Bus	67	66	-1	67	67	No change
Bus route 14 Wilton to Kilbirnie	Bus	86	89	+3	66	66	No change
Bus route 18 Webb St to Victoria Uni	Car	9	11	+2	8	8	+0.3
	Bus	13	15	+2	13	12.5	-0.2
Bus route 18 Victoria Uni to Webb St	Car	16	15	-1	13	15	+2
	Bus	18.5	18	-0.5	16	19	+3
Bus route 24 Miramar to Ctny Pl (via Kilbirnie & bays)	Car	20	21	+1	26	24	-2
Bus route 24 Ctny Pl to Mirarmar (via Kilbirnie & bays)	Car	18	18.5	+0.5	58	47	-11
Bus route 31x Miramar to Ctny Pl Express (via tunnel)	Bus	23	20	-3	24	25	+1
Bus route 31x Ctny Pl to Mirarmar Express (via tunnel)	Bus	37	33	-4	17	17	No change
AX Airport Express Airport to Courtenay	Bus	23	21	-2	21	22	+1
AX Airport Express Courtenay to Airport	Bus	38	35	-3	19	19	No change
General traffic Airport to Jvl (Quays)	Car	33	31	-2	29	32	+3

Route		AM peak			PM peak		
		Do Min (minutes)	Const. (minutes)	Difference (minutes)	Do Min (minutes)	Constr. (minutes)	Difference (minutes)
General traffic Jvl to Airport (Quays)	Car	40	40	No Change	28	30	+2
General traffic Airport to Jvl (TT)	Car	32	30	-2	25	29	+4
General traffic Jvl to Airport (TT)	Car	36	40	+4	29	29	No Change

Bus route 7 – Brooklyn ←→ Manners Street

12. Figure 25, Figure 26, Figure 27 and Figure 28 provide a more detailed view of the bus route 7.

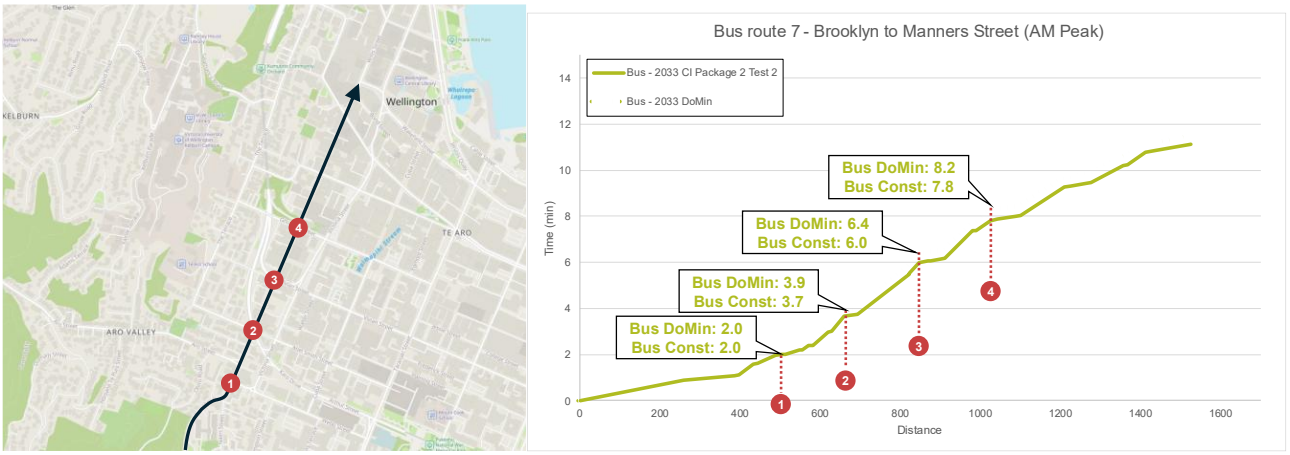


Figure 25 – Change in journey time for bus route 7 in the northbound direction (AM peak)

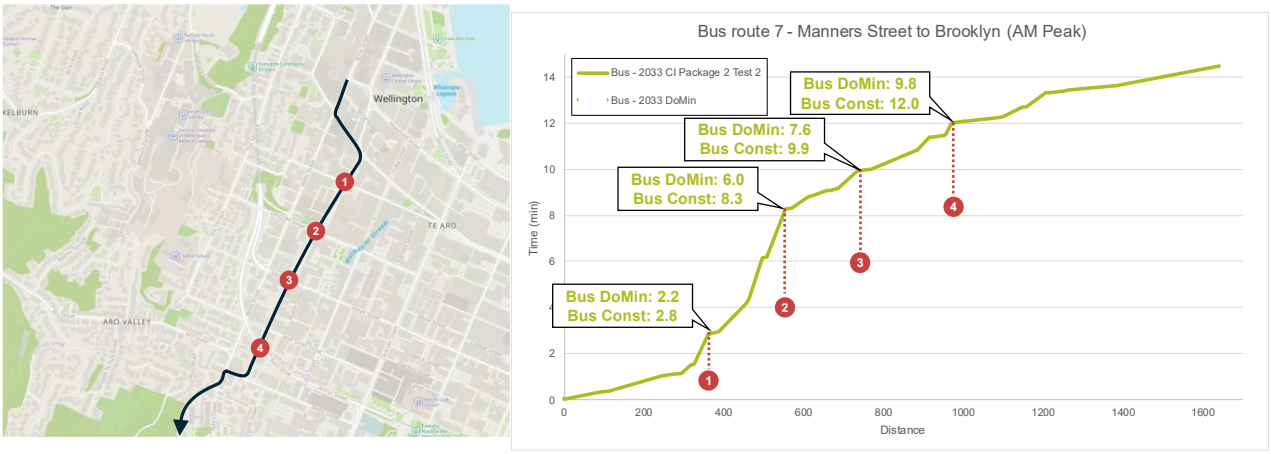


Figure 26 – Change in journey time for bus route 7 in the southbound direction (AM peak)

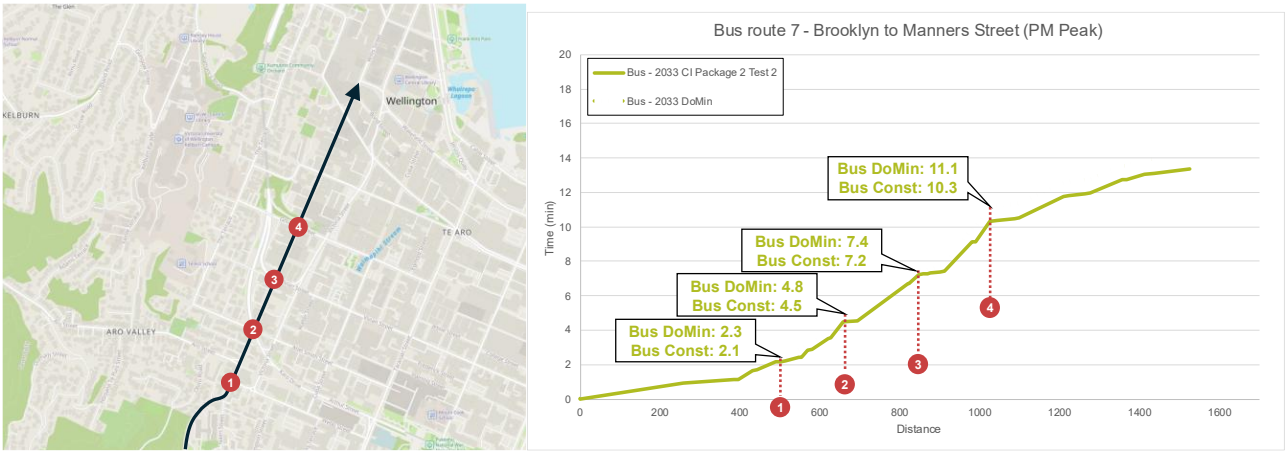


Figure 27 – Change in journey time for bus route 7 in the northbound direction (PM peak)

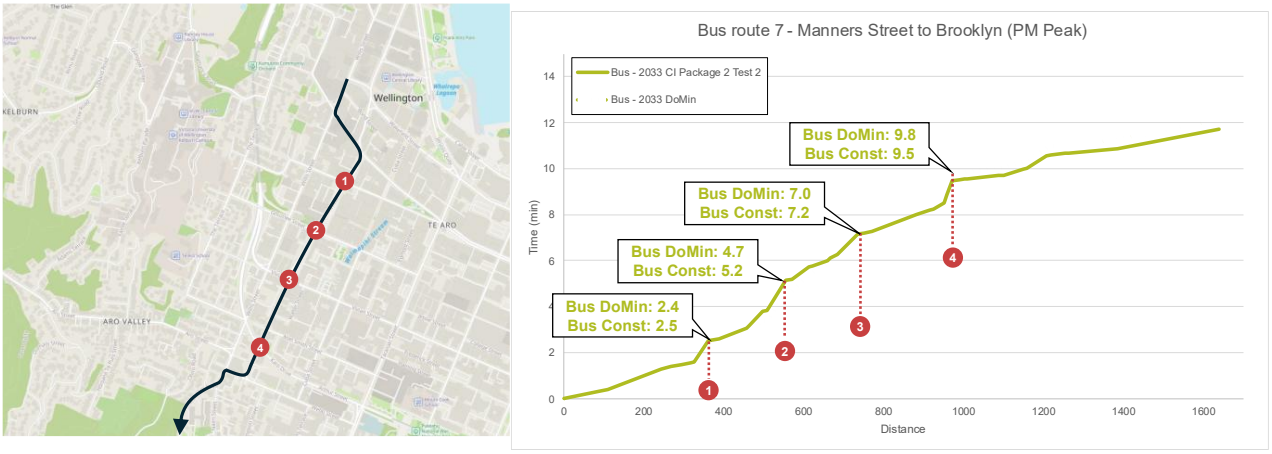


Figure 28 – Change in journey time for bus route 7 in the southbound direction (PM peak)

Bus route 18 – Webb St ←→ Victoria University

13. Figure 29, Figure 30, Figure 31 and Figure 32 provide a more detailed view of the bus route 18.

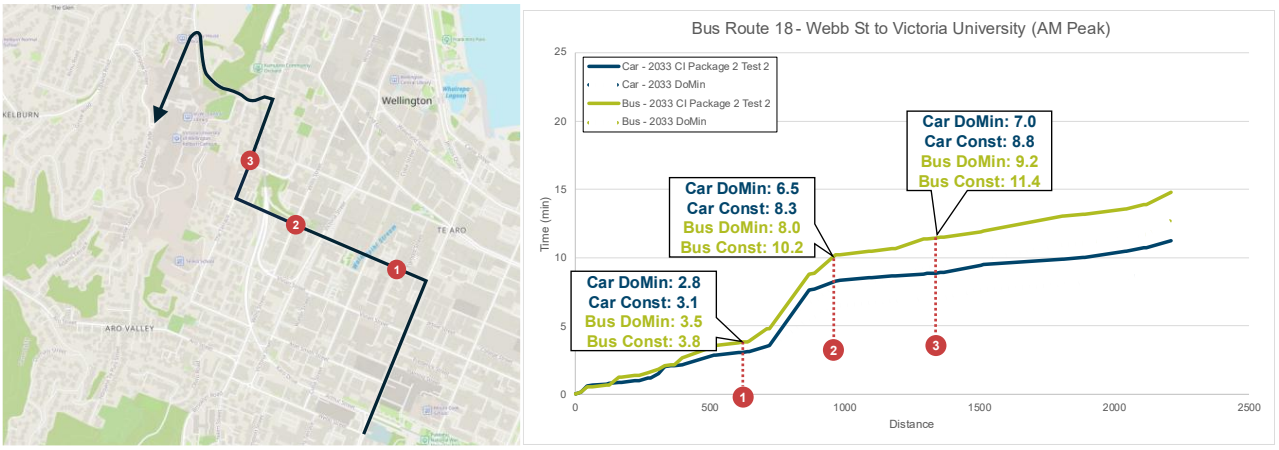


Figure 29 – Change in journey time for bus route 18 in the westbound direction (AM peak)

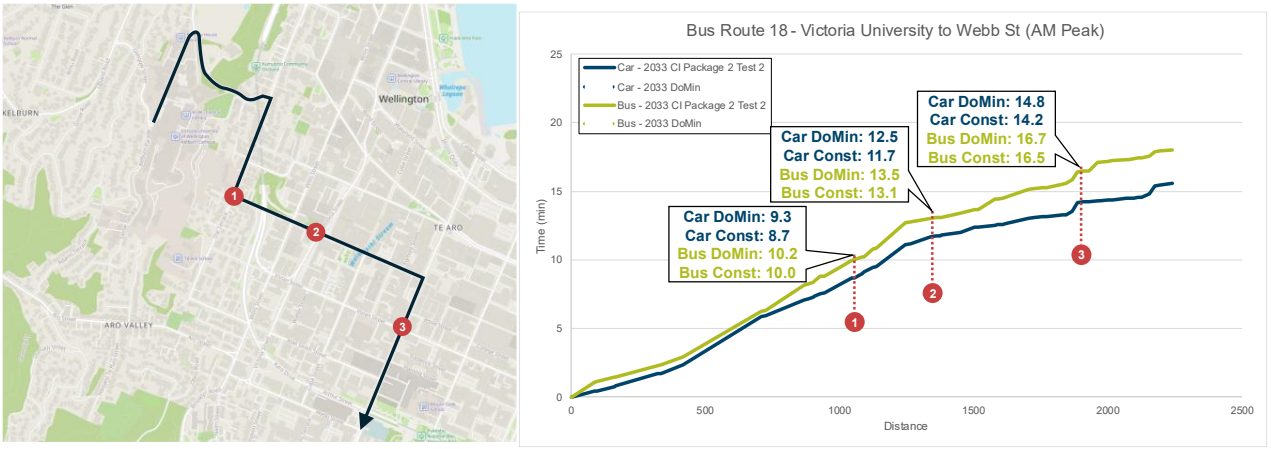


Figure 30 – Change in journey time for bus route 18 in the eastbound direction (AM peak)

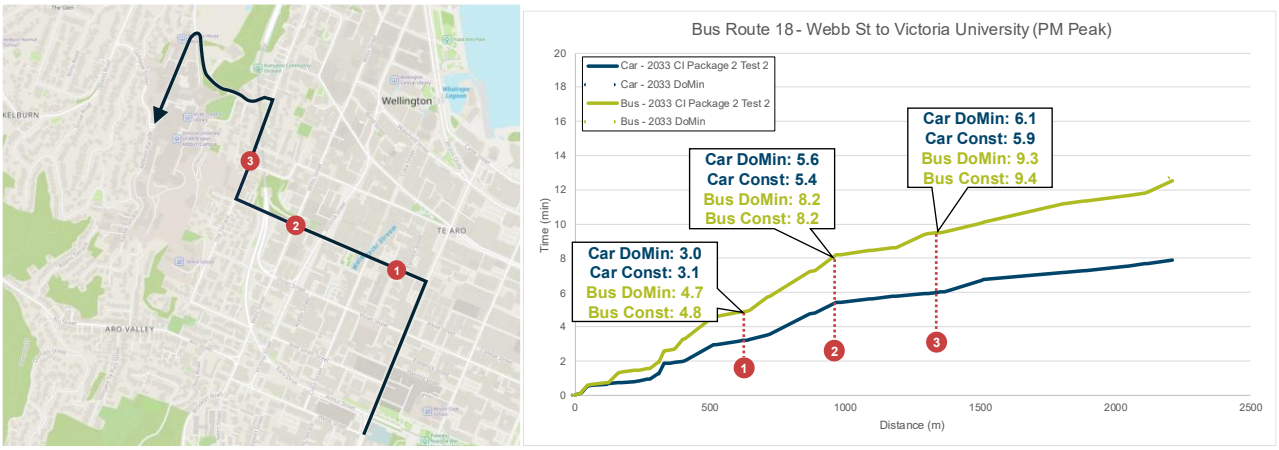


Figure 31 – Change in journey time for bus route 18 in the westbound direction (PM peak)

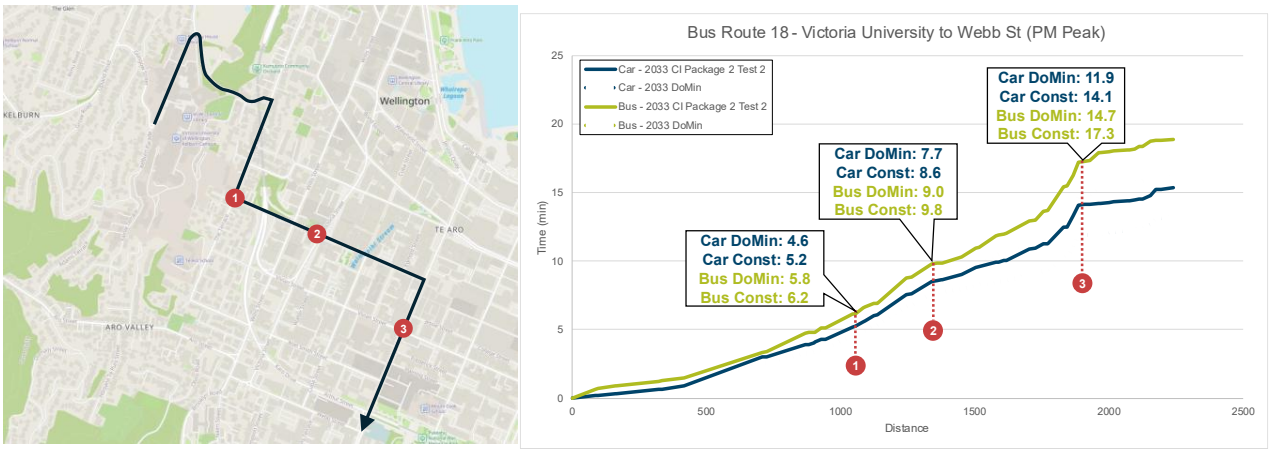


Figure 32 – Change in journey time for bus route 18 in the eastbound direction (PM peak)

General traffic – Ngauranga ←→ Hospital

14. Figure 33, Figure 34, Figure 35 and Figure 36 provide a more detailed view of general traffic travelling between the Ngauranga and the hospital.

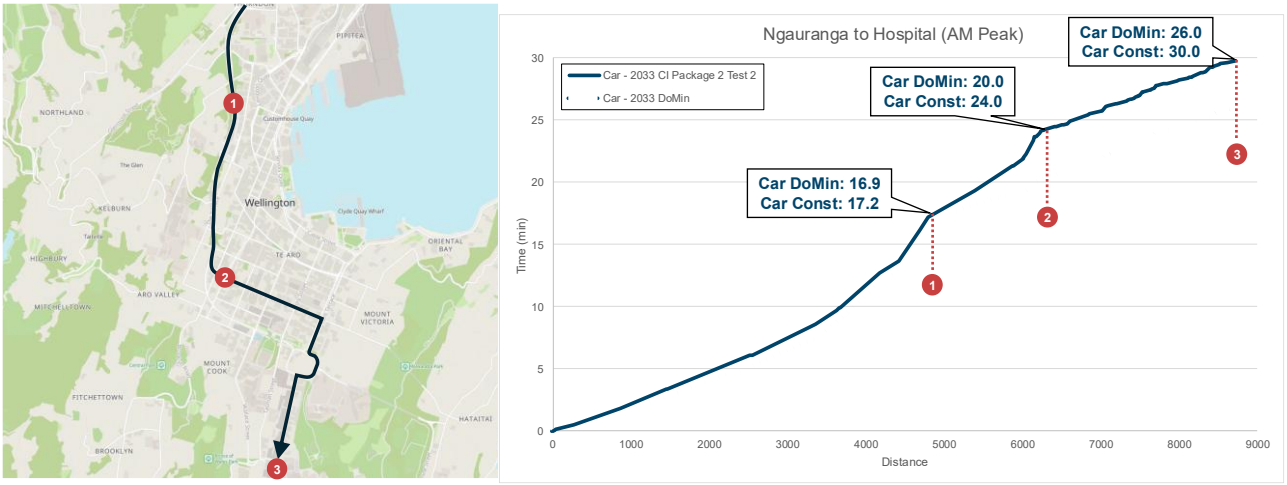


Figure 33 – Change in journey time for general traffic travelling between Ngauranga and the hospital in the southbound direction (AM peak)

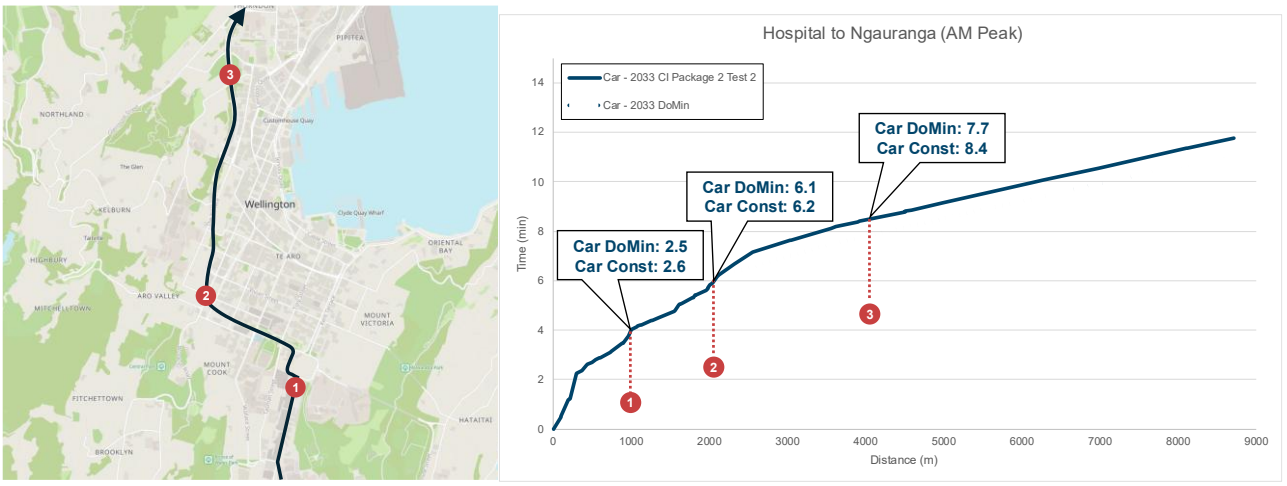


Figure 34 – Change in journey time for general traffic travelling between Ngauranga and the hospital in the northbound direction (AM peak)

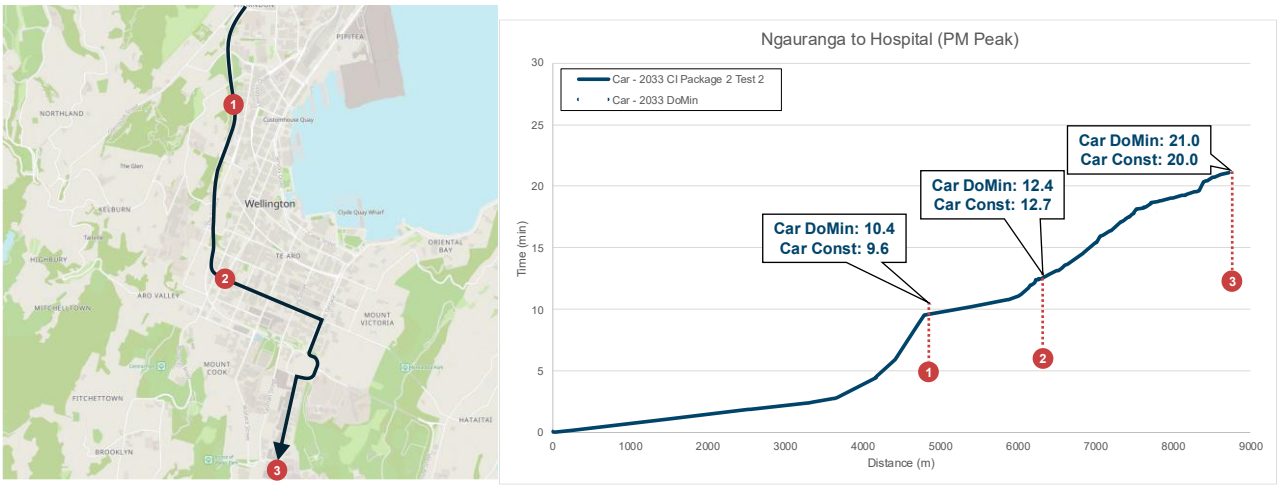


Figure 35 – Change in journey time for general traffic travelling between Ngauranga and the hospital in the southbound direction (PM peak)

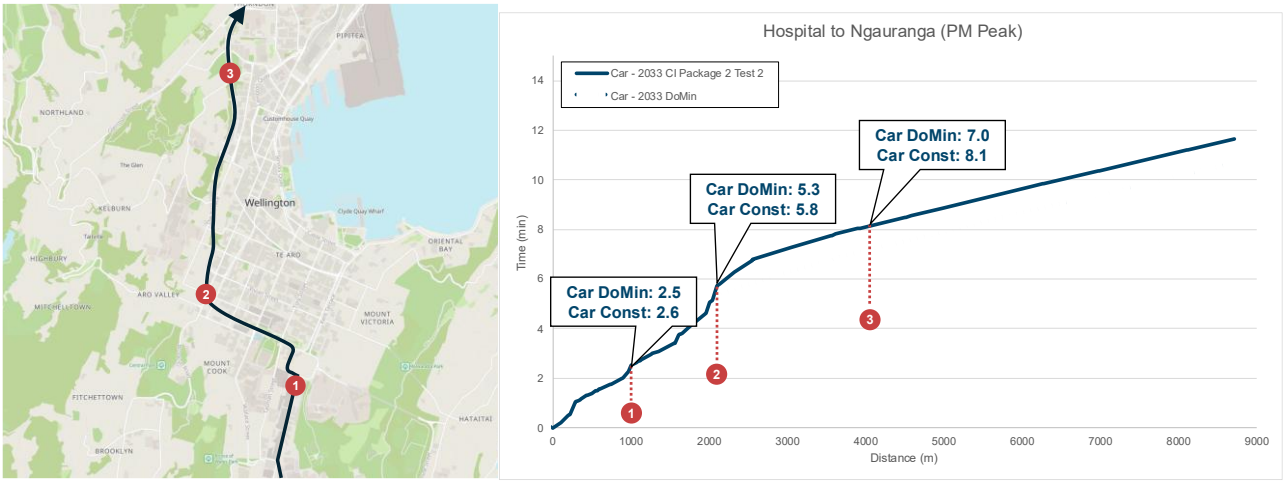


Figure 36 – Change in journey time for general traffic travelling between Ngauranga and the hospital in the northbound direction (PM peak)

General traffic – Airport ←→ Jvl (via Quays)

15. Figure 37, Figure 38, Figure 39 and Figure 40 provide a more detailed view of general traffic travelling between the airport and Johnsonville via the Quays.

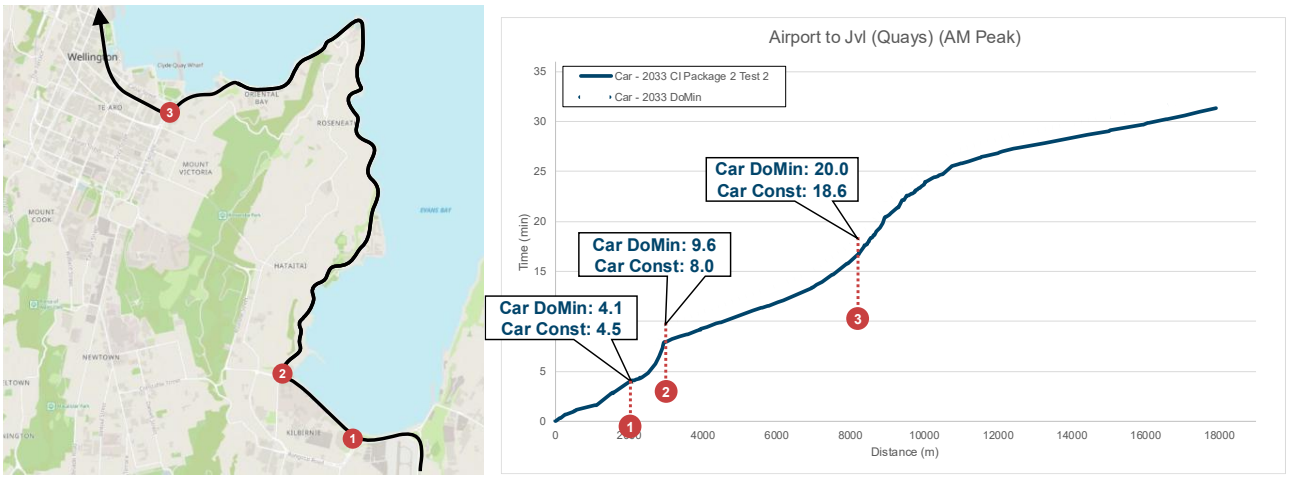


Figure 37 – Change in journey time for general traffic travelling between Johnsonville and the airport (via the quays) in the westbound direction (AM peak)

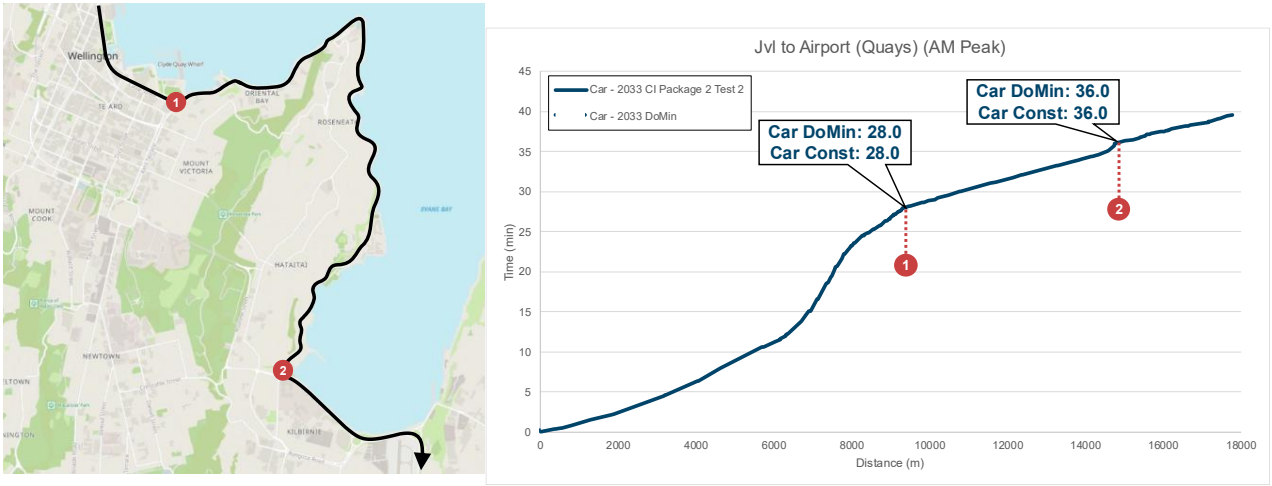


Figure 38 – Change in journey time for general traffic travelling between Johnsonville and the airport (via the quays) in the eastbound direction (AM peak)

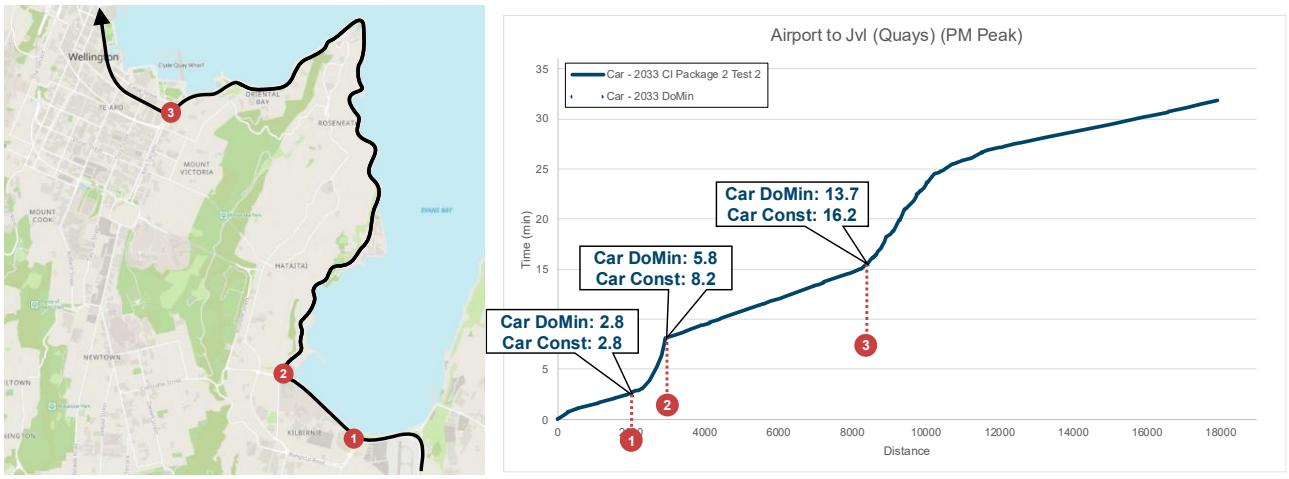


Figure 39 – Change in journey time for general traffic travelling between Johnsonville and the airport (via the quays) in the westbound direction (PM peak)

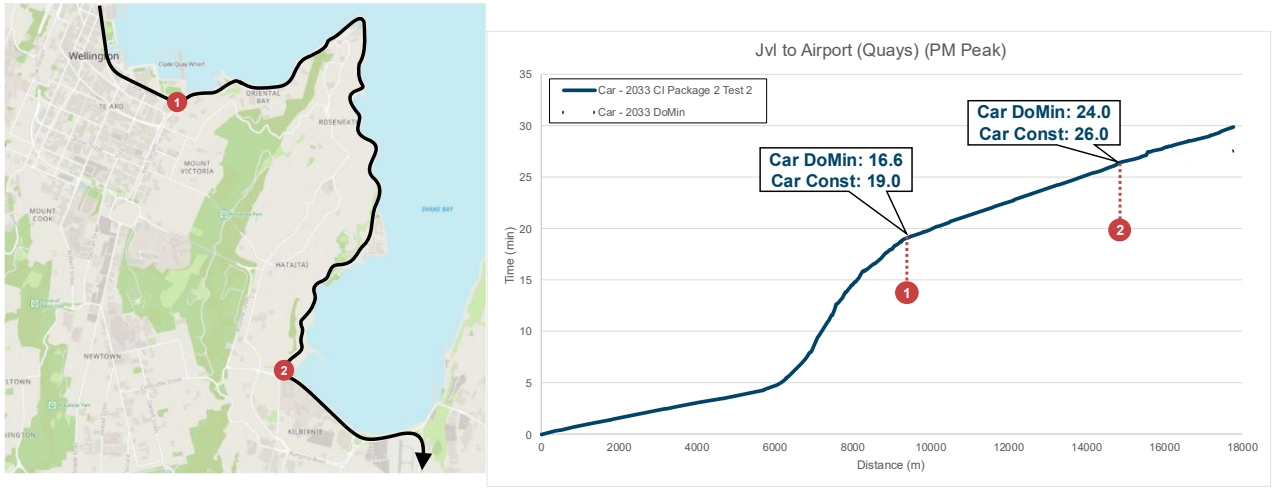


Figure 40 – Change in journey time for general traffic travelling between Johnsonville and the airport (via the quays) in the eastbound direction (PM peak)

General traffic – Airport ←→ Jvl (via Terrace Tunnel)

16. Figure 41, Figure 42, Figure 43 and Figure 44 provide a more detailed view of general traffic travelling between the airport and Johnsonville via the Terrace Tunnel.

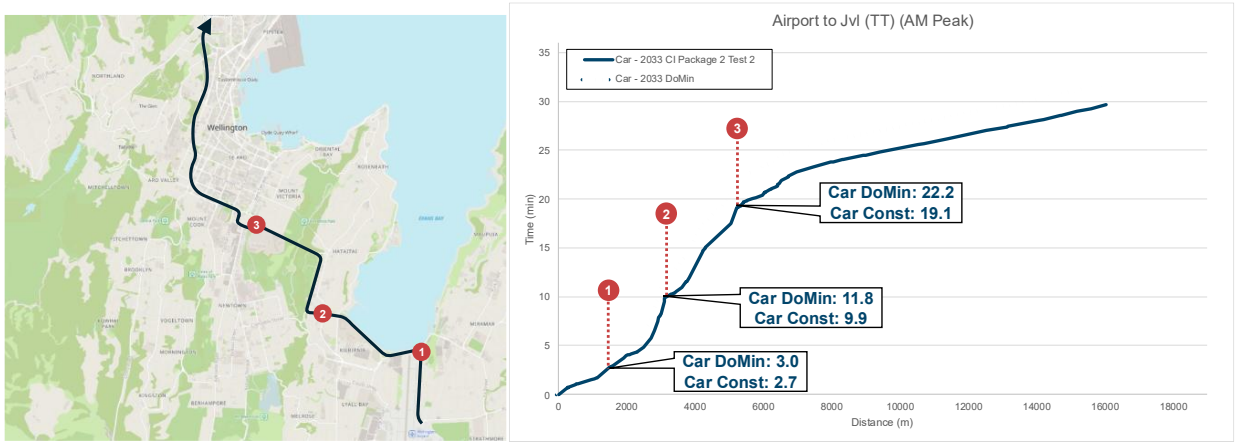


Figure 41 – Change in journey time for general traffic travelling between Johnsonville and the airport (via Terrace Tunnel) in the westbound direction (AM peak)

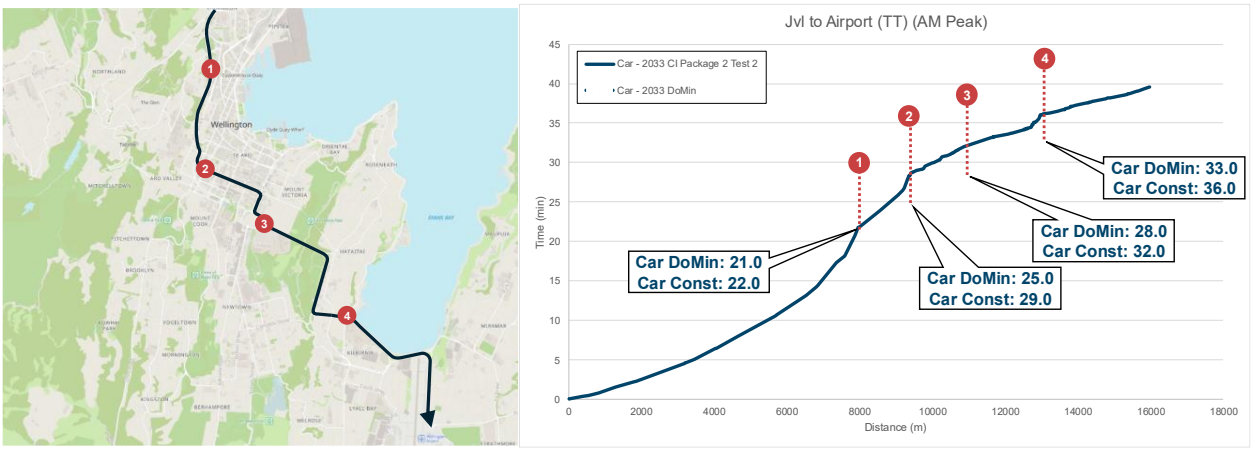


Figure 42 – Change in journey time for general traffic travelling between Johnsonville and the airport (via Terrace Tunnel) in the eastbound direction (AM peak)

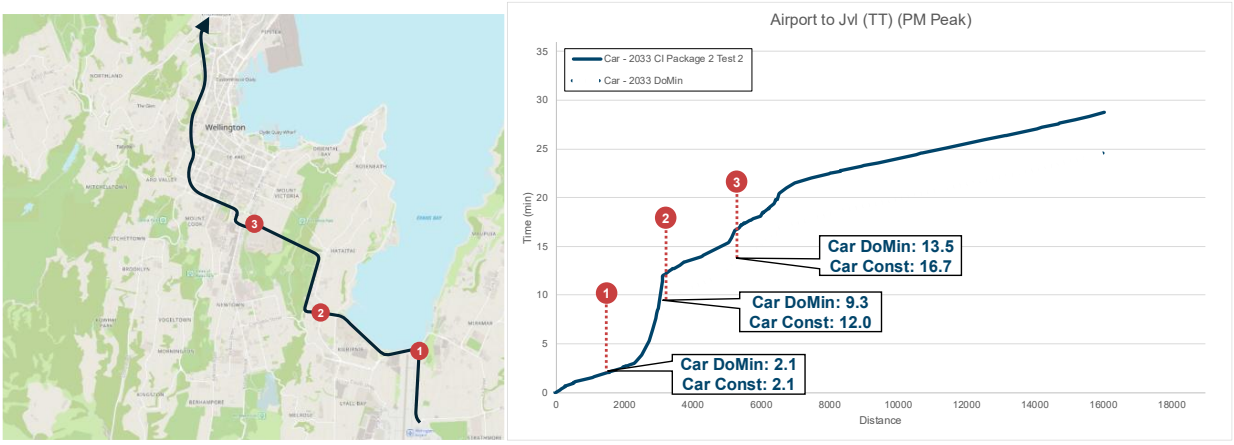


Figure 43 – Change in journey time for general traffic travelling between Johnsonville and the airport (via Terrace Tunnel) in the westbound direction (PM peak)

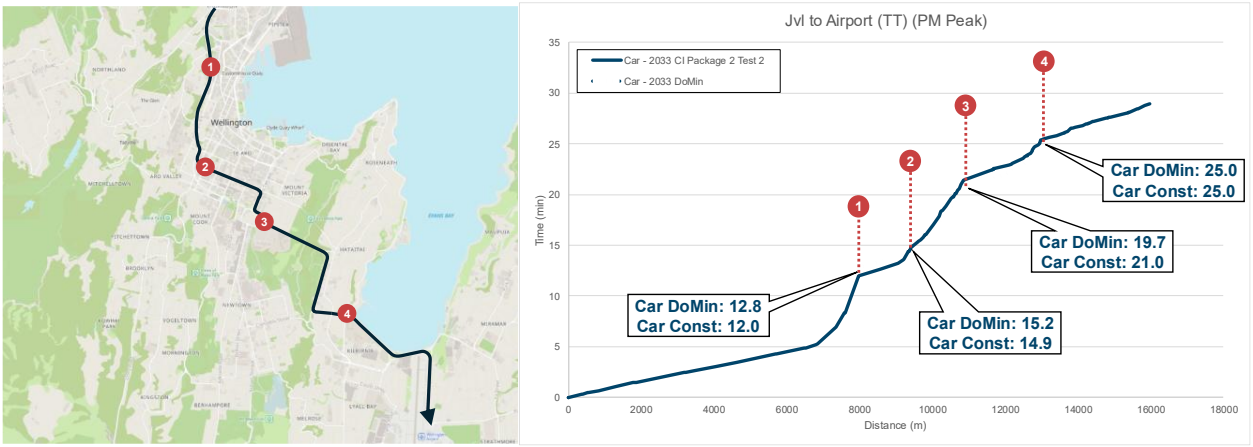


Figure 44 – Change in journey time for general traffic travelling between Johnsonville and the airport (via Terrace Tunnel) in the eastbound direction (PM peak)

Package 3 - Basin Reserve

Test D – stage 3 construction (diversion of traffic on Sussex St and restricted access via Ellice St and Hania St)

17. In Table 5Table 2, I present the change in journey times for the bus routes and general traffic routes assessed. The subsequent sections provide a more detailed view of the routes primarily affected by test D.

Table 5: Changes in journey time as a result of Test D

Route		AM peak			PM peak		
		Do Min (minutes)	Const. (minutes)	Difference (minutes)	Do Min (minutes)	Constr. (minutes)	Difference (minutes)
Bus route 1 Island Bay to Crtny Pl	Car	16	17	+1	15	15	+0.1
	Bus	23	24	+1	23	24	+1
Bus route 1 Crtny Pl to Island Bay	Car	13	13.5	+0.5	14	15	+1
	Bus	23	24	+1	23	23	No change
Bus route 2 Miramar to Courtenay Pl (via Kilbirnie and tunnel)	Bus	24	25	+1	22	24	+2
Bus route 2 Courtenay Pl to Miramar (via Kilbirnie and tunnel)	Bus	30	30	No change	21	20	-1
Bus route 3 Kilbirnie to Manners	Car	25	29	+4	17	20	+3
	Bus	36	39	+3	28	32	+4
Bus route 3 Manners to Kilbirnie	Car	14	14	+0.5	17	16	-1
	Bus	21	22	+1	25	25	No change
Bus route 7 Brooklyn to Manners St	Bus	11.5	11	-0.5	14	14	+0.1
Bus route 7 Manners St to Brooklyn	Bus	12	16	+4	12	12	-0.5
Bus route 14 Kilbirnie to Wilton	Bus	67	71	+4	67	66	-1
Bus route 18 Webb St to Victoria Uni	Car	9	10	+1	8	8	No change
	Bus	13	14	+1	13	12	-1
Bus route 18 Victoria Uni to Webb St	Car	16	17	+1	13	13	+0.1
	Bus	19	19	+0.5	16	17	+1
Bus route 24 Miramar to Ctny Pl (via Kilbirnie & bays)	Car	19.5	19	-0.2	26	28	+2
Bus route 24 Ctny Pl to Mirarmar (via Kilbirnie & bays)	Car	18	18.5	+0.5	58	41	-17
Bus route 31x Miramar to Ctny Pl Express (via tunnel)	Bus	23	24	+1	24	28	+4
Bus route 31x Ctny Pl to Mirarmar Express (via tunnel)	Bus	37	27	-10	17	17	-0.5
AX Airport Express Airport to Courtenay	Bus	23	23	No change	21	23	+2
AX Airport Express Courtenay to Airport	Bus	38	29	-9	19	19	-0.5
General traffic Airport to Jvl (Quays)	Car	33	36	+3	29	29	No change
General traffic Jvl to Airport (Quays)	Car	40	43	+3	28	29	+1

Route		AM peak			PM peak		
		Do Min (minutes)	Const. (minutes)	Difference (minutes)	Do Min (minutes)	Constr. (minutes)	Difference (minutes)
General traffic Airport to Jvl (TT)	Car	32	36	+4	25	25	No change
General traffic Jvl to Airport (TT)	Car	36	36	No change	29	30	+1
General traffic Rintoul Rd to Ctny Pl	Car	8	9	+1.5	7	7	No change
General traffic Ctny Pl to Rintoul Rd	Car	6	6	+0.5	7	8	+1

Bus route 1 – Island Bay ←→ Courtenay Place

18. Figure 45, Figure 46, Figure 47 and Figure 48 provide a more detailed view of the bus route 1.

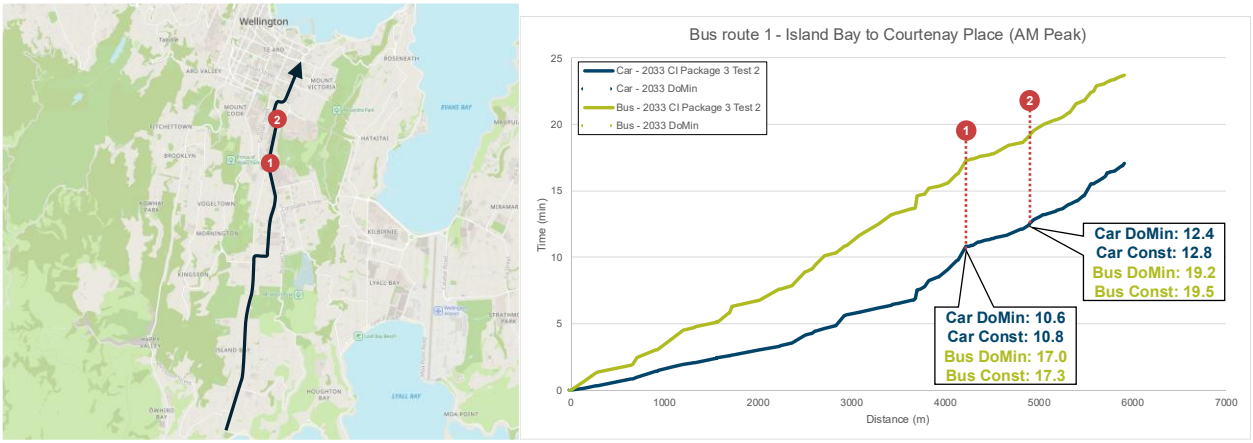


Figure 45 – Change in journey time for bus route 1 in the northbound direction (AM peak)

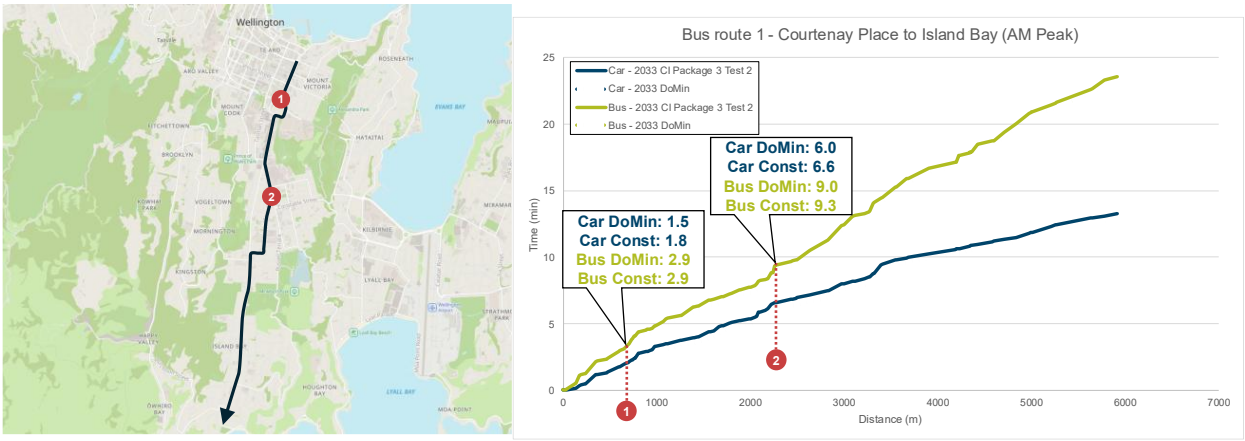


Figure 46 – Change in journey time for bus route 1 in the southbound direction (AM peak)

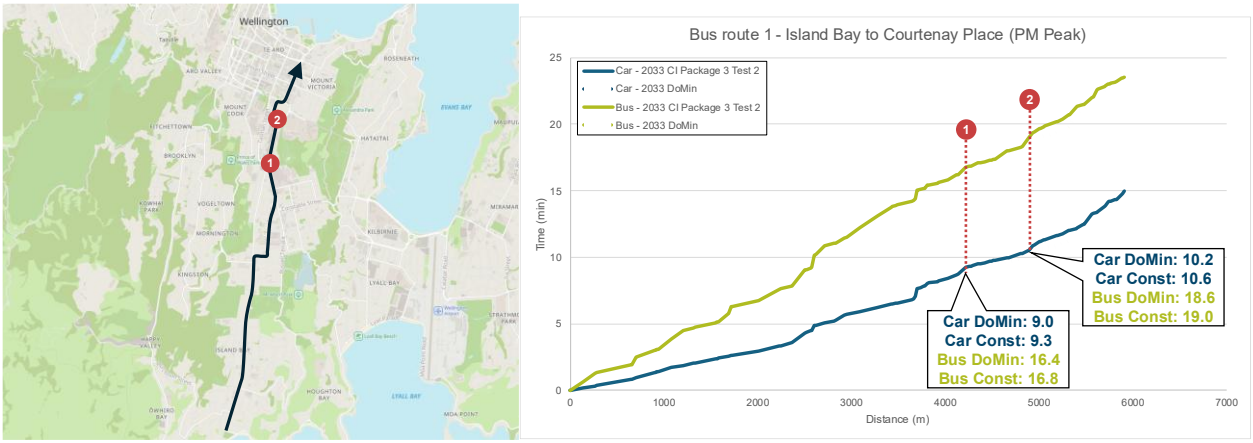


Figure 47 – Change in journey time for bus route 1 in the northbound direction (PM peak)

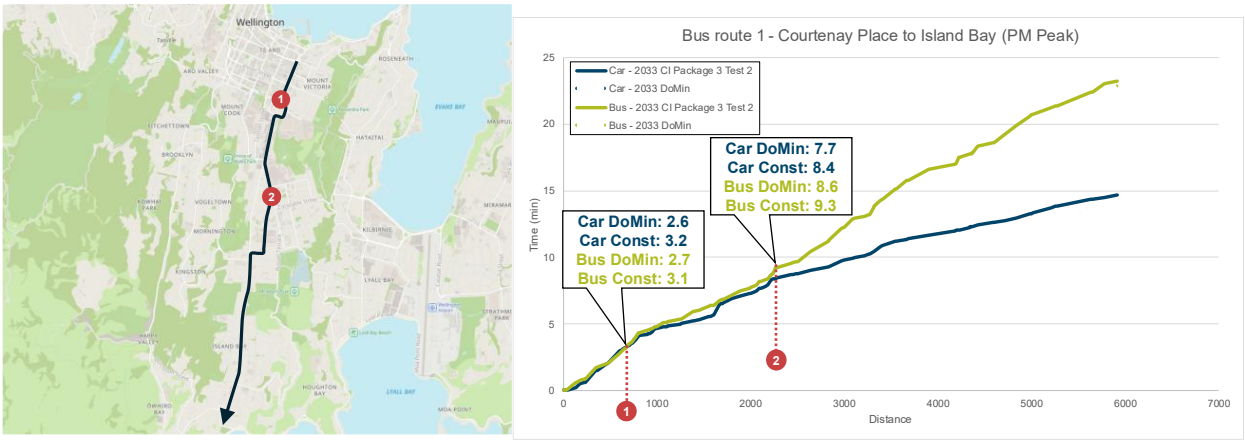


Figure 48 – Change in journey time for bus route 1 in the southbound direction (PM peak)

Bus route 3 – Kilbirnie ←→ Manners Street

19. Figure 49, Figure 50, Figure 51 and Figure 52 provide a more detailed view of the bus route 3.

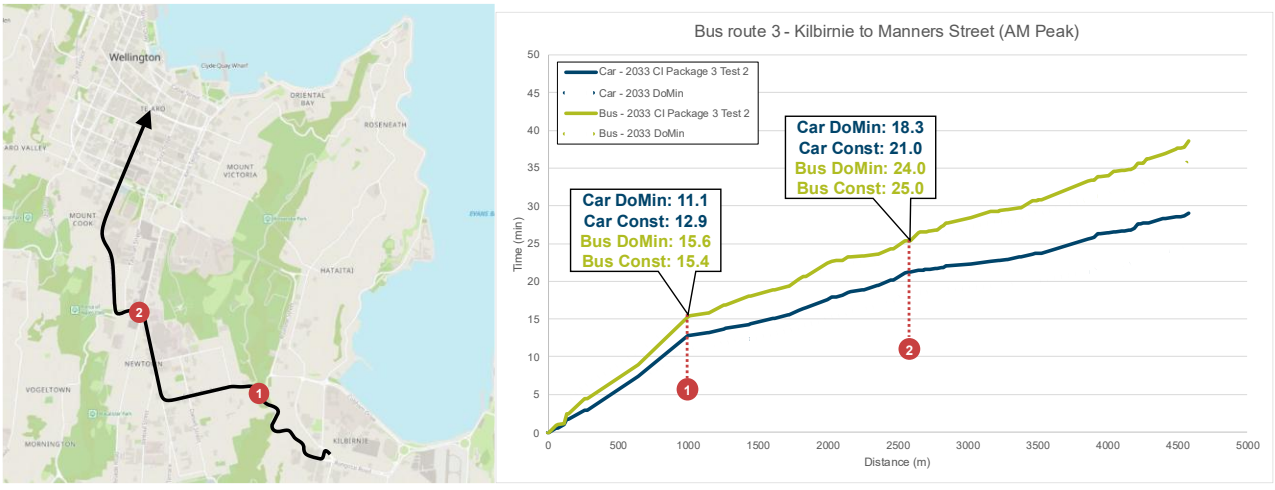


Figure 49 – Change in journey time for bus route 3 in the northbound direction (AM peak)

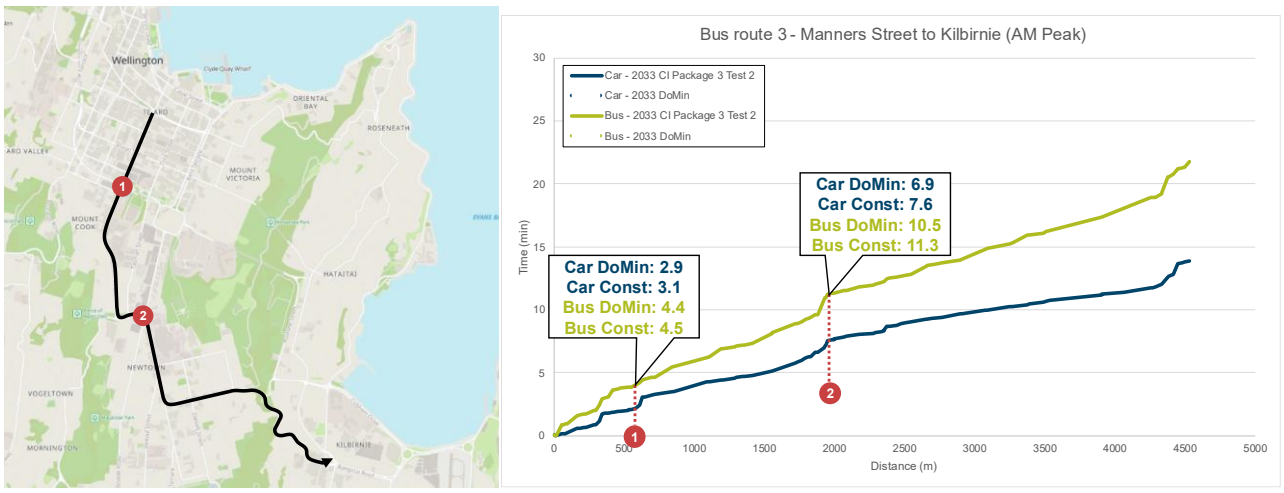


Figure 50 – Change in journey time for bus route 3 in the southbound direction (AM peak)

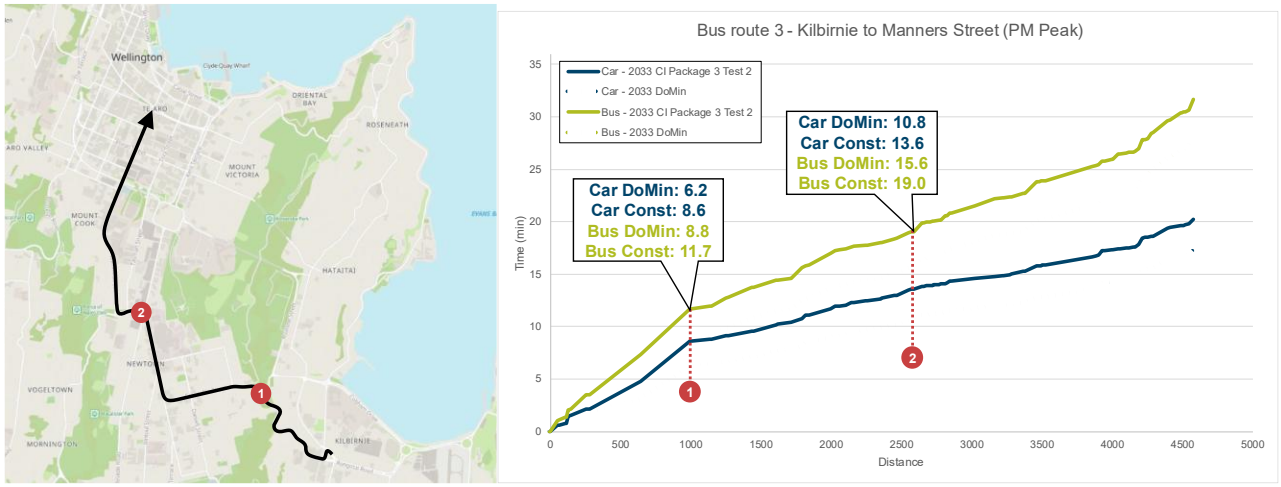


Figure 51 – Change in journey time for bus route 3 in the northbound direction (PM peak)

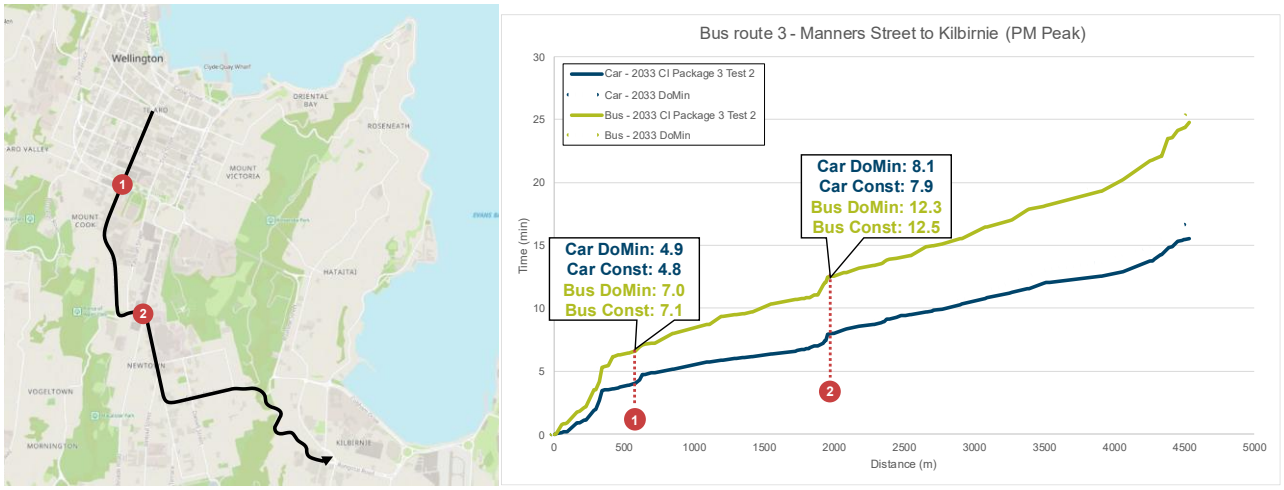


Figure 52 – Change in journey time for bus route 3 in the southbound direction (PM peak)

General traffic – Airport ←→ Jvl (via Quays)

20. Figure 53, Figure 54, Figure 55 and Figure 56 provide a more detailed view of general traffic travelling between the airport and Johnsonville via the Quays.

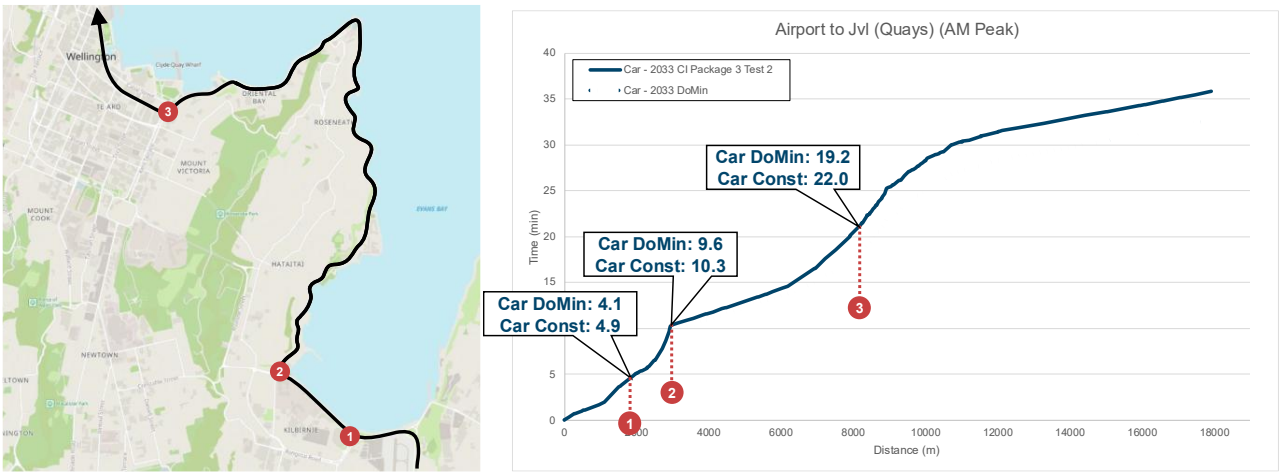


Figure 53 – Change in journey time for general traffic travelling between Johnsonville and the airport (via the quays) in the westbound direction (AM peak)

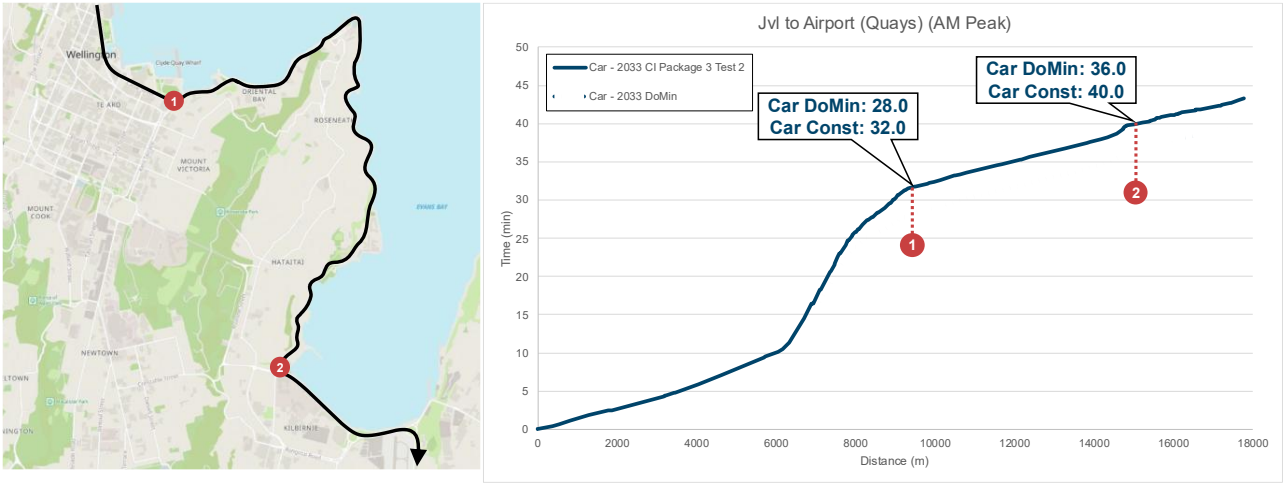


Figure 54 – Change in journey time for general traffic travelling between Johnsonville and the airport (via the quays) in the eastbound direction (AM peak)

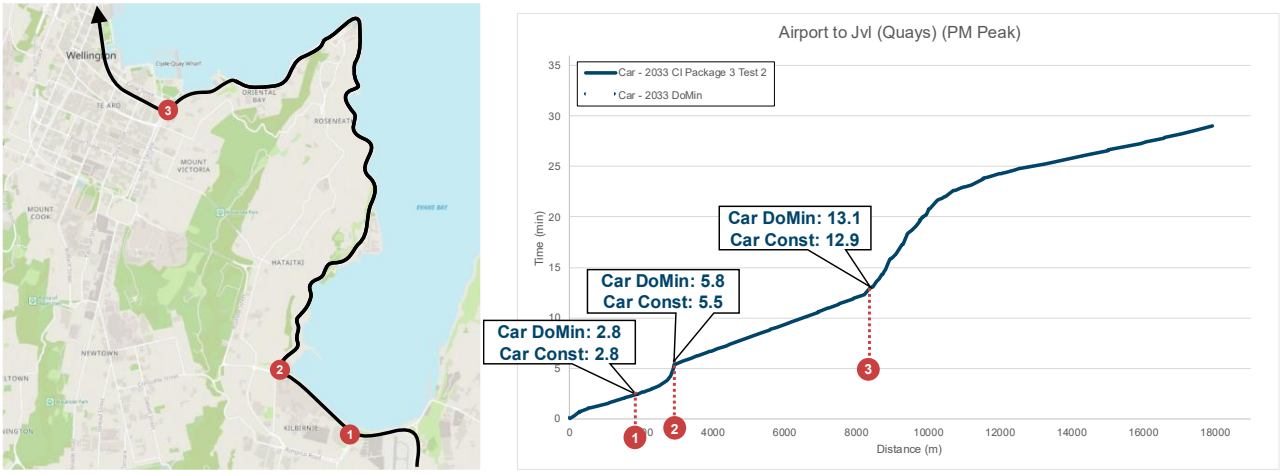


Figure 55 – Change in journey time for general traffic travelling between Johnsonville and the airport (via the quays) in the westbound direction (PM peak)

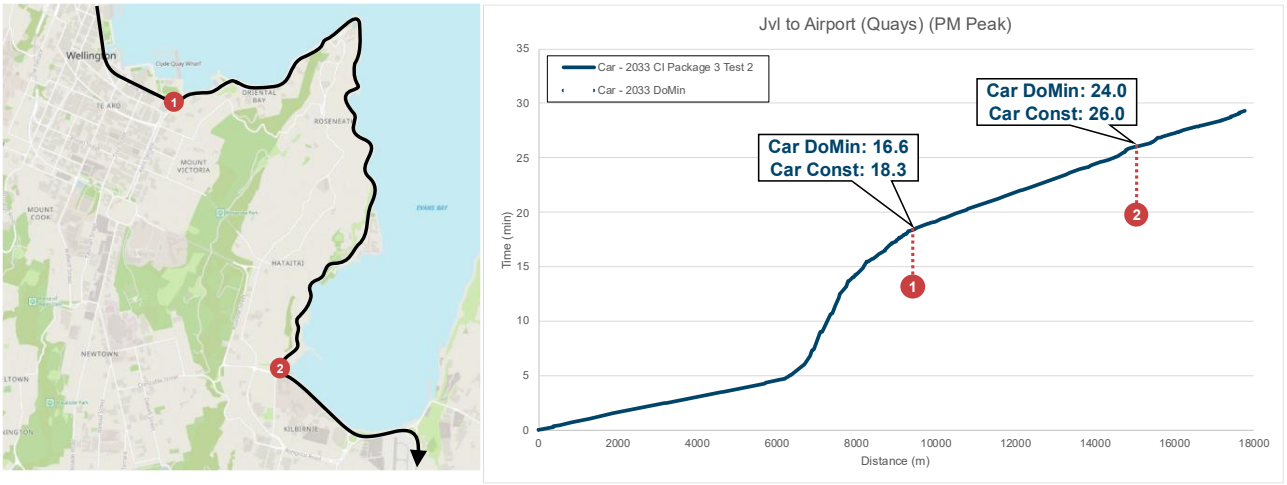


Figure 56 – Change in journey time for general traffic travelling between Johnsonville and the airport (via the quays) in the eastbound direction (PM peak)

General traffic – Airport ←→ Jvl (via Terrace Tunnel)

21. Figure 57, Figure 58, Figure 59 and Figure 60 provide a more detailed view of general traffic travelling between the airport and Johnsonville via the Terrace Tunnel.

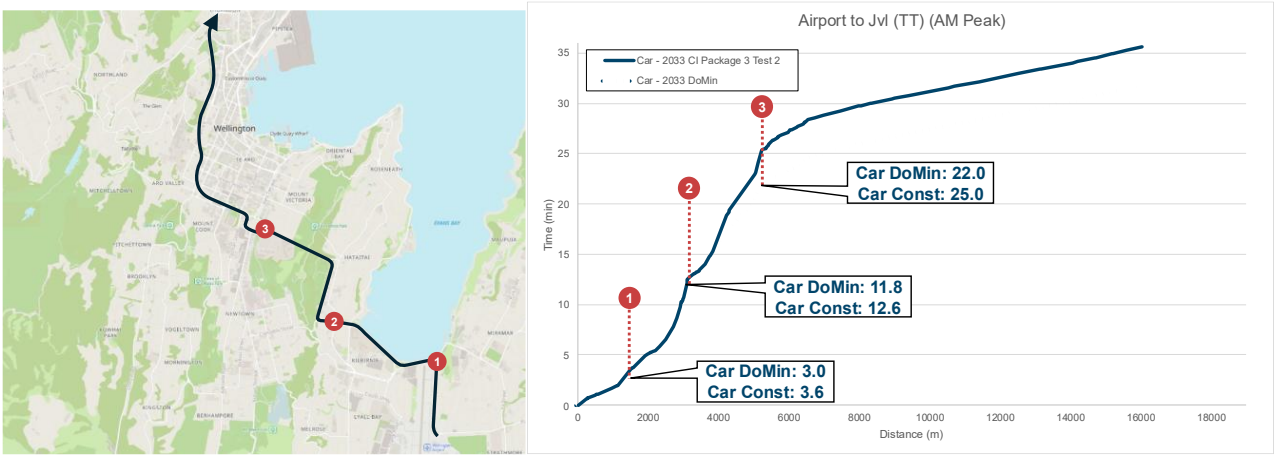


Figure 57 – Change in journey time for general traffic travelling between Johnsonville and the airport (via Terrace Tunnel) in the westbound direction (AM peak)

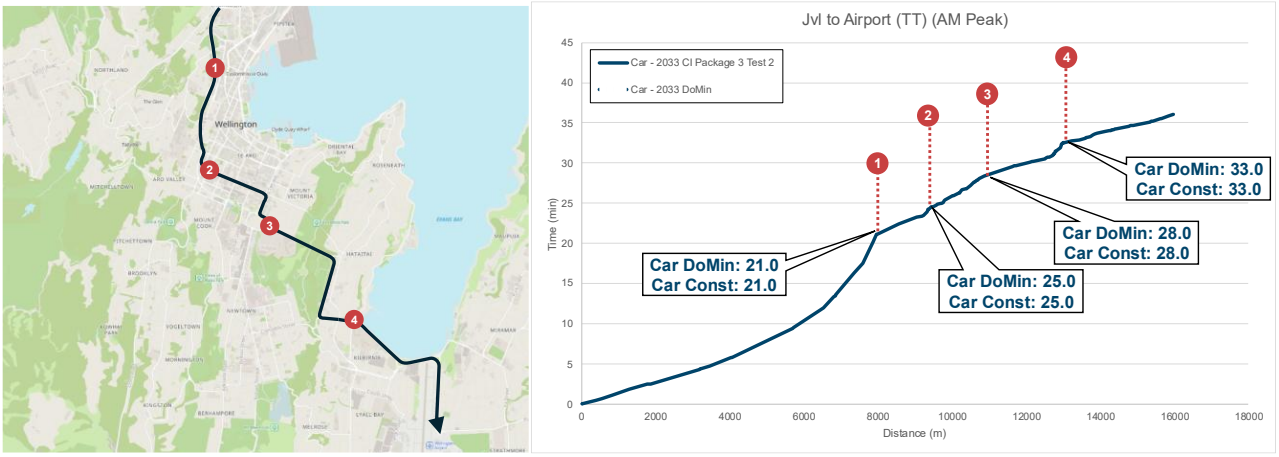


Figure 58 – Change in journey time for general traffic travelling between Johnsonville and the airport (via Terrace Tunnel) in the eastbound direction (AM peak)

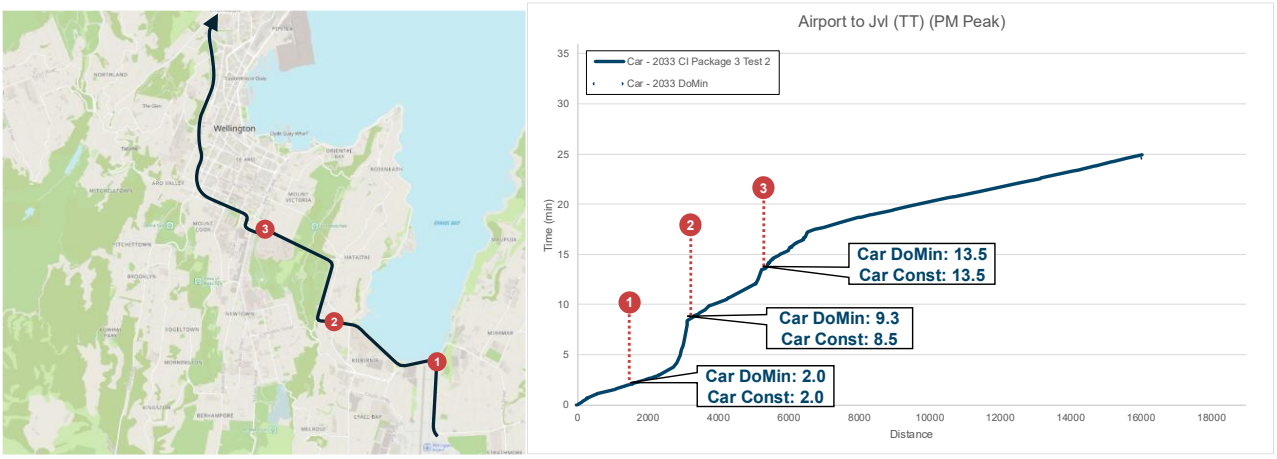


Figure 59 – Change in journey time for general traffic travelling between Johnsonville and the airport (via Terrace Tunnel) in the westbound direction (PM peak)

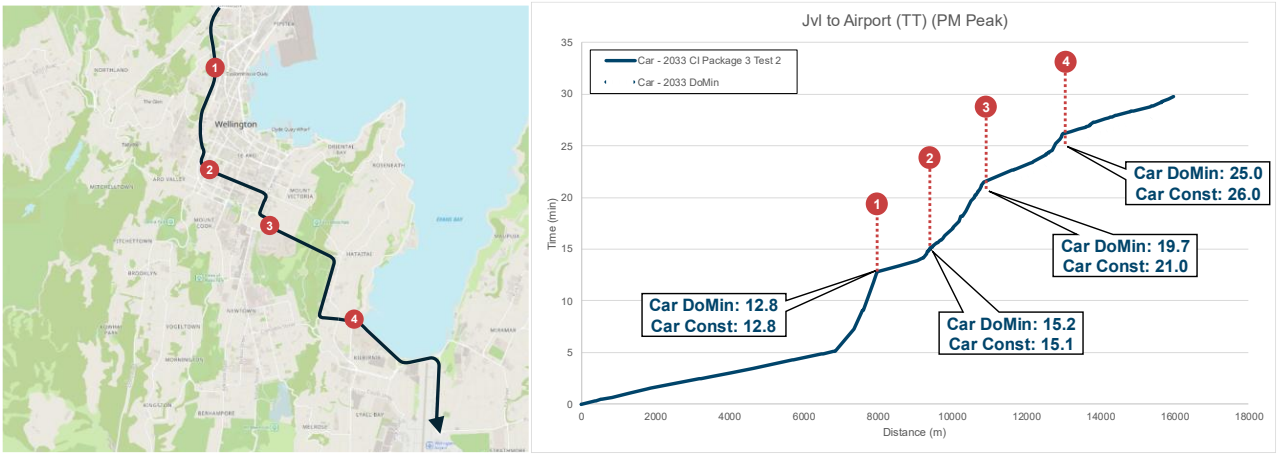


Figure 60 – Change in journey time for general traffic travelling between Johnsonville and the airport (via Terrace Tunnel) in the eastbound direction (PM peak)

Test E – Stage 5 construction (diversion of traffic on Sussex St and restricted access via Ellice St and Hania St)

22. In Table 6Table 2, I present the change in journey times for the bus routes and general traffic routes assessed. The subsequent sections provide a more detailed view of the routes primarily affected by test E.

Table 6: Changes in journey time as a result of Test E

Route		AM peak			PM peak		
		Do Min (minutes)	Const. (minutes)	Difference (minutes)	Do Min (minutes)	Constr. (minutes)	Difference (minutes)
Bus route 1 Island Bay to Crtny Pl	Car	16	18	+2	15	15	-0.2
	Bus	23	24	+1	23	23	No Change
Bus route 1 Crtny Pl to Island Bay	Car	13	19	+6	14	17	+3
	Bus	23	22	-1	23	22	-1
Bus route 2 Miramar to Courtenay Pl (via Kilbirnie and tunnel)	Bus	24	26	+2	22	27	+5
Bus route 2 Courtenay Pl to Miramar (via Kilbirnie and tunnel)	Bus	30	25	-5	21	21	No change
Bus route 3 Kilbirnie to Manners	Car	25	33	+8	17	16	-1
	Bus	36	45	+9	28	26	-2
Bus route 3 Manners to Kilbirnie	Car	13	19	+6	16	19	+2
	Bus	21	28	+7	25	28	+3
Bus route 7 Brooklyn to Manners St	Bus	11.5	11.5	No change	14	14	-0.5
Bus route 7 Manners St to Brooklyn	Bus	12	14	+2	12	13	+1
Bus route 14 Kilbirnie to Wilton	Bus	67	67	No change	67	67	No change
Bus route 18 Webb St to Victoria Uni	Car	9	11	+2	8	9	+1
	Bus	13	14	+1.5	13	13	+0.5
Bus route 18 Victoria Uni to Webb St	Car	16	14	-2	13	13	+0.2
	Bus	19	17	-2	16	17	+1
Bus route 24 Miramar to Ctny Pl (via Kilbirnie & bays)	Car	19.5	21	+1.5	26	24	-2
Bus route 24 Ctny Pl to Mirarmar (via Kilbirnie & bays)	Car	18	20	+2	58	37	-21
Bus route 31x Miramar to Ctny Pl Express (via tunnel)	Bus	23	25	+2	24	28	+4
Bus route 31x Ctny Pl to Mirarmar Express (via tunnel)	Bus	37	23	-14	17	17	-0.2
AX Airport Express Airport to Courtenay	Bus	23	25	+2	21	26	+5
AX Airport Express Courtenay to Airport	Bus	38	24	-14	19	20	+1
General traffic Airport to Jvl (Quays)	Car	33	36	+3	29	31.0	+2
General traffic Jvl to Airport (Quays)	Car	40	39	-1	28	28	No Change
General traffic Airport to Jvl (TT)	Car	32	30	-2	25	25	No Change

Route		AM peak			PM peak		
		Do Min (minutes)	Const. (minutes)	Difference (minutes)	Do Min (minutes)	Constr. (minutes)	Difference (minutes)
General traffic Jvl to Airport (TT)	Car	36	37	+1	29	26	-3
General traffic Rintoul Rd to Ctny Pl	Car	8	11	+2	7	9	+2
General traffic Ctny Pl to Rintoul Rd	Car	6	11	+6	7	10	+3

Bus route 1 – Island Bay ←→ Courtenay Place

23. Figure 61, Figure 62, Figure 63 and Figure 64 provide a more detailed view of the bus route 1.

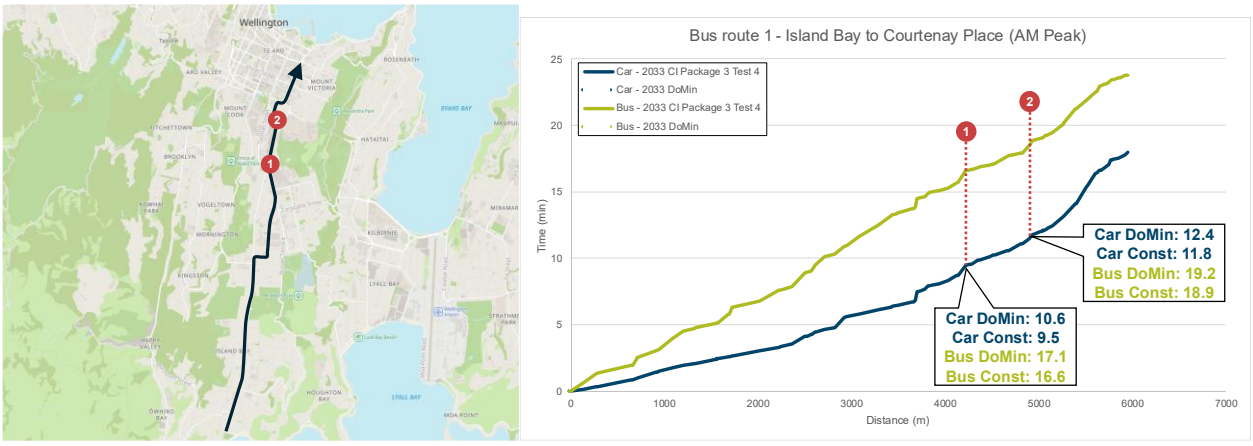


Figure 61 – Change in journey time for bus route 1 in the northbound direction (AM peak)

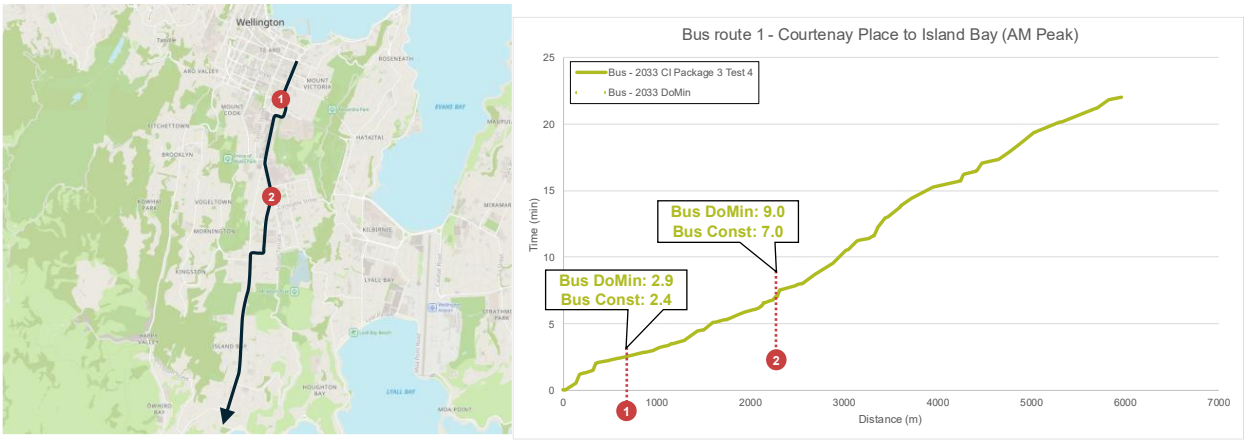


Figure 62 – Change in journey time for bus route 1 in the southbound direction (AM peak)

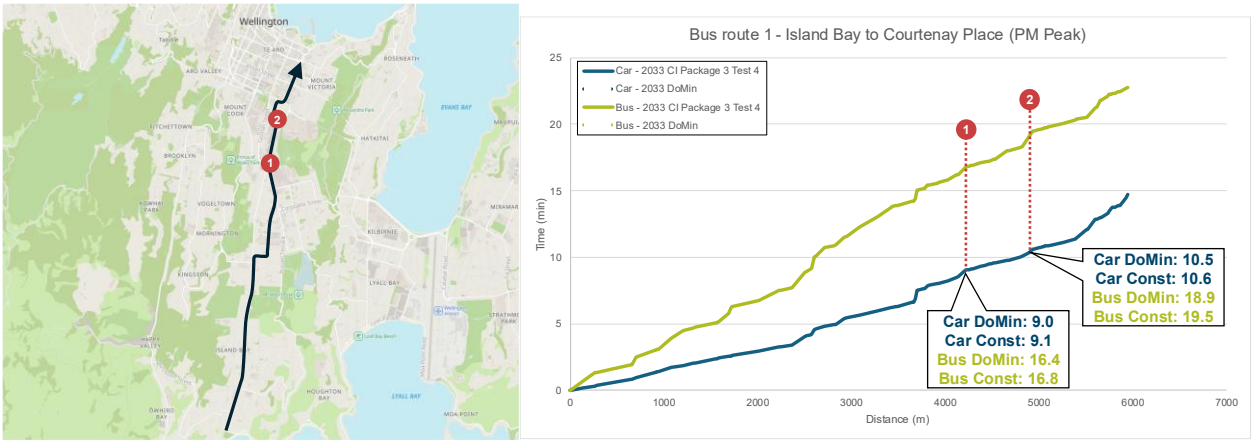


Figure 63 – Change in journey time for bus route 1 in the northbound direction (PM peak)

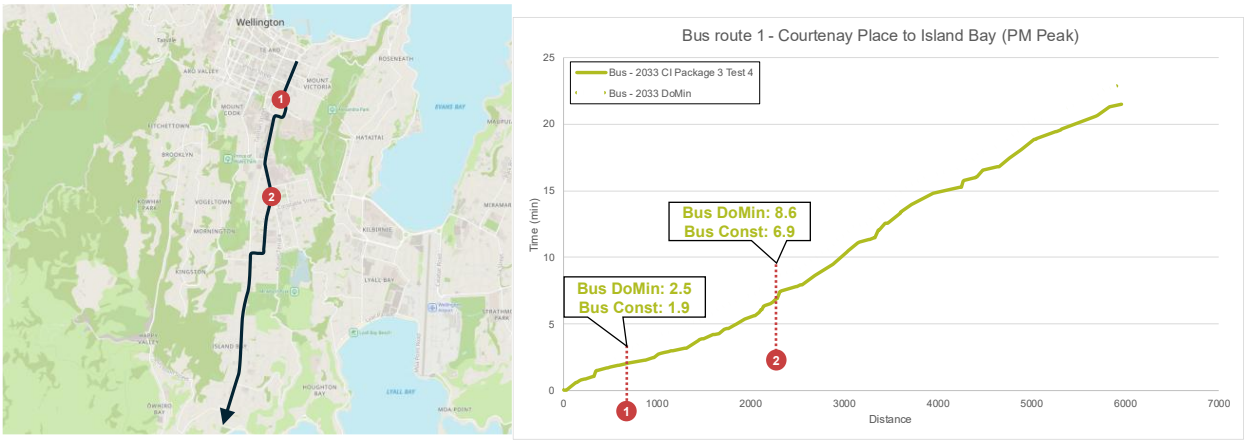


Figure 64 – Change in journey time for bus route 1 in the southbound direction (PM peak)

Bus route 3 – Kilbirnie ←→ Manners Street

24. Figure 65, Figure 66, Figure 67 and Figure 68 provide a more detailed view of the bus route 3.

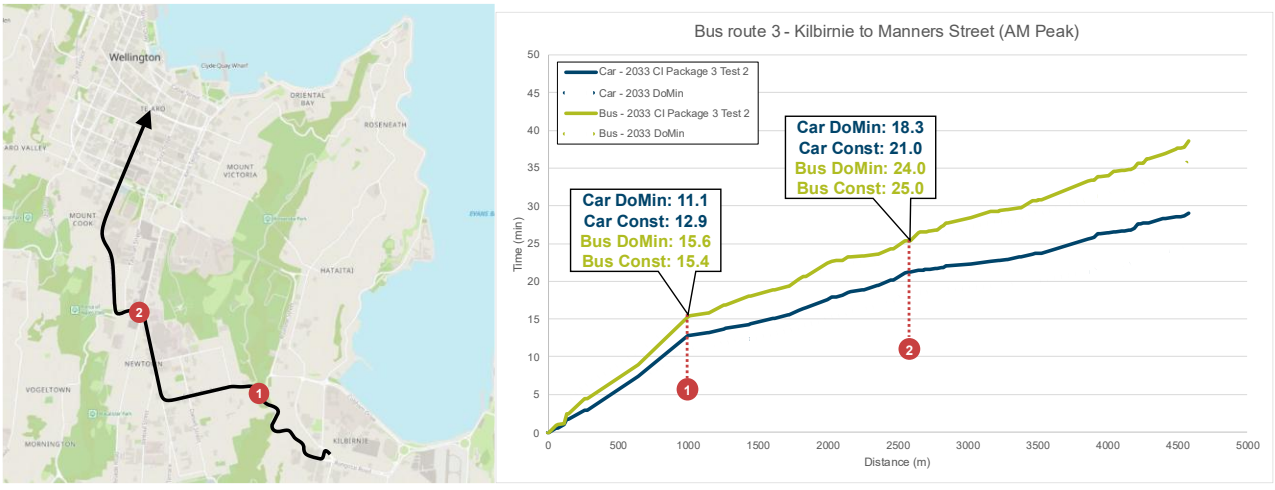


Figure 65 – Change in journey time for bus route 3 in the northbound direction (AM peak)

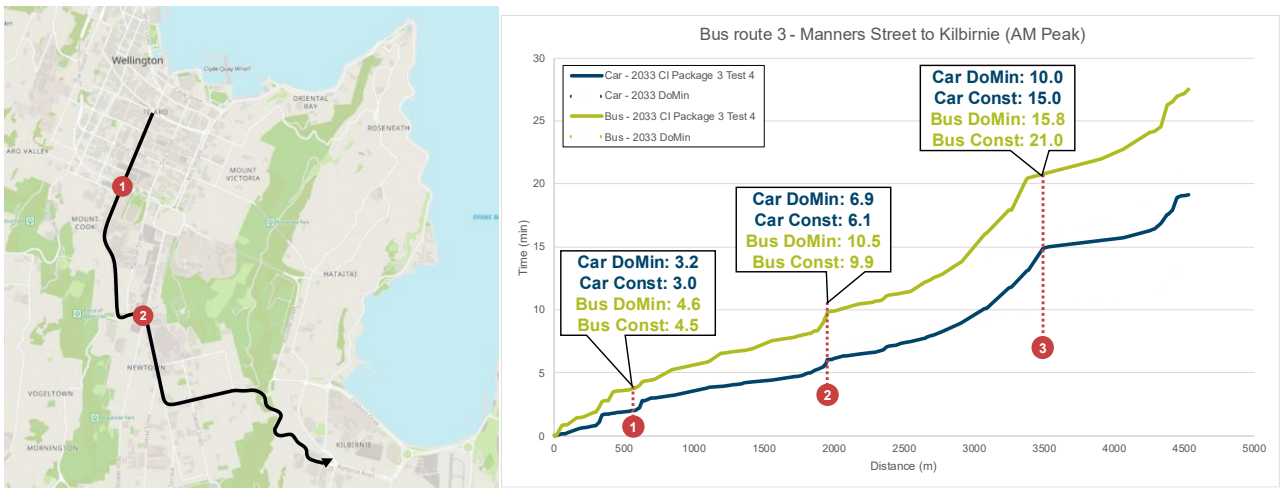


Figure 66 – Change in journey time for bus route 3 in the southbound direction (AM peak)

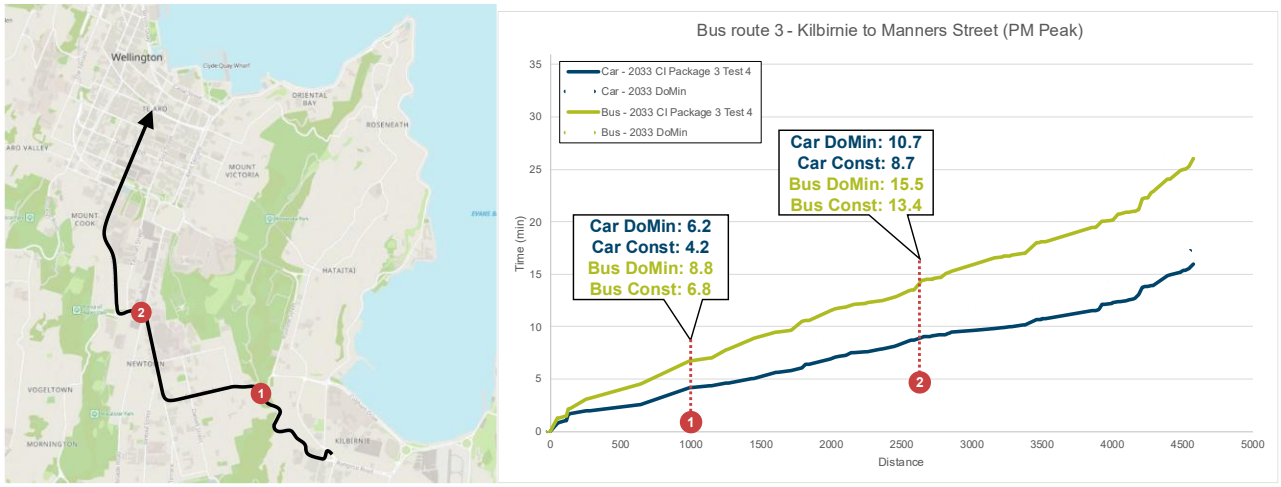


Figure 67 – Change in journey time for bus route 3 in the northbound direction (PM peak)

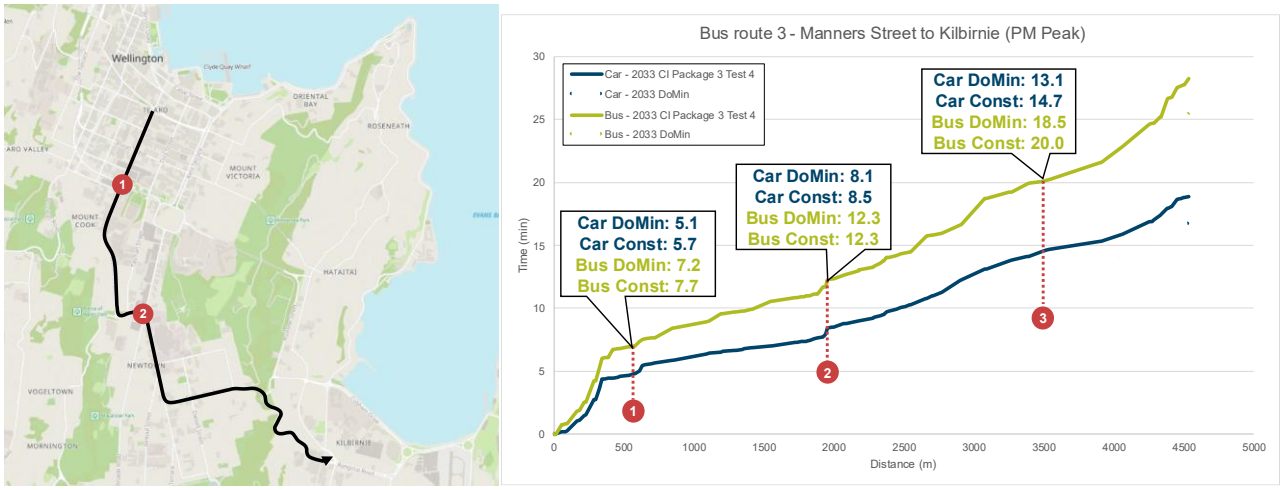


Figure 68 – Change in journey time for bus route 3 in the southbound direction (PM peak)

General traffic – Airport ←→ Jvl (via Quays)

25. Figure 69, Figure 70, Figure 71 and Figure 72 provide a more detailed view of general traffic travelling between the airport and Johnsonville via the Quays.

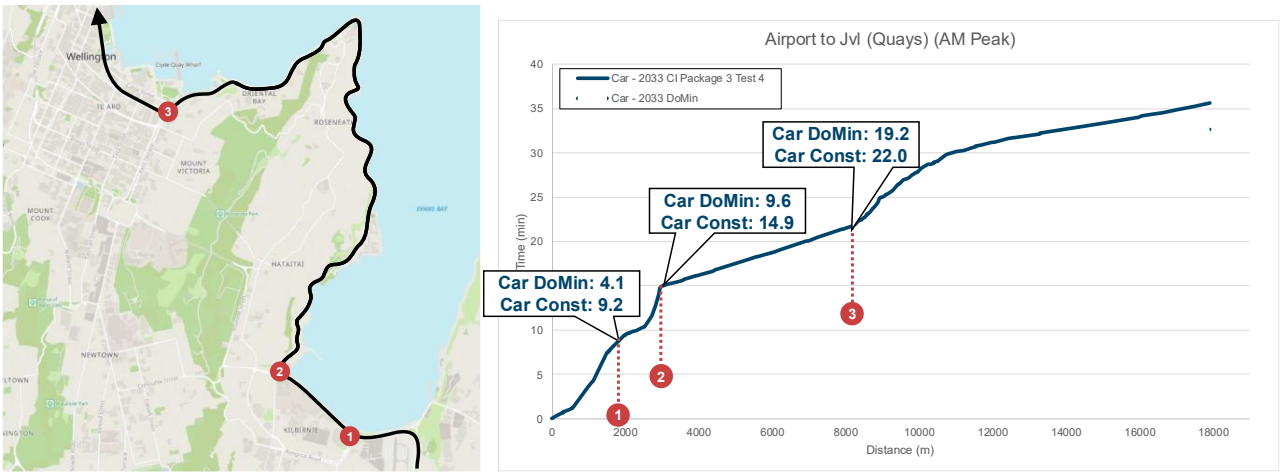


Figure 69 – Change in journey time for general traffic travelling between Johnsonville and the airport (via the quays) in the westbound direction (AM peak)

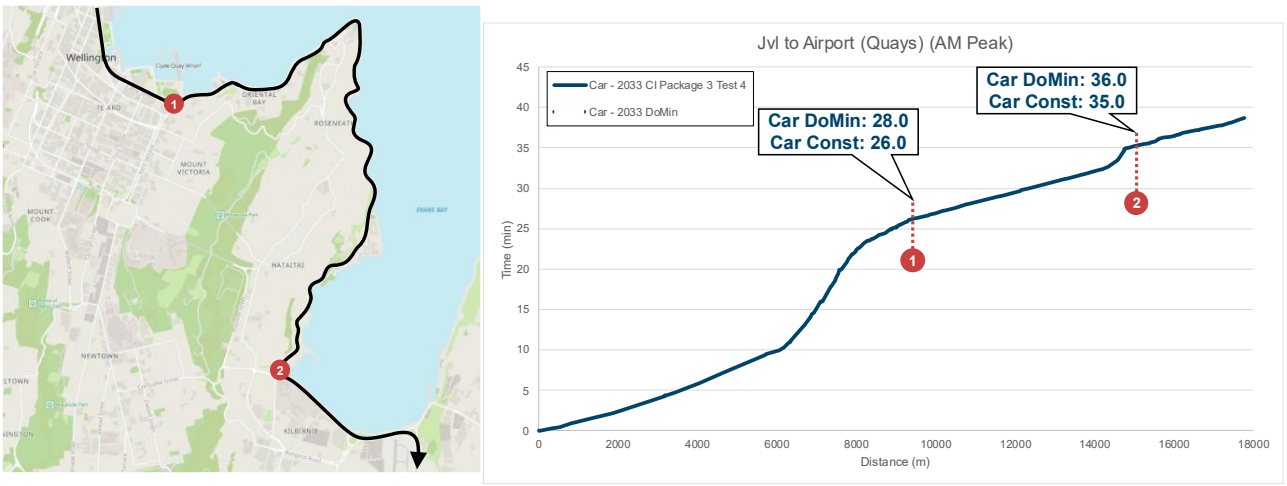


Figure 70 – Change in journey time for general traffic travelling between Johnsonville and the airport (via the quays) in the eastbound direction (AM peak)

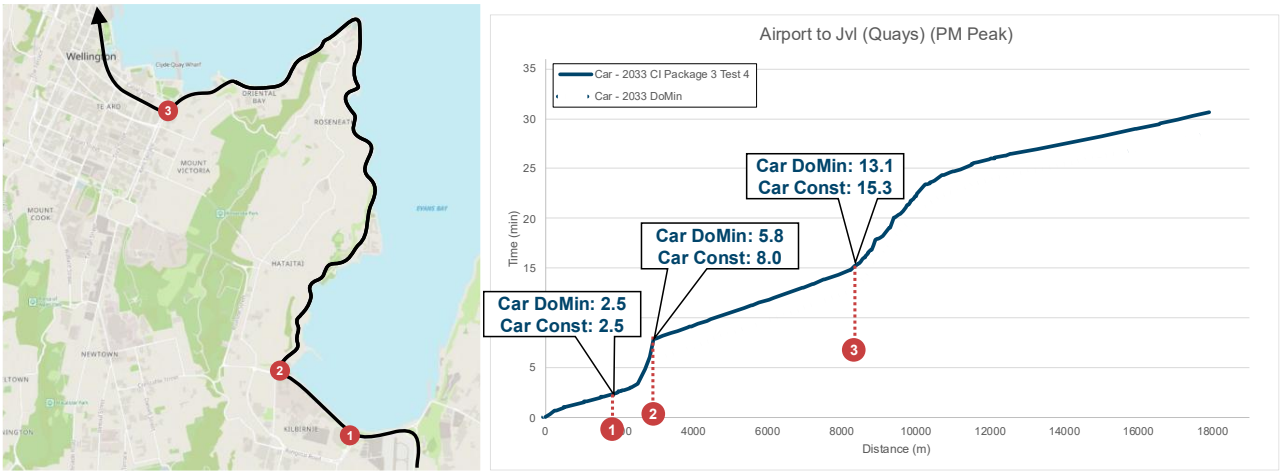


Figure 71 – Change in journey time for general traffic travelling between Johnsonville and the airport (via the quays) in the westbound direction (PM peak)

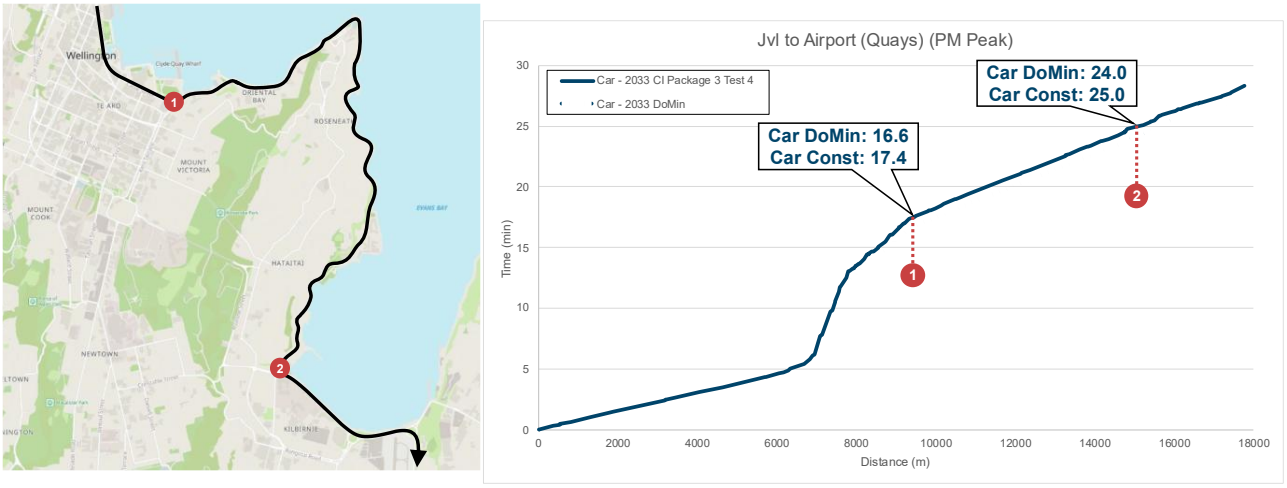


Figure 72 – Change in journey time for general traffic travelling between Johnsonville and the airport (via the quays) in the eastbound direction (PM peak)

General traffic – Airport ←→ Jvl (via Terrace Tunnel)

26. Figure 73, Figure 74, Figure 75 and Figure 76 provide a more detailed view of general traffic travelling between the airport and Johnsonville via the Terrace Tunnel.

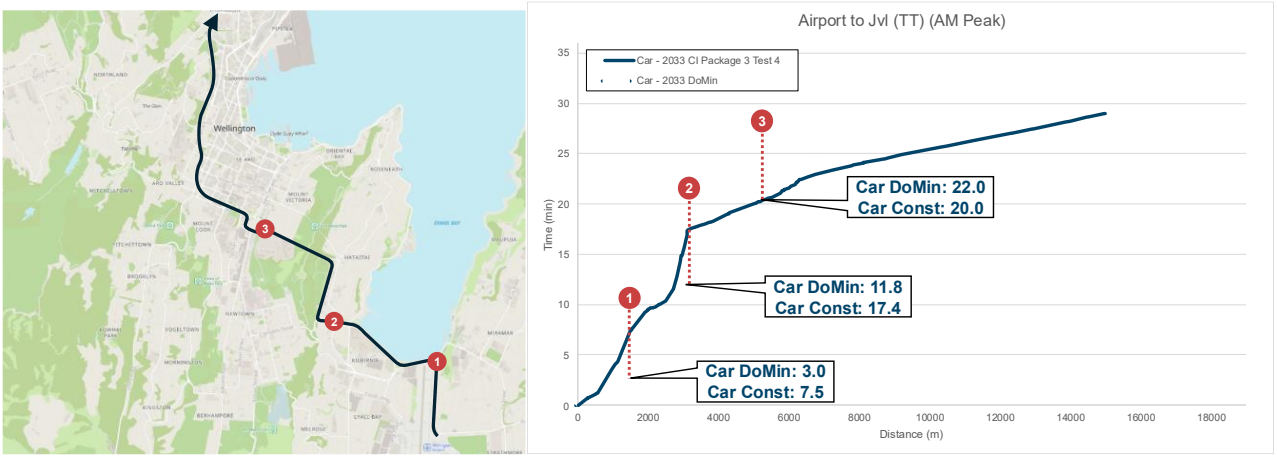


Figure 73 – Change in journey time for general traffic travelling between Johnsonville and the airport (via Terrace Tunnel) in the westbound direction (AM peak)

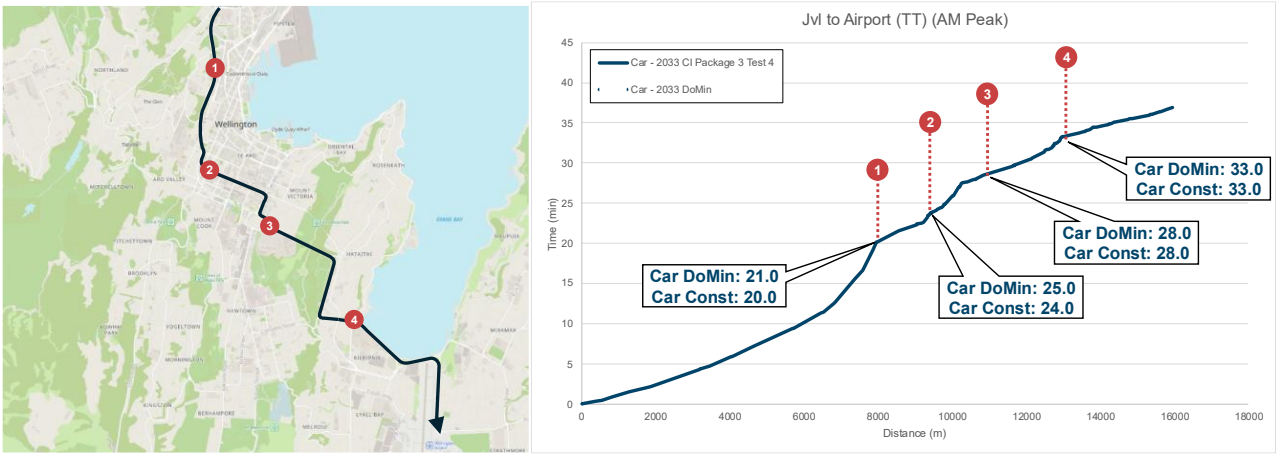


Figure 74 – Change in journey time for general traffic travelling between Johnsonville and the airport (via Terrace Tunnel) in the eastbound direction (AM peak)

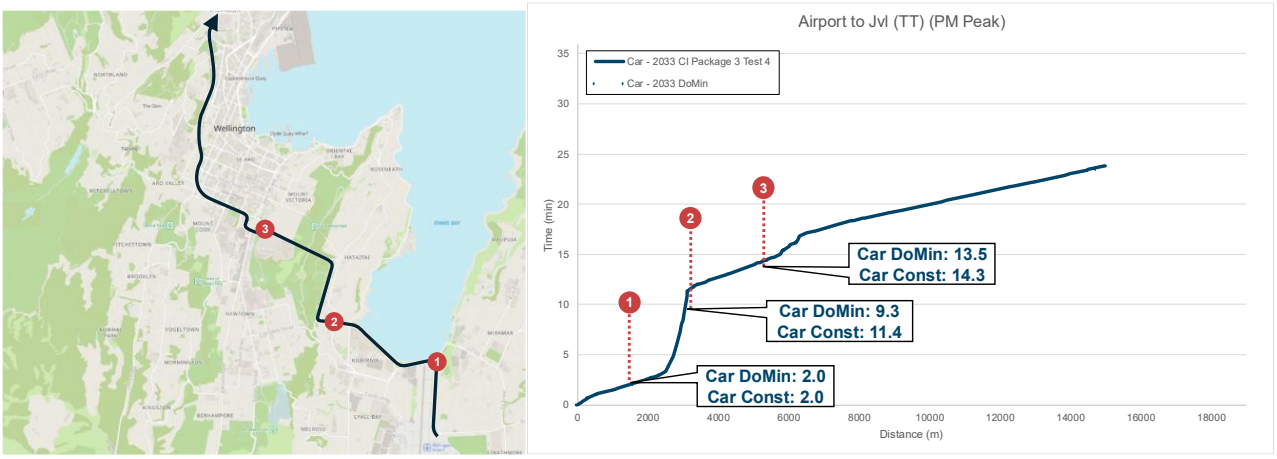


Figure 75 – Change in journey time for general traffic travelling between Johnsonville and the airport (via Terrace Tunnel) in the westbound direction (PM peak)

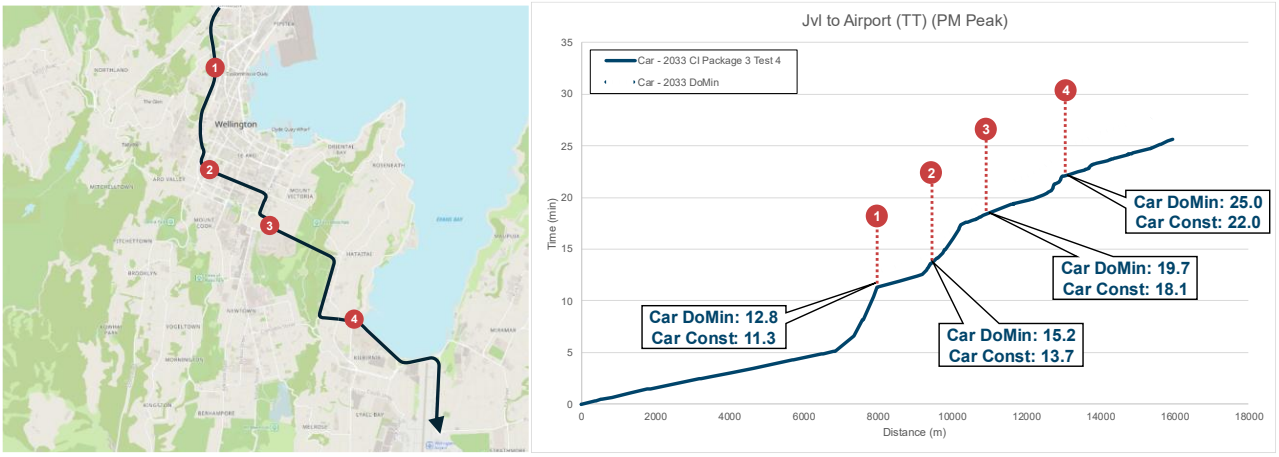


Figure 76 – Change in journey time for general traffic travelling between Johnsonville and the airport (via Terrace Tunnel) in the eastbound direction (PM peak)

Package 5 - Eastern Connections

Test F Ruahine Street and Wellington Road works, with access changes to Hataitai

27. In Table 7Table 4Table 2, I present the change in journey times for the bus routes and general traffic routes assessed. The subsequent sections provide a more detailed view of the routes primarily affected by test F.

Table 7: Change in journey time as a result of Test F

Route		AM peak			PM peak		
		Do Min (minutes)	Const. (minutes)	Difference (minutes)	Do Min (minutes)	Constr. (minutes)	Difference (minutes)
Bus route 1 Island Bay to Crtny Pl	Car	16	17	+1	15	13	-2
	Bus	23	24	+1	23	22	-1
Bus route 1 Crtny Pl to Island Bay	Car	13	13	No change	14	13	-0.5
	Bus	23	23	No change	23	22	-1
Bus route 2 Miramar to Courtenay Pl (via Kilbirnie and tunnel)	Bus	24	24	No change	22	21	-1
Bus route 2 Courtenay Pl to Miramar (via Kilbirnie and tunnel)	Bus	30	28	-2	21	19	-2
Bus route 3 Kilbirnie to Manners	Car	25	19	-6	17	13	-3
	Bus	36	28	-8	28	24	-4
Bus route 3 Manners to Kilbirnie	Car	13	14	+1	16	17	+1
	Bus	21	23	+2	25	27	+2
Bus route 7 Brooklyn to Manners St	Bus	11.5	11	-0.5	14	12	-2
Bus route 7 Manners St to Brooklyn	Bus	12	13	+1	12	11	-1
Bus route 14 Kilbirnie to Wilton	Bus	67	67	No change	67	65	-2
Bus route 18 Webb St to Victoria Uni	Car	9	9	No change	8	8	-0.5
	Bus	13	13	+0.5	13	13	No change
Bus route 18 Victoria Uni to Webb St	Car	16	16	-0.5	13	11	-2
	Bus	19	18	-1	16	14	-2
Bus route 24 Miramar to Ctny Pl (via Kilbirnie & bays)	Car	19	18	-1	26	25	-1
Bus route 24 Ctny Pl to Mirarmar (via Kilbirnie & bays)	Car	18	17	-1	58	23	-35
Bus route 31x Miramar to Ctny Pl Express (via tunnel)	Bus	23	21	-2	24	20	-4
Bus route 31x Ctny Pl to Mirarmar Express (via tunnel)	Bus	37	25	-12	17	16	-1
AX Airport Express Airport to Courtenay	Bus	23	24	+1	21	20	-1
AX Airport Express Courtenay to Airport	Bus	38	27	-11	19	18	-1
General traffic Airport to Jvl (Quays)	Car	33	35	+2	29	27	-2
General traffic Jvl to Airport (Quays)	Car	40	39	-1	28	29	+1
General traffic Airport to Jvl (TT)	Car	32	36	+4	25	21	-4
General traffic Jvl to Airport (TT)	Car	36	35	-1	29	31	+2

Bus route 3 – Kilbirnie ←→ Manners Street

28. Figure 77, Figure 78, Figure 79 and Figure 80 provide a more detailed view of the bus route 3.

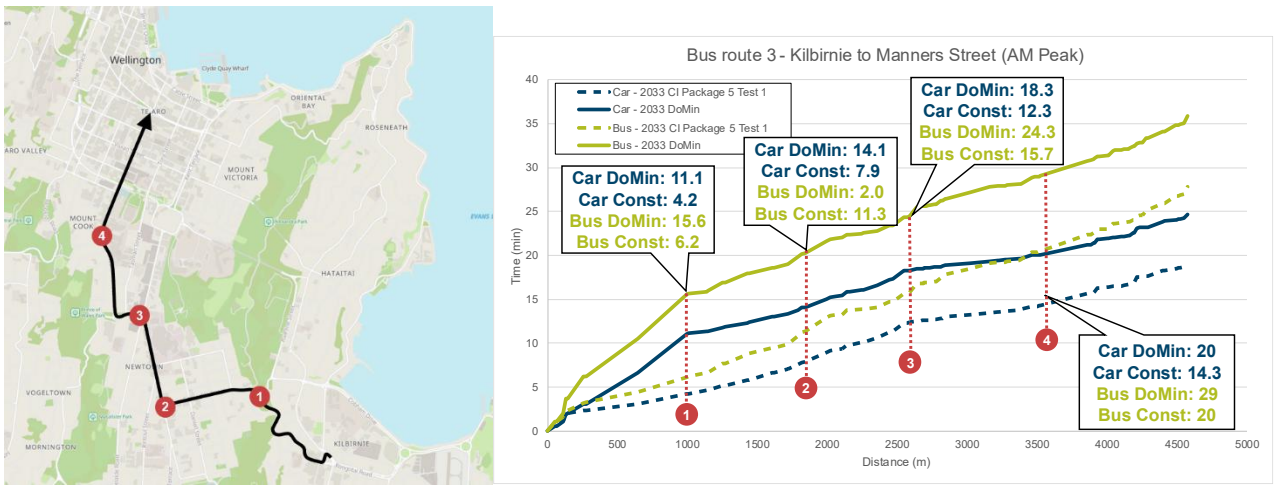


Figure 77 – Change in journey time for bus route 3 in the northbound direction (AM peak)

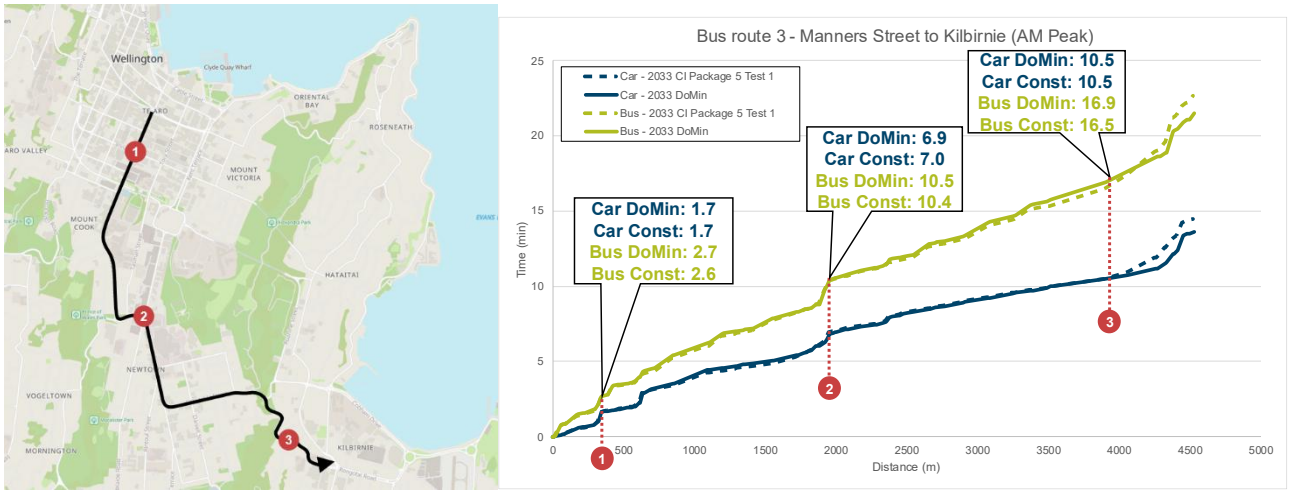


Figure 78 – Change in journey time for bus route 3 in the southbound direction (AM peak)

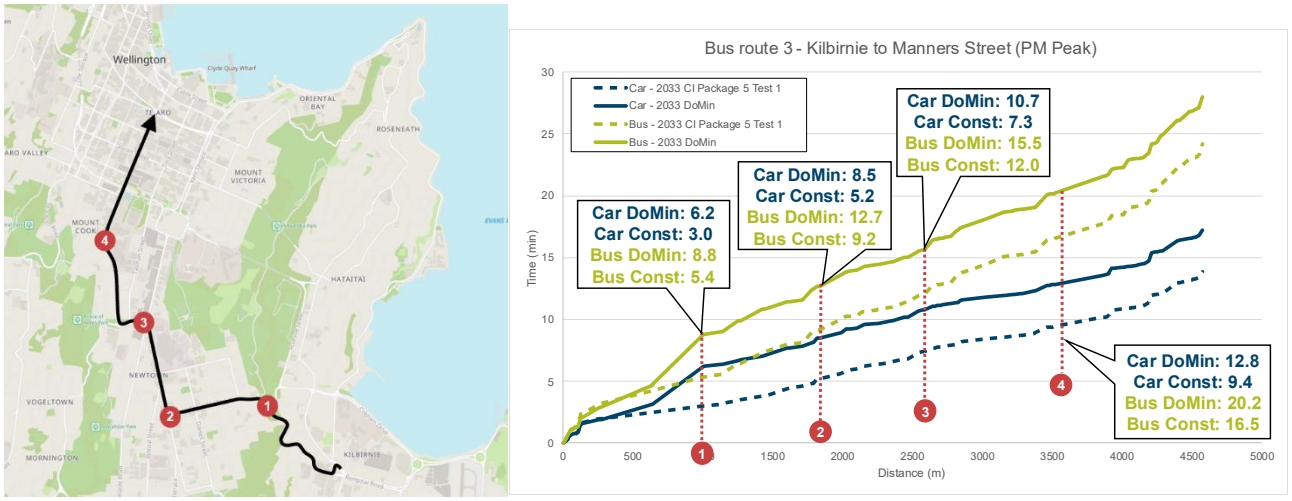


Figure 79 – Change in journey time for bus route 3 in the northbound direction (PM peak)

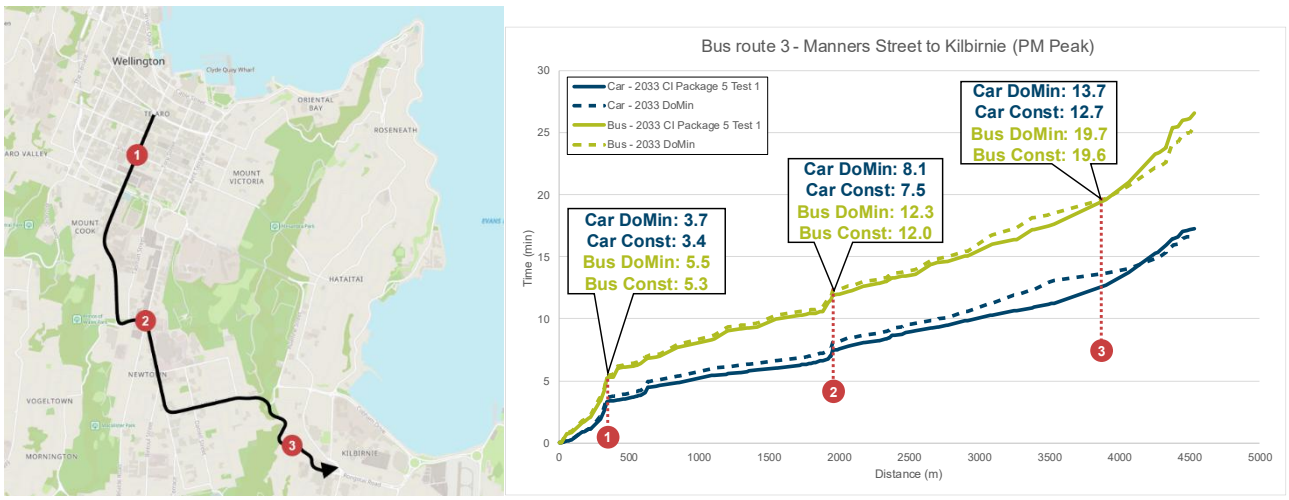


Figure 80 – Change in journey time for bus route 3 in the southbound direction (PM peak)

Bus route 14 – Kilbirnie ←→ Wilton

29. Figure 81 and Figure 82 provide a more detailed view of the bus route 14.

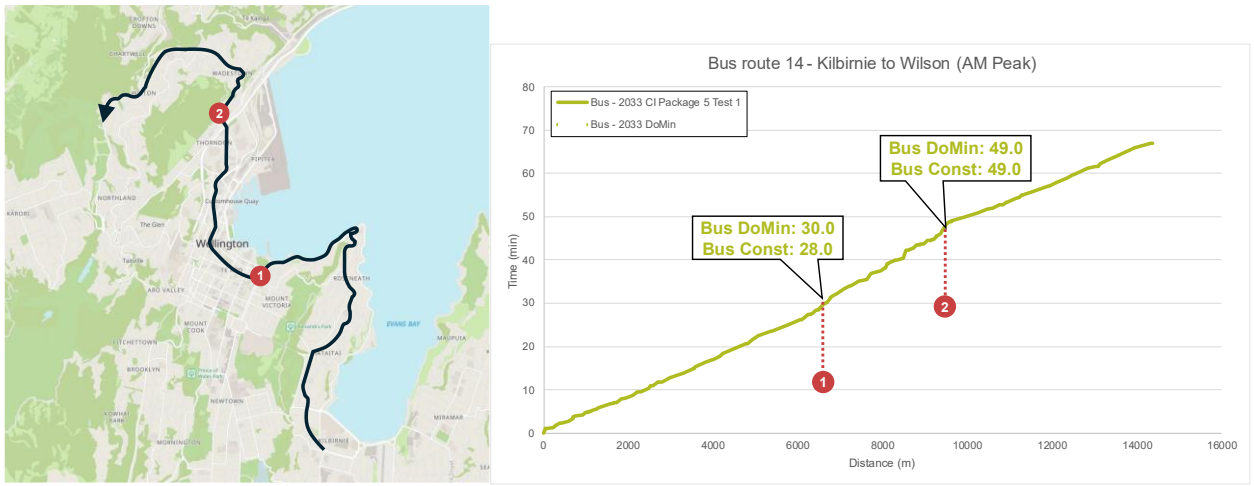


Figure 81 – Change in journey time for bus route 14 in the northbound direction (AM peak)

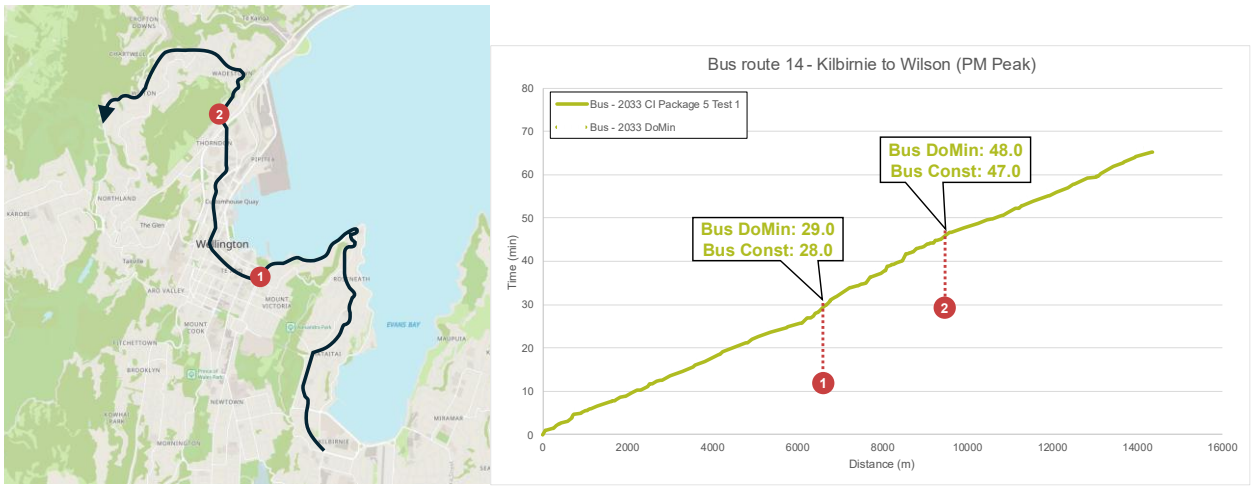


Figure 82 – Change in journey time for bus route 14 in the northbound direction (PM peak)

Bus route 31x – Miramar ←→ Courtenay Place (via Hataitai Bus Tunnel)

30. Figure 83, Figure 84, Figure 85 and Figure 86 provide a more detailed view of the bus route 31x.

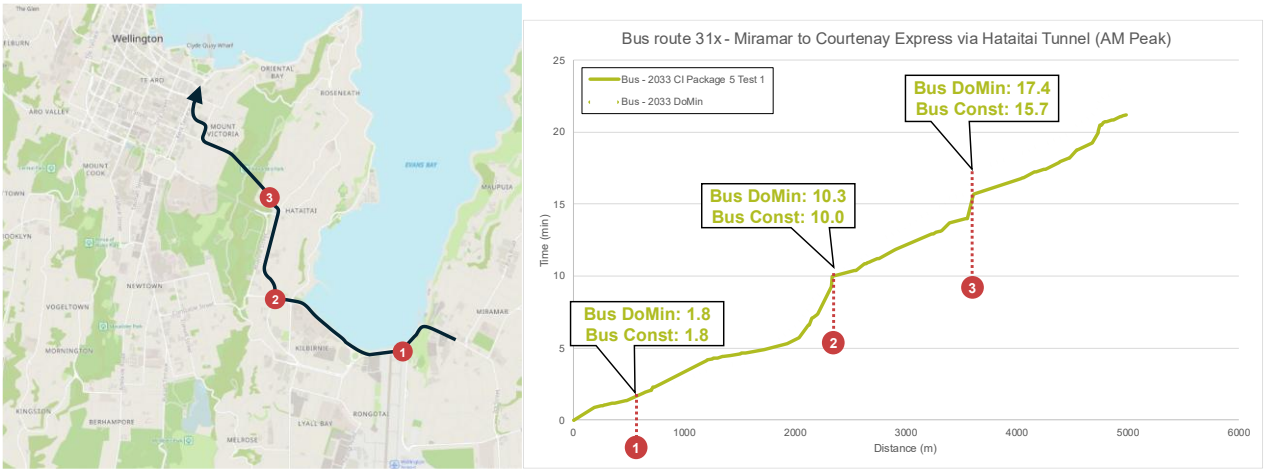


Figure 83 – Change in journey time for bus route 31x in the westbound direction (AM peak)

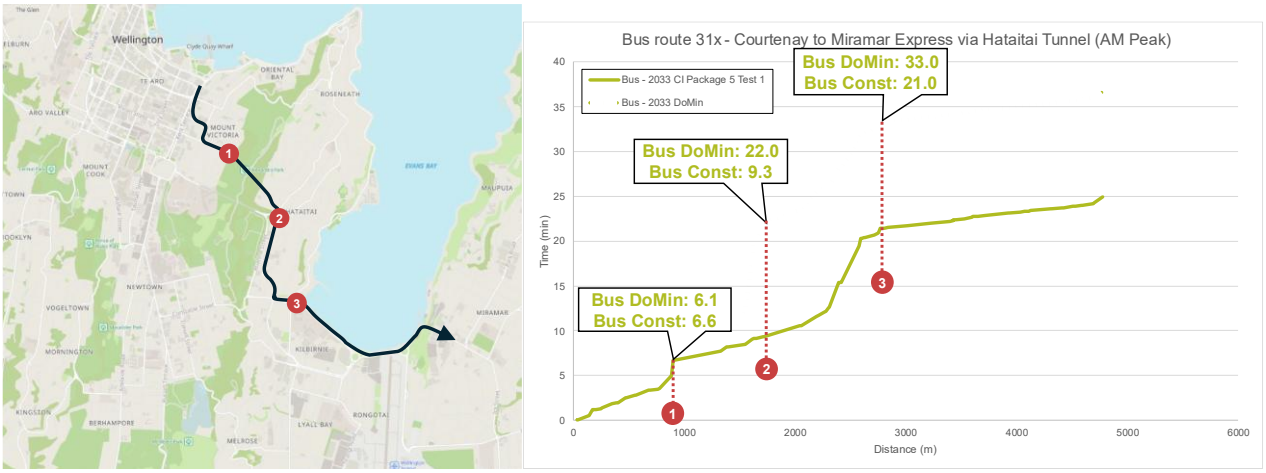


Figure 84 – Change in journey time for bus route 31x in the eastbound direction (AM peak)

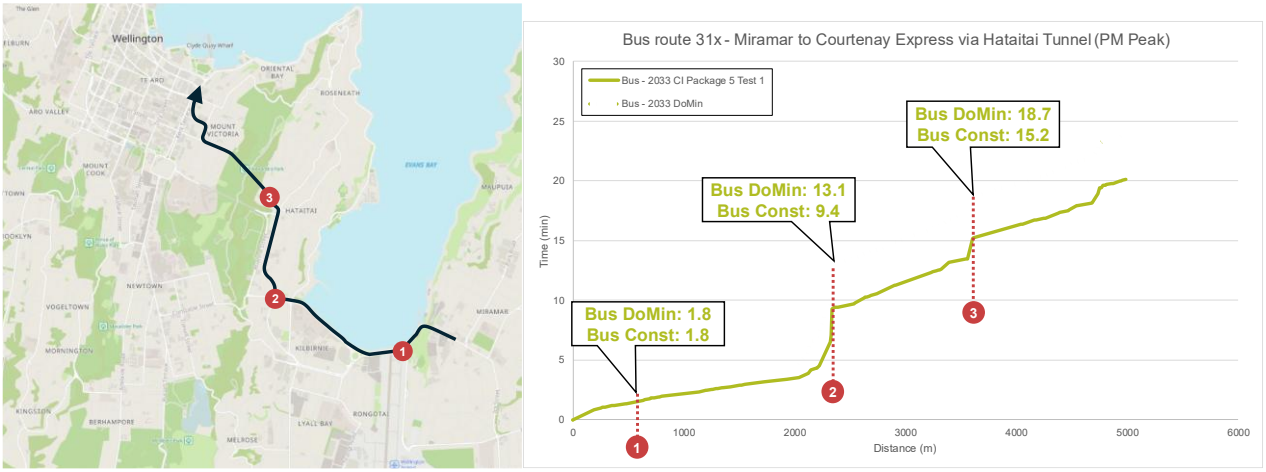


Figure 85 – Change in journey time for bus route 31x in the westbound direction (PM peak)

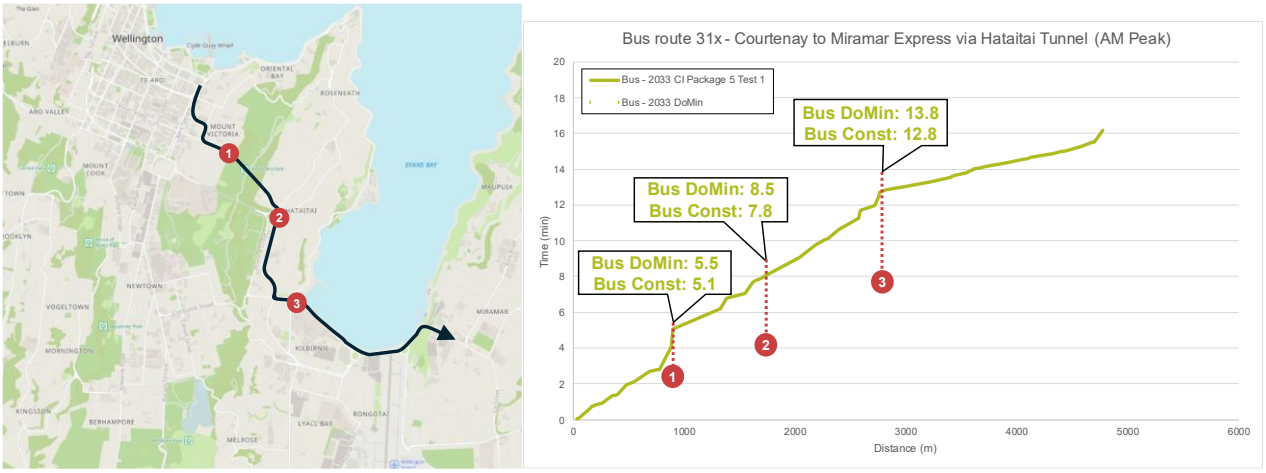


Figure 86 – Change in journey time for bus route 31x in the eastbound direction (PM peak)

Bus route Airport Express – Airport ←→ Courtenay Place

31. Figure 87, Figure 88, Figure 89 and Figure 90 provide a more detailed view of the Airport Express bus route.

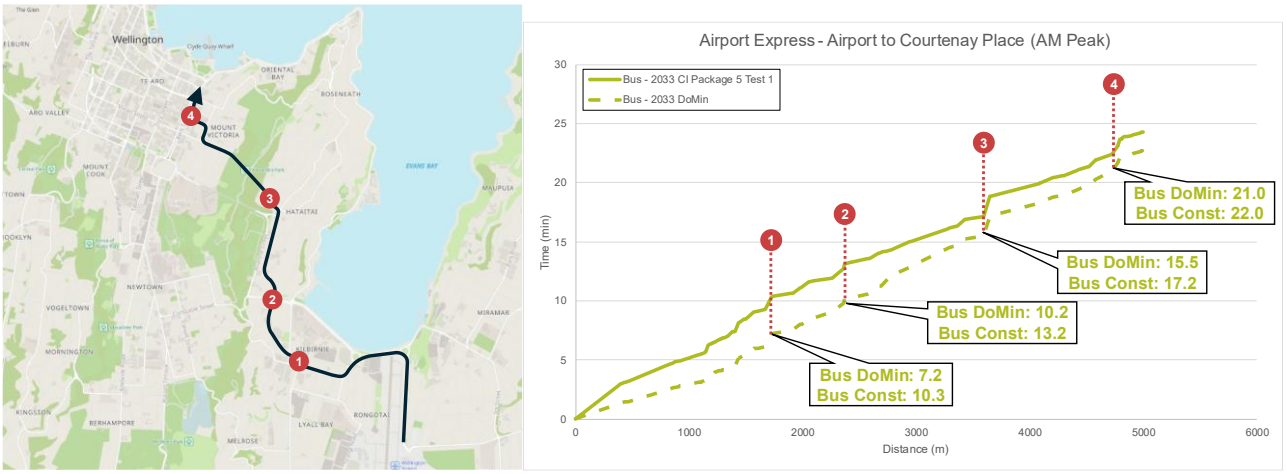


Figure 87 – Change in journey time for Airport Express bus route in the westbound direction (AM peak)

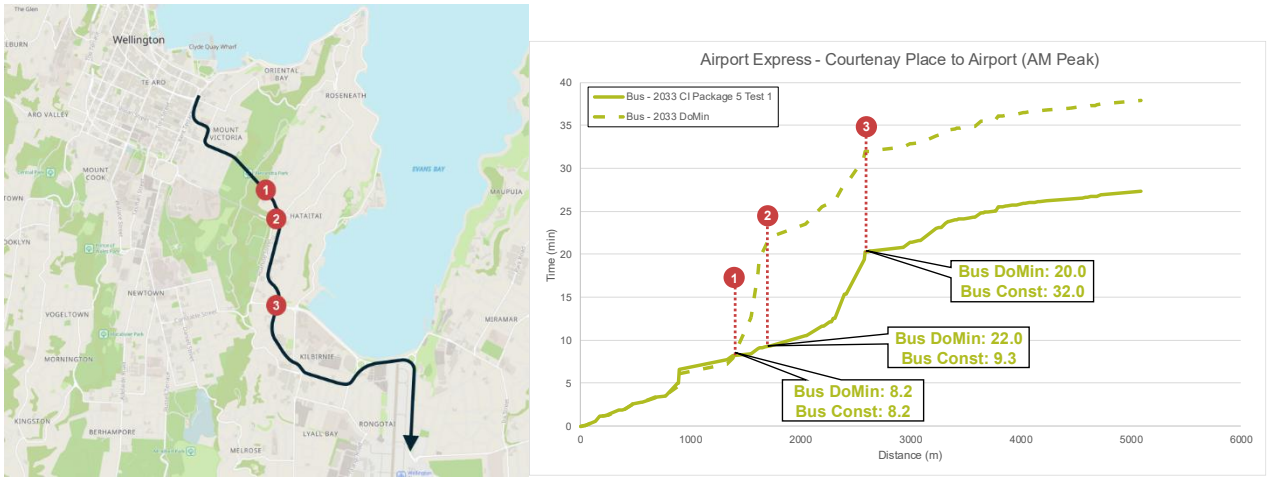


Figure 88 – Change in journey time for Airport Express bus route in the eastbound direction (AM peak)

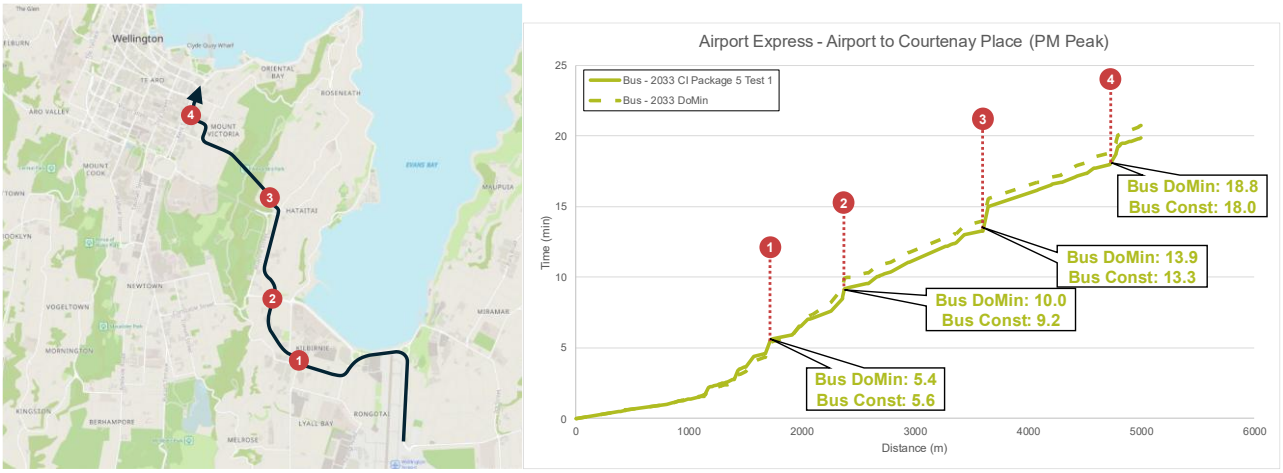


Figure 89 – Change in journey time for Airport Express bus route in the westbound direction (PM peak)

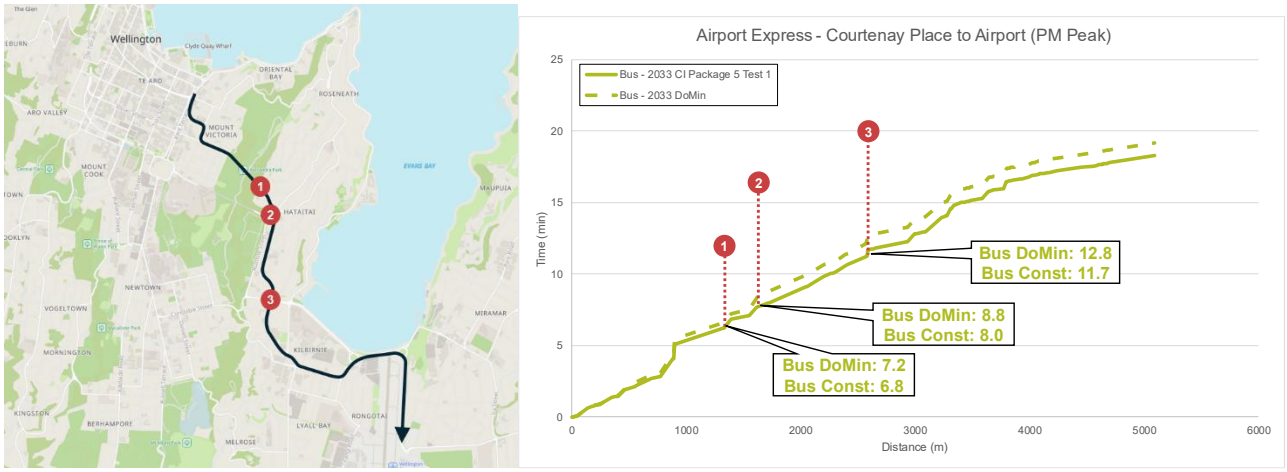


Figure 90 – Change in journey time for Airport Express bus route in the eastbound direction (PM peak)

General traffic – Airport ←→ Jvl (via Quays)

32. Figure 91, Figure 92, Figure 93 and Figure 94 provide a more detailed view of general traffic travelling between the airport and Johnsonville via the Quays.

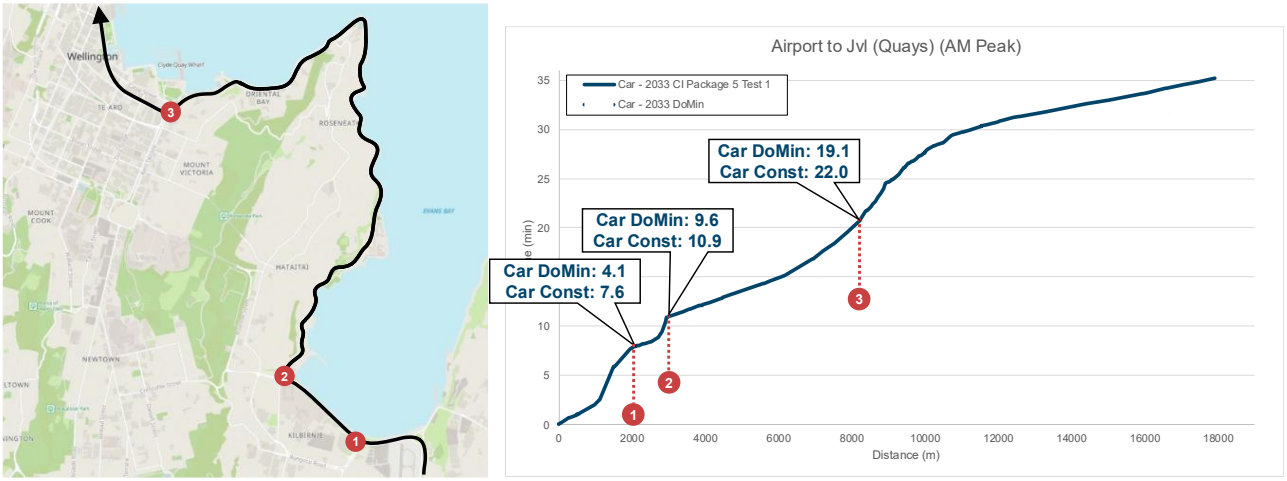


Figure 91 – Change in journey time for general traffic travelling between Johnsonville and the airport (via the quays) in the westbound direction (AM peak)

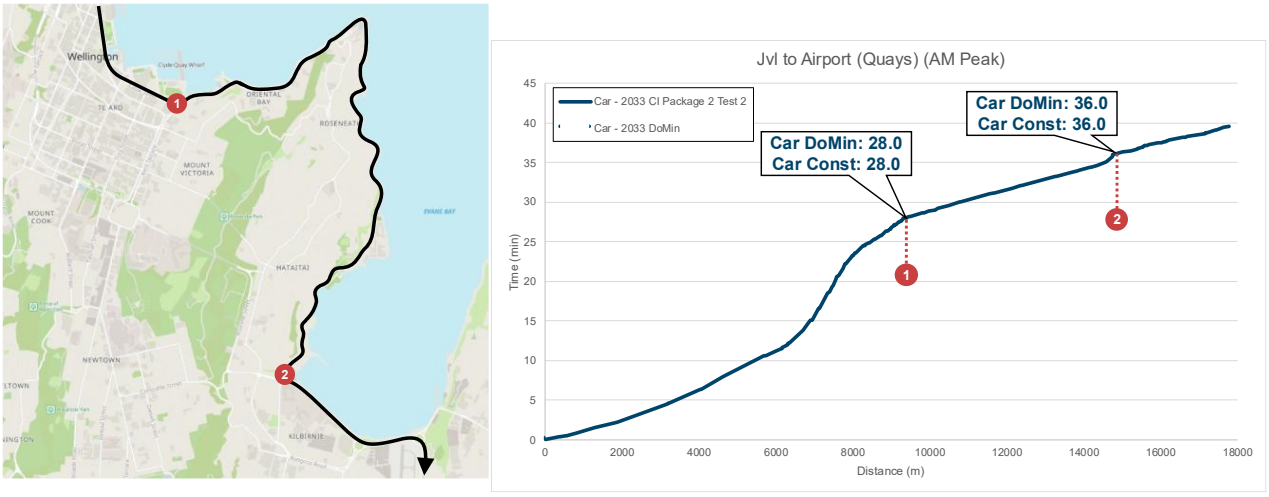


Figure 92 – Change in journey time for general traffic travelling between Johnsonville and the airport (via the quays) in the eastbound direction (AM peak)

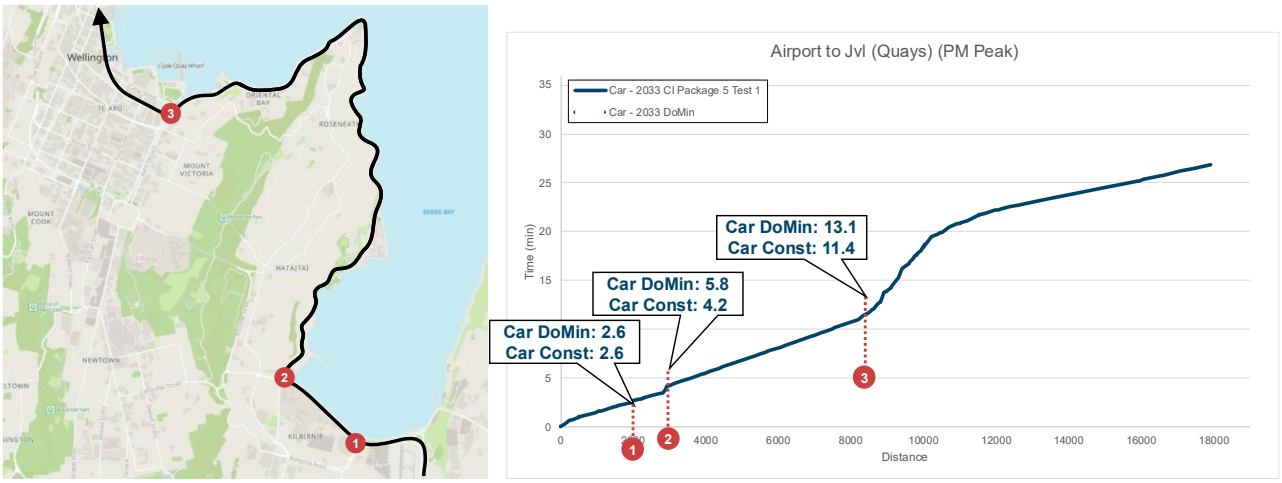


Figure 93 – Change in journey time for general traffic travelling between Johnsonville and the airport (via the quays) in the westbound direction (PM peak)

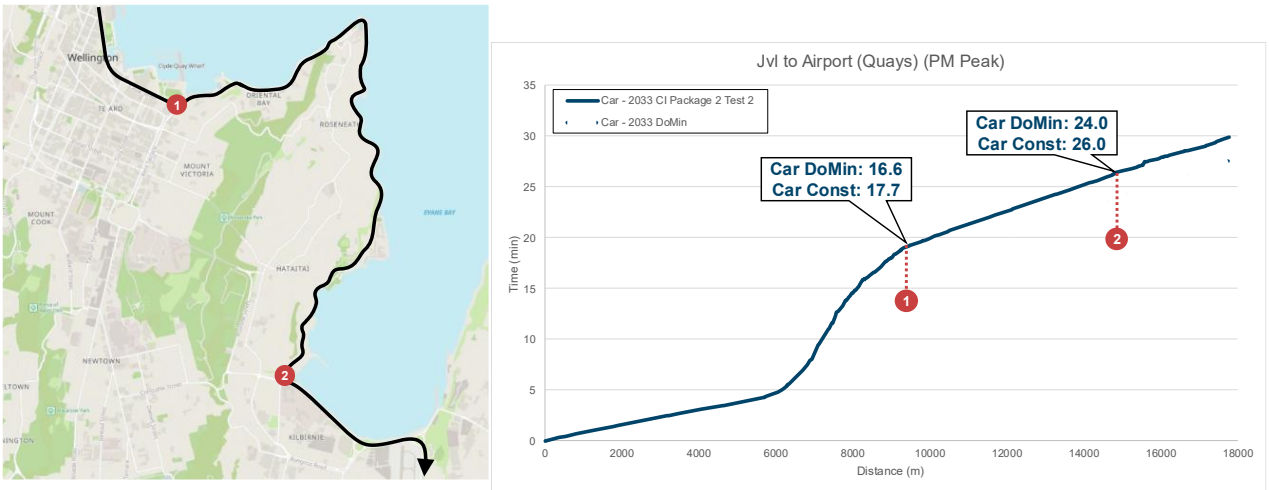


Figure 94 – Change in journey time for general traffic travelling between Johnsonville and the airport (via the quays) in the eastbound direction (PM peak)

General traffic – Airport ←→ Jvl (via Terrace Tunnel)

33. Figure 95, Figure 96, Figure 97 and Figure 98 provide a more detailed view of general traffic travelling between the airport and Johnsonville via the Terrace Tunnel.

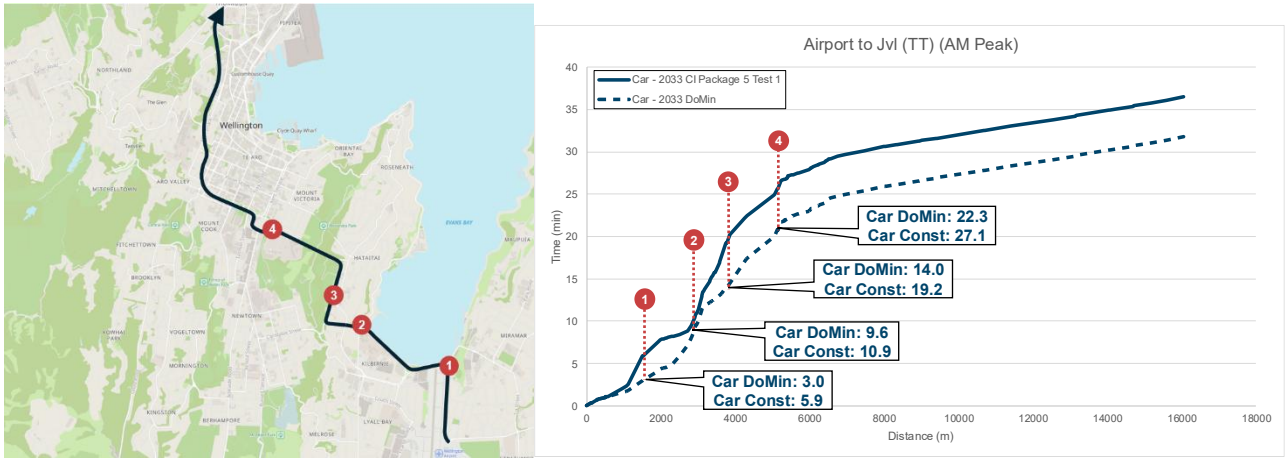


Figure 95 – Change in journey time for general traffic travelling between Johnsonville and the airport (via Terrace Tunnel) in the westbound direction (AM peak)

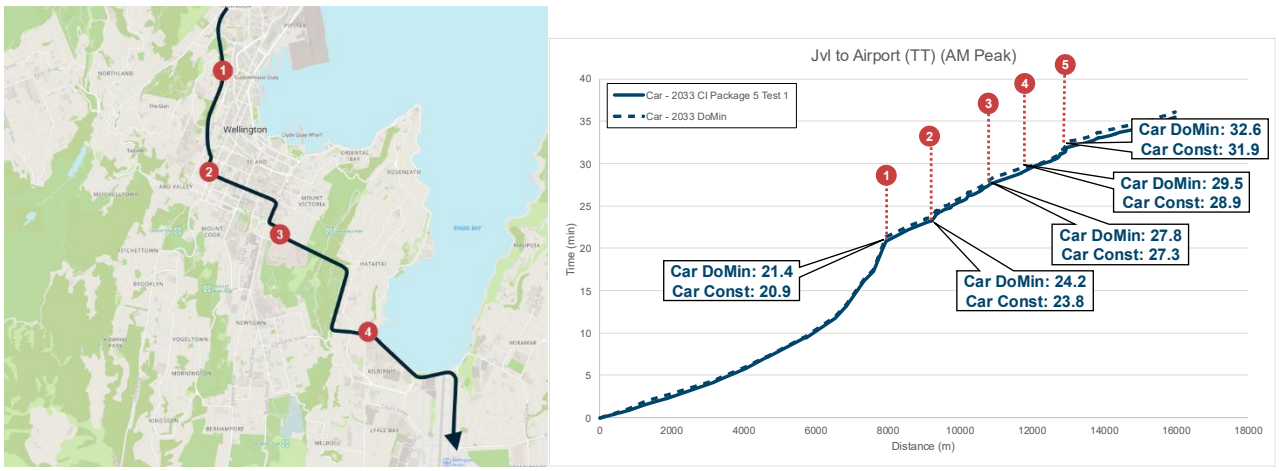


Figure 96 – Change in journey time for general traffic travelling between Johnsonville and the airport (via Terrace Tunnel) in the eastbound direction (AM peak)

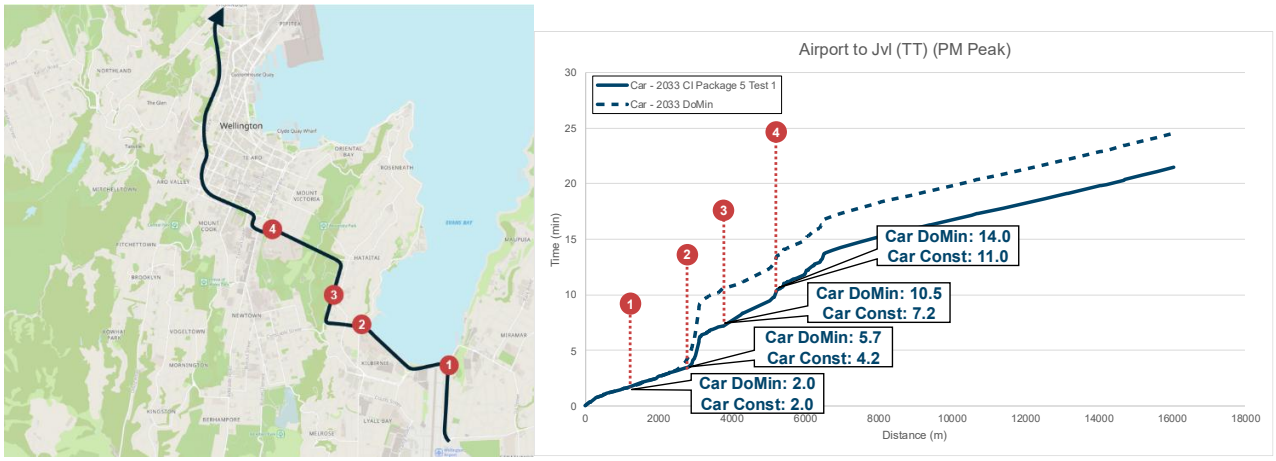


Figure 97 – Change in journey time for general traffic travelling between Johnsonville and the airport (via Terrace Tunnel) in the westbound direction (PM peak)

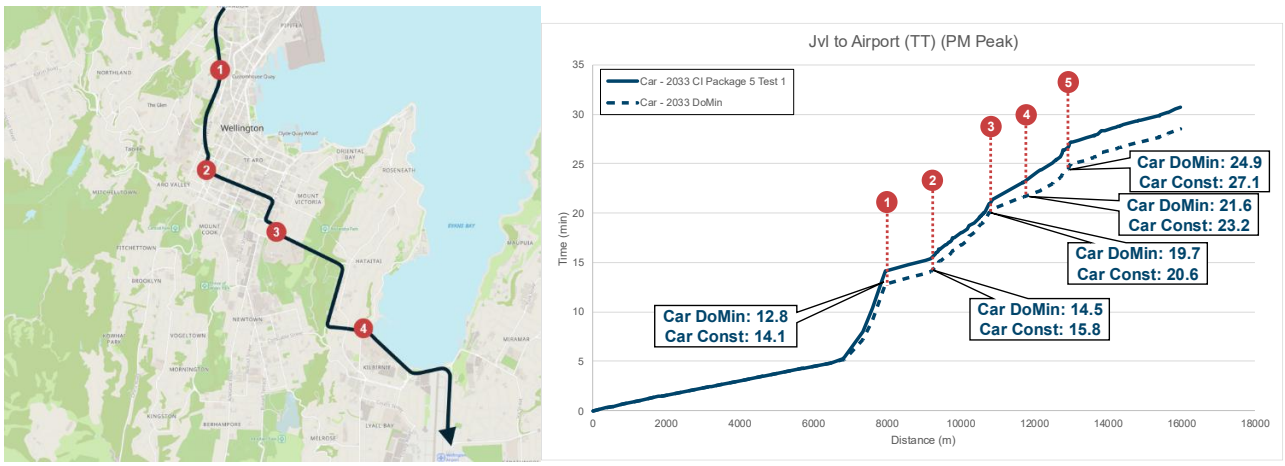


Figure 98 – Change in journey time for general traffic travelling between Johnsonville and the airport (via Terrace Tunnel) in the eastbound direction (PM peak)

General Traffic – Airport ←→ Bowen

34. Figure 99, Figure 100, Figure 101 and Figure 102 provide a more detailed view of general traffic travelling between the airport and Bowen Street.

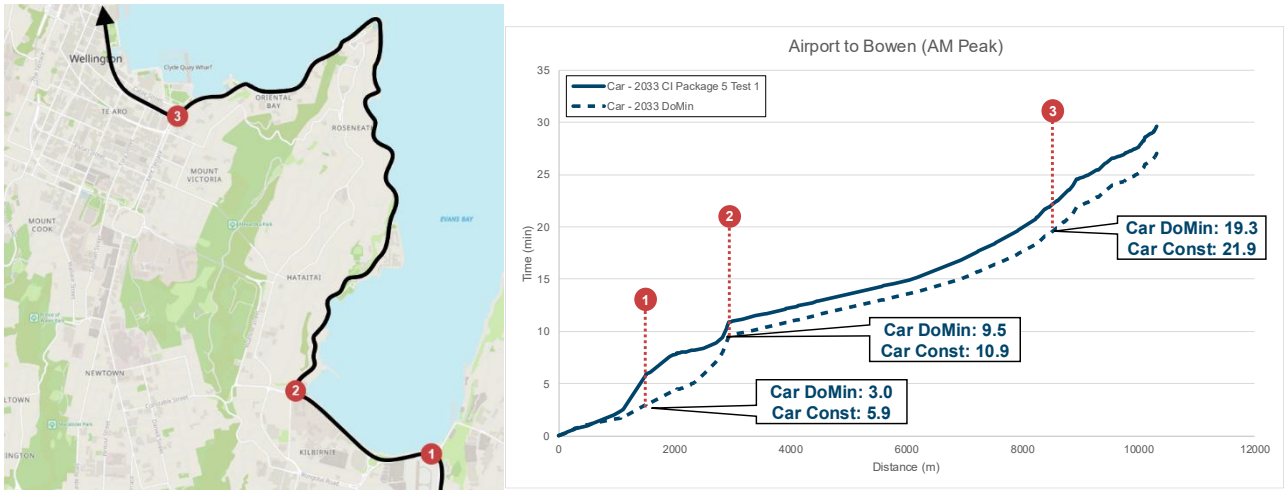


Figure 99 – Change in journey time for general traffic travelling between the airport and Bowen Street (via Quays) in the westbound direction (AM peak)

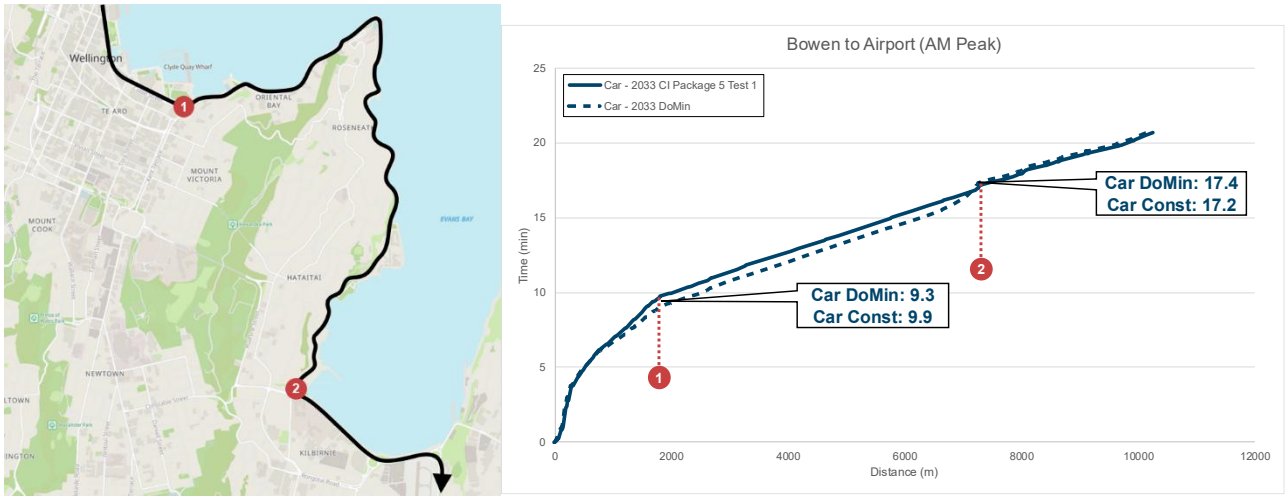


Figure 100 – Change in journey time for general traffic travelling between the airport and Bowen Street (via Quays) in the eastbound direction (AM peak)

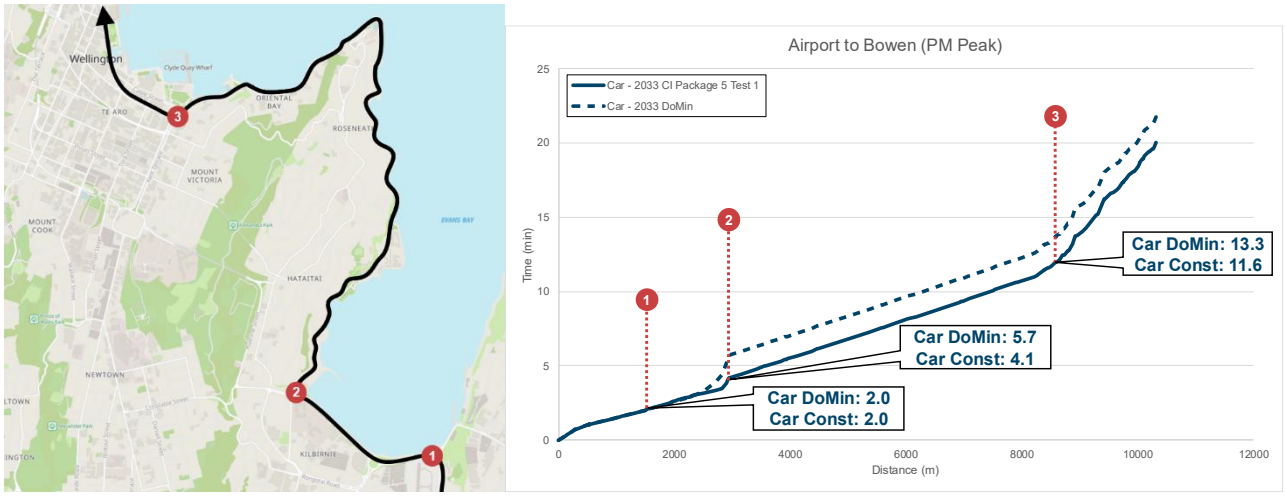


Figure 101 – Change in journey time for general traffic travelling between the airport and Bowen Street (via Quays) in the westbound direction (PM peak)

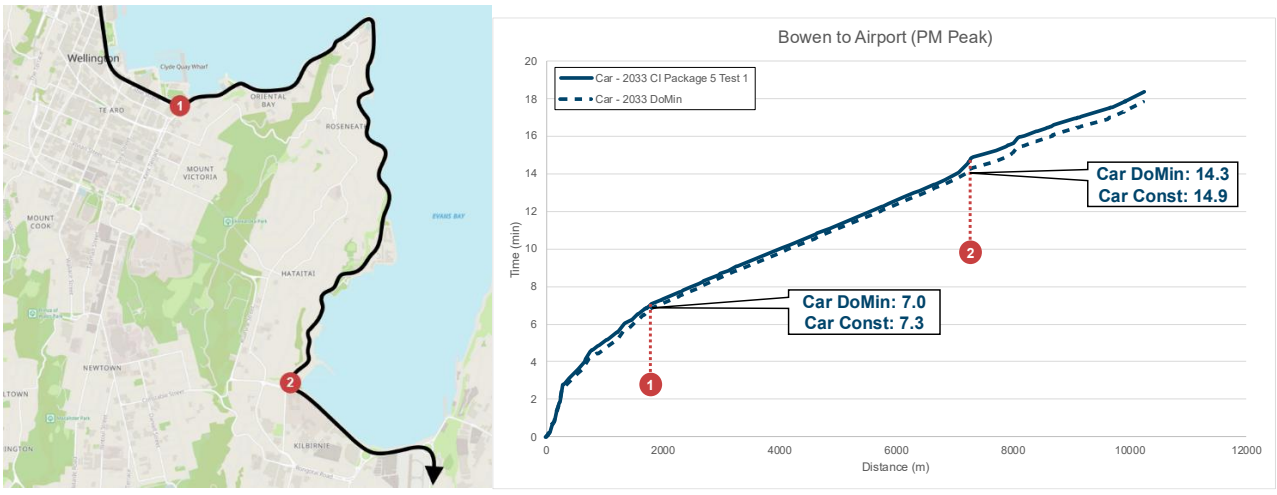


Figure 102 – Change in journey time for general traffic travelling between the airport and Bowen Street (via Quays) in the eastbound direction (AM peak)