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 REPORT #3
ECONOMICS ASSESSMENT

Table of Contents

1. INTRODUCTION

1. My full name is **David Stanley Norman**. I am the Chief Economist for Australia and New Zealand at GHD. My role in this consent process is Economics Lead.

2. In preparing this assessment, I have worked closely with Mr Duncan Tindall (Transport Lead) and Ms Mary O'Callahan (Lead Planner).

3. Arc Advisory contributed significantly to the assessment of standard transport benefits and costs of the proposed project. I have reviewed their assessment and incorporated their analysis into my own assessment presented here.

Qualifications and experience

4. I have the following qualifications and overarching experience:

   i. I hold a Bachelor of Arts degree in Economics and a Post-graduate diploma in Management, as well as a Bachelor of Science in Psychology and Genetics

   ii. I have 19 years of experience in increasingly senior roles as an economist in the private sector (BERL, PwC, Westpac and now GHD), research (the Building Research Association of New Zealand) and in government (Auckland Council)

   iii. I have led, worked on, or reviewed at least 700 economics, strategy and finance projects over those 19 years

5. A large part of my work has focused on two specific areas directly relevant to this assessment:

   i. The economics of transport projects including their wider capacity to transform urban form through improving housing access, business resilience, safety and employment as well as the "standard" transport benefits one would expect such as travel time savings, safety improvements or lower vehicle operating costs

   ii. The inevitable trade-offs that occur in every decision, and how we can credibly weigh competing impacts such as environmental, cultural, social or financial costs and benefits

6. Some relevant examples (among dozens) of projects I have worked on over the last few years include:

   i. **The Economic Assessment for the RiverLink** Resource Management Act 1991 (RMA) applications, since granted, which included valuing the transport benefits of the Project as well as the flood resilience benefits and the urban regeneration opportunities

   ii. **The Investment Case for East West Link**, that considered the standard transport benefits but also the productivity growth, housing access, employment and business resilience benefits the Project would unlock

   iii. **The Detailed Business Case for Stage 2 of Cameron Road** in Tauranga, where I again prepared analysis demonstrating the wider benefits of a city-shaping transport investment

   iv. **The Economic Impacts and Affordability of Proposed Water Quality Standards** under Greater Wellington Regional Council's Plan Change 1, which considered questions of balancing improved water quality outcomes against the ability to fund those improvements and the value the community places on them

   v. **The Economic Assessment of Improving Biodiversity Protections** for Wellington City Council, that considered how different levels of biodiversity protection on private and

public land may generate different levels of biodiversity improvement and value for communities and the costs of those different levels of improvement

vi. **The Resilience Benefits and Costs of Proposed Improvements to Titahi Bay Road** in Porirua, which was an early study in New Zealand that considered the resilience benefits of better roading, using an approach similar to that used in this current work

7. I began working on this project in July 2025.

Code of conduct

8. 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

9. 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.

10. The Project will provide for more efficient and reliable access on SH1 and includes duplicate tunnels at The Terrace and Mount 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. The Project aims to unblock critical bottlenecks on the state highway, maintain access for local movements and enable public transport growth. For a more detailed description of the Project, see Part B of the substantive application.

Scope of assessment

11. My assessment addresses the following matters:

i. A brief summary of the methodology I have used

ii. An analysis of the expected direct transport benefits

iii. An analysis of the expected wider economic benefits and city-shaping potential of the Project

iv. An assessment of the scale of benefits as being of regional or national significance

v. An analysis of the construction and maintenance costs of the Project

vi. An analysis of the scale of other potential costs of the Project including construction disruption impacts

vii. Two sensitivity tests, using higher estimates of wider economic benefits and assuming a toll is applied to the transport corridor.

viii. Brief comment on economics-related feedback from the early engagement process

Assumptions and exclusions in this assessment

12. I have relied on inputs from various other technical experts. These included:

    i. Arc Advisory who developed multiple assessments of transport benefits with and without tolls, as well as providing estimates of the impact on the regional transport network as a result of closure of the existing Terrace Tunnel and Mount Victoria Tunnel to support estimation of network disruption impacts

    ii. NZTA who provided estimates of the construction costs by year for use in the cost-benefit analysis

    iii. Hoffcon's *SH1 Wellington Improvements: Constructability Report – For Consenting*, which describes a methodology for managing construction across the various sections of the Project to inform the estimation of disruption impacts

2. EXECUTIVE SUMMARY

13. The FTAA allows for consideration of the **regional and/or national significance** of a proposed investment, the **extent of a proposal's regional or national benefits**, and **proportionality of benefits and adverse impacts** (beyond the typical transport benefits and costs) to inform decision making under the FTAA.

14. My analysis demonstrates that the proposed State Highway 1 improvements along Wellington's spine will unlock benefits that are of **national and regional significance** through:

    i. Improved functioning of the busiest highway corridor in New Zealand outside of Auckland, the most regionally important transport corridor in Wellington, and the trunk route between the airport, businesses in the city centre and the seat of government

    ii. A well-functioning urban environment as defined by the National Policy Statement on Urban Development[1] (NPS-UD), by providing efficient and reliable links to national and regional destinations, valued at around $2.0 billion over the analysis period in present value terms

    iii. Significant economic benefits by boosting labour productivity and regional GDP by an estimated $1.5 billion over the analysis period in present value terms within a corridor that accounts for 4.6% of New Zealand's total GDP

    iv. Resilience to natural hazard risks (reducing downtime in the Terrace Tunnel and Mt Victoria Tunnel locations from one year to six weeks for a 1/500 year event), to unplanned events such as vehicle accidents, and to planned maintenance outages along the route

    v. Additional housing along the corridor and in the east that will be better linked to the city

15. My assessment of all the benefits of the Project indicates gross monetised benefits of around $3.46 billion in present value terms. It is vital to also keep in mind that:

    i. The assessment of benefits has used several particularly conservative assumptions that are likely to understate the benefits

    ii. There are several additional benefits that are not expressed in dollar terms but that are additive to the monetised benefits reported here, notably additional housing enabled, more consumer choice through businesses creation, and increased business resilience for businesses

16. Project delivery costs (construction and maintenance for instance) are not central to the decision-making process under the FTAA or RMA, but I include them here for the purpose of full transparency and completeness. These costs total $2.64 billion in unescalated, present value terms.

[1] National Policy Statement on Urban Development. (May 2022). Policy 1. Well-functioning urban environments "have good accessibility for all people between housing, jobs, community services, natural spaces, and open spaces, including by way of public or active transport"

Table 1: Net present value (NPV) of benefits and costs

Component	Present value ($m)
Quantified benefits	$3,457
Quantified costs	$2,637

17. I also conducted sensitivity tests in which assumptions of costs and benefits were changed, which yielded a wider range of benefits and cost values.

18. In summary, the Project is expected to provide benefits that are of regional and national significance that will also unlock housing, employment and improved choice of goods and services for Wellington residents.

3. ASSESSMENT FRAMEWORK

NZTA and Ministry of Transport guidance documents

19. Several pre-existing documents and guides are relevant to how this Economic Assessment was completed:

i. **Monetised Benefits and Costs Manual** (NZTA, 2026) sets out a standardised way to estimate the transport benefits and costs of a proposed transport improvement.[2] NZTA has been a leader within the New Zealand economic assessment area for the last 20 years with its increasingly comprehensive manual for estimating these costs and benefits. I have generally followed the Manual's (MBCM) procedures in measuring standard transport benefits unless I have stipulated otherwise

ii. **Government Policy Statement on Land Transport** (Ministry of Transport, 2024) sets out the Government's priorities for land transport funding, including "economic growth and prosperity"; "increased maintenance and resilience"; "safety"; and "value for money"[3] These priorities are all relevant when considering the potential of the Project to unlock economic development; how the Project will boost resilience on the highway network; how it will shift traffic onto safer corridors; and the inevitable trade-offs required when considering the proportionality of benefits and costs across different domains such as environment, social or financial

iii. **Investment Prioritisation Method, 2024-27** (NZTA) emphasises the need for projects to align with the Government Policy Statement, providing a scoring matrix for projects to demonstrate this alignment[4]

[2] See NZTA. (2024). Monetised Benefits and Costs Manual. Retrieved on 12 August 2025 from https://www.nzta.govt.nz/resources/monetised-benefits-and-costs-manual

[3] See MoT. (2024). Government Policy Statement on Land Transport 2024-34. Retrieved on 12 August 2025 from https://www.transport.govt.nz/assets/Uploads/Government-Policy-Statement-on-land-transport-2024-FINAL.pdf

[4] See NZTA. (2024). Investment Prioritisation Method (IPM) 2024-27. Retrieved on 12 August 2025 from https://nzta.govt.nz/assets/P-and-I-Knowledge-Base/docs/2024-27-IPM.pdf

4. ASSESSMENT METHODOLOGY

20. This section summarises the methodology I used to assess the main categories of benefits and costs. I first list the categories of benefits and costs assessed before providing a more detailed explanation of how each benefit or cost was estimated.

Benefit type I: Standard transport benefits

21. Transport modelling on the new Do-Minimum scenario, the Base Untolled Option (and for sensitivity testing, the Tolled Option) were provided to Arc Advisory, who provided those results to me. I verified the reasonableness of these calculations and the underpinning assumptions. Standard transport benefits include:

i. **Travel Time Savings**: The amount of time that a road user spends travelling represents an opportunity cost to both individual road users and to businesses. Faster travel produces these benefits

ii. **Congestion Reduction Value**: In addition to travel **time**, congested conditions are unpleasant for road users. Reducing congestion provides relief from these conditions[5]

iii. **Travel Time Reliability Improvements**: When a journey is unreliable there are fluctuations in the amount of time a trip may take due to congestion from non-constant day-to-day traffic flows. Improving reliability creates a productivity time-saving benefit as people have greater confidence about the length of trip and can therefore use their time more efficiently

iv. **Public Transport Travel Time Improvements**: This is the same as Travel Time Savings, but with specific monetised values for Public Transport trips

v. **Vehicle Operating Costs Reduction**: The cost of fuel, tyres, repairs and maintenance, oil, and the depreciation associated with vehicle use falls when vehicles can move in a more free-flowing way due to reduced congestion

vi. **Walking and cycling benefits**: Health benefits accrue to walkers and cyclists when a transport project encourages a net increase in the distance people walk and cycle

vii. **Safety Improvement Benefits**: Road-related deaths and serious injuries carry immense costs; not only can a person lose their life or sustain debilitating injuries but it also negatively affects the people around them and society as a whole. Safety improvement benefits represent the reduced social cost of these incidents for drivers, walkers and cyclists

viii. **Emissions (Environment) Reduction**: Climate pollutants that contribute to global warming and have global impacts, including the increase in the number of adverse weather events that may negatively impact road infrastructure. Reducing them is beneficial

[5] In the analysis we present travel time savings and congestion reduction benefits as one combined benefit stemming from improved flow of traffic.

ix. **Emissions (Human Health) Reduction**: Harmful air pollutants can negatively impact health, particularly respiratory and cardiovascular health in the immediate area. Reducing these pollutants reduces the damage to human health

Benefit type II: Wider economic benefits (WEBs)

22. Further to these standard benefits of improved transport systems, I assessed several more categories of economic benefit, some of which can be expressed in dollar terms. Others, which are no less real, are not measured in dollar terms but should also be held in mind by decision-makers in considering the total basket of benefits against the total basket of costs. WEBs include:

i. **Resilience benefits**: Transport improvements that reduce travel disruption create a more resilient transport network. For instance, additional tunnels provide options for temporarily adjusting travel patterns in the event one tunnel is closed due to an accident or natural disaster. The new tunnels in the case of SH1 will also be built to modern seismic standards making them far more likely to survive a major earthquake and keep this major transport route accessible. These benefits are measured in dollar terms

ii. **Agglomeration (Productivity and Production) Benefits**: Agglomeration occurs when the productivity of workers and the number of workers within a geographic area increases as businesses, their suppliers and customers tend to co-locate because of the benefits of close proximity and as access between workers and jobs rises, allowing greater specialisation. In the analysis here, these benefits include the higher labour productivity expected as the transport intervention improves the efficiency of interaction between businesses in the corridor along the route of the improvements, but also total production as the number of workers in the area rises faster than it would in the absence of a transport intervention. These benefits are measured in dollar terms

iii. **Imperfect Competition Benefits**: Standard transport benefit calculations include the travel time savings to businesses that benefit from the Project. But the economic gains from the Project are likely greater than these because businesses are able to maintain higher prices than if competition forced them to pass through all those travel savings as reduced costs to customers. These business benefits from imperfect competition should be estimated separately to travel time and vehicle operations savings. These benefits are measured in dollar terms

iv. **Employment Increase**: Employment rises when a transport intervention improves the attractiveness of a location and makes it easier to enter the workforce either through decreased travel times for workers or incentivising businesses to expand due to the improved efficiencies of a better transport network. These benefits are measured as jobs added

v. **Access to Goods and Services Increase**: As land use in the corridor becomes more efficient, more businesses are established, increasing choice for businesses and households in terms of goods and services they can access. These benefits are measured as new businesses supported

vi. **Business Resilience Increase**: As the number of people living and working in the corridor rises, business resilience improves as local businesses have a bigger market within an accessible distance. This benefit is discussed qualitatively

vii. **Housing Enabled**: A transport improvement can improve housing access by making an area more desirable for more intensive housing development than would otherwise be the

case, leading to more affordable house prices than would otherwise occur and leading to more efficient use of land for residential purposes. These benefits are measured in additional housing delivered

23. Calculating these WEBs rests on a few key assumptions:

    i. **Current forecasts of growth in population and employment in the region** implicitly assume transport interventions that allow the city to continue to operate. In the absence of these interventions, congestion will continue to grow to unsustainable levels and consequently affecting growth of the city. The current growth projections commissioned by Greater Wellington Regional Council underpin several WEBs including agglomeration, employment increase, access to goods and services, business resilience and housing enabled

    ii. **Resilience benefits** were calculated based on transport modelling that compared the impact of partial or full closures in the current state (Do Minimum) against the impact in the event of tunnel duplication as proposed in this project. The methodology took into account average trip lengths, the generalised probability of a disruption (from tunnel incidents or from earthquakes), the likely length of disruption and the existence of alternative routes

    iii. **Imperfect competition benefits** were measured based on the methodology set out in the MBCM, estimated at 10.7% of travel time savings for heavy commercial vehicles

Determining regional or national significance

24. A key feature of consenting projects via the FTAA, is where projects can be shown to demonstrate that the benefits they generate are of regional or national significance, the decision-maker must specifically evaluate the proportionality of these benefits against any adverse impacts.

25. Having established the scale of the benefits, I discuss why these benefits are of regional and national significance.

26. I also comment on the stimulus effect of the Project on the Wellington economy. This stimulus is expected to primarily be the result of tax dollars being spent in the region, but there is a strong argument that this level of spending would not otherwise occur in the region and thus from a regional significance perspective, is an important consideration.

Cost type I: Standard construction and maintenance costs

27. I note that for applications where there is a private applicant, the monetary costs to that applicant (construction, maintenance and so on) are not generally relevant to a decision-maker in the FTAA (or RMA) process. For instance, if I was writing an economic assessment for a privately-funded solar farm development, I would consider only the benefits of the project including jobs created by the construction phase, and any quantified negative impacts resulting from the project such as construction disruption impacts. Construction and maintenance costs would be excluded from the assessment as irrelevant because the FTAA process is about the proportionality of benefits and unmitigated costs. Giving weight to construction and maintenance costs in this FTAA decision-making process would mean essentially applying a higher standard to the NZTA than would apply to a private applicant. However, for the purpose of full transparency and completeness, construction and maintenance costs are included in this assessment.

28. Cost estimates were provided to me by NZTA. There are several elements to the costs of constructing and maintaining an infrastructure project. These include:

i. **Property costs**: This includes the purchase of any land required to complete the Project, and any costs of relocation of businesses

ii. **Pre-implementation and approvals costs**: These are costs associated with professional services such as design and other managed costs as part of the consenting of the Project.

iii. **Construction costs**: The cost of all work to build the proposal including design and supervision costs, any landscaping or post-construction restoration

iv. **Maintenance costs**: The ongoing cost of operating the transport investment and keeping it in good operational condition, typically a percentage of the estimated construction cost

v. **NZTA administration fee**: The cost of NZTA managing property transactions, construction and maintenance of the Project, typically 6.5% to 9% of the Project cost

vi. **Toll-collection infrastructure and collection costs:** These apply only in the case of the Tolled scenario

Cost type II: Other costs of the Project

29. **Construction disruption impacts:** These are estimated from transport modelling run to simulate how travel may be disrupted during construction of the Project. They are estimated the same way as the standard transport benefits of the Project but are a disbenefit (cost) rather than a benefit.

5. STANDARD TRANSPORT BENEFITS

Overarching benefits assumptions

30. The overarching benefit assumptions used in the economic assessment are:

    i. Benefits streams were assumed to begin the year after construction is completed (assumed to begin in 2035)

    ii. Transport model benefit **estimates** for 2033 and 2053 were provided by Arc Advisory

    iii. Transport modelling and associated transport benefit estimates were estimated for 2033 and 2053 only and interpolated for the years from 2033 to 2053

    iv. Standard transport benefits are assumed to flat-line after 2053, a standard approach used for that far out into the future, but also a particularly modest assumption

Standard transport benefit estimates

31. Standard transport benefits were estimated as outputs from the transport modelling[6], measured relative to the Do Minimum scenario. The results in net present value terms are shown in Table 2.

Table 2: Present value standard transport benefits from the Base Option

Standard transport benefits relative to Do Minimum	Present value ($m)
Time travel savings	$1,580
Time reliability savings	$386
Walking and cycling	$12
Safety benefits	$27
Public transport benefits	$11
Emissions health benefits	-$6
Emissions climate benefits	-$7
Vehicle operating cost reductions	-$86
Total standard transport benefits	**$1,917**

32. According to the modelling results, the largest contributor to the standard transport benefits is the travel time savings, followed by travel time reliability benefits.

33. According to the modelling results, because the transport improvements are so significant, they will encourage more travel (i.e. more vehicle kilometres travelled), leading to a small decrease in health and climate benefits from emissions, and an increase in vehicle operating costs due to extra travel.

34. Safety improves despite there being some induced travel as safety for active mode users (cyclists and pedestrians) improves, according to the modelling results. Safety benefits are only counted along the corridor and exclude benefits across the rest of the network as more vehicles move from less safe local roads onto the improved highway network.

[6] Specific model outputs provided to me for the Base Option were *Economics - Untolled 050226*.

6. WIDER ECONOMIC BENEFITS

35. Wider economic benefits (WEBs) expressed in dollars in this assessment include resilience benefits, agglomeration and imperfect competition. Together, they are estimated at $1.54 billion in net present value terms.

Table 3: Present value of the wider economic benefits of the Project

Wider economic benefits	Present value ($m)
Resilience	$25
Agglomeration	$1,507
Imperfect competition	$8
Total WEBs	**$1,540**

Resilience benefits

36. Resilience benefits occur when the proposed transport solution leads to less disruption in travel for road users because the solution reduces disruptions through, for example:

    i. Reducing head-on crashes for example by separating traffic travelling in opposing directions by building duplicate tunnels

    ii. Improving optionality in times of longer disruption, for example by duplicating tunnels built to higher seismic standards that will provide the option of bi-directional traffic flow in the event that an earthquake closes the existing older tunnels

37. The resilience benefits of the Project have been calculated as road network user disruption cost savings only. The benefits estimated here do not include any flow-on impacts on businesses along the corridor in the case of a significant tunnel closure (e.g. due to an earthquake closing existing tunnels for months). These resilience benefit estimates only consider the direct impacts on the transport network as it forces changes in traveller behaviour due to a closure or partial closure and could be a small fraction of the true resilience benefits. They are therefore likely to represent a significant underestimate of resilience benefits.

38. The SH1 improvements are expected to improve resilience in two major ways.

    i. The number of crashes will be reduced and the number of travellers affected when there is an incident in one tunnel falls by increasing the number of lanes and separating oncoming traffic through the Terrace and Mt Victoria Tunnels

    ii. The new tunnels are likely to be substantially more resilient than the existing ones, providing a route along the corridor that is likely to be back in operation far faster than the existing tunnels in the event of a major earthquake

39. I considered resilience impacts from the perspectives of:

    i. **High probability low impact** incidents such as crashes or other tunnel disruption

    ii. **Low probability high impact** incidents – a large earthquake that closes the tunnels for a longer period of time

40. I limited my analysis to the resilience impacts of the improvements through the additional and upgraded existing tunnels rather than any other resilience benefits across the broader route. Again, this means **my analysis likely underestimates the resilience benefits**.

41. In the event of a tunnel being closed because of an incident, drivers have four options:

i. Wait in traffic for the incident to be resolved. This is the option drivers may be forced to take if they are already on approach to a tunnel where a partial or full closure is in effect. In the event of an earthquake closing a tunnel for a considerable time (up to several months), drivers will obviously not choose this option

ii. Cancel their trip. In the event of a long-term closure due to an earthquake, few drivers will ultimately choose this option especially if the closure lasts more than a few days

iii. Proceed more slowly on the existing route in the event that a lane remains open in their direction of travel. Because the new tunnels are expected to be more resilient, once they re-open after a major earthquake, drivers will likely have the option of "diverting" through the new tunnel, which would be made temporarily bi-directional

iv. Divert onto another route

42. The way drivers respond will vary depending on the type of incident in the tunnel and its expected duration. By adding two new tunnels, drivers' options will be changed: the number of bi-directional tunnel closures will reduce, and in the event of a major event like an earthquake closing existing tunnels, the option will exist to make the new tunnels bi-directional temporarily to ease the burden on alternative routes. I set out the assumptions used for these different driver choices in different situations in the more comprehensive Annexure.

43. Data was available through Traffic Road Event Information System (TREIS) and through NZTA Facebook posts on incidents in the tunnels that allowed me to estimate the number of high probability, low impact incidents per year in each of the existing tunnels, as well as the share of serious incidents that were head-on collisions (which will be avoided in the new layout) and single-lane outages.

44. Data was available from the *Seismic Resilience Philosophy: SH1 Wellington Improvements* document on the expected impact of scale of earthquake (1 in 50 years, 1 in 500 years, 1 in 2500 years) on the existing and new tunnel availability as well as likelihood of these scales of quake occurring in the next 100 years.[7] This data allowed me to estimate the likely reduction in partial and full tunnel closures once the tunnels are duplicated.

45. Arc Advisory provided model results for what would happen to travel times, distances and speeds across the regional network if either of the existing tunnels was closed. I also estimated how duplicating the tunnels will reduce the impact of single lane closure events.

46. Combining this data with NZTA estimates of the value of time and vehicle operating costs allowed me to estimate the resilience benefits of low impact, high probability (like crashes) and high impact, low probability events (like earthquakes) on travellers, as shown in Table 4.

Table 4: Resilience benefits of the proposed SH1 tunnel improvements

Resilience benefits	Present value ($m)
High probability low impact incidents	$5.4
Low probability high impact incidents	$19.7
Total resilience benefits	**$25.1**

[7] *Seismic Resilience Philosophy: SH1 Wellington Improvements*. 23 September 2025. I have also reviewed Technical Report #13, regarding resilience, in relation to this issue.

47. Although there are several single-lane and full closure events each year in both tunnels, transport modelling indicates that network-wide impacts are modest as most closures are resolved quite quickly. However, the far less common but more damaging case of a major earthquake with a 1/500 year return period would be sufficient to close the existing tunnels for a year and the new tunnels for around 6 weeks. Having the tunnel duplication in place therefore significantly improves resilience along the corridor. The resilience benefit of tunnel duplication in the case of these large-duration events is $21 million of the total resilience benefit of approximately $25 million.

Agglomeration

48. Agglomeration occurs when the productivity of workers and the number of workers within a geographic area increases. This increase is the result of businesses, their suppliers and customers tending to co-locate because of the benefits of close proximity and as access between workers and jobs improves, allowing greater specialisation. In the analysis here, these benefits include the higher labour productivity expected as the transport intervention improves the efficiency of interaction between businesses in the corridor, but also total production as the number of workers in the area rises faster than it would in the absence of a transport intervention.

49. A solution that improves travel times along SH1 by unblocking tunnel bottlenecks and improving access to the city centre is expected to increase the attractiveness of the location for businesses, and to support growth in job density, allowing more efficient use of land along the corridor.

Defining "the corridor"

50. Net benefits through improved productivity and total production are measured at the Wellington Regional level. However, the assumption is that the better outcomes at the Wellington Regional level accrue due to improved access to the area within a one kilometre radius along the corridor stretching from the northern end of the Terrace Tunnel(s) to the airport. This area was chosen to include the Stats NZ statistical areas (SA2s) that sit within a one kilometre radius of the road improvements but also includes Rongotai where benefit to the Airport is expected from the improvements.[8] This improved transport improves job access and raises productivity along that corridor, such that overall the number of jobs in Wellington is higher than it would otherwise be. The SA2s included in the corridor are shown in Figure 1.

[8] We note that this is a particularly modest assumption. Some stakeholders have argued that travel behaviour will be affected over a much larger distance from the corridor than one kilometre as the crow flies, and therefore the productivity gains may accrue over a wider area than the corridor used in my analysis.

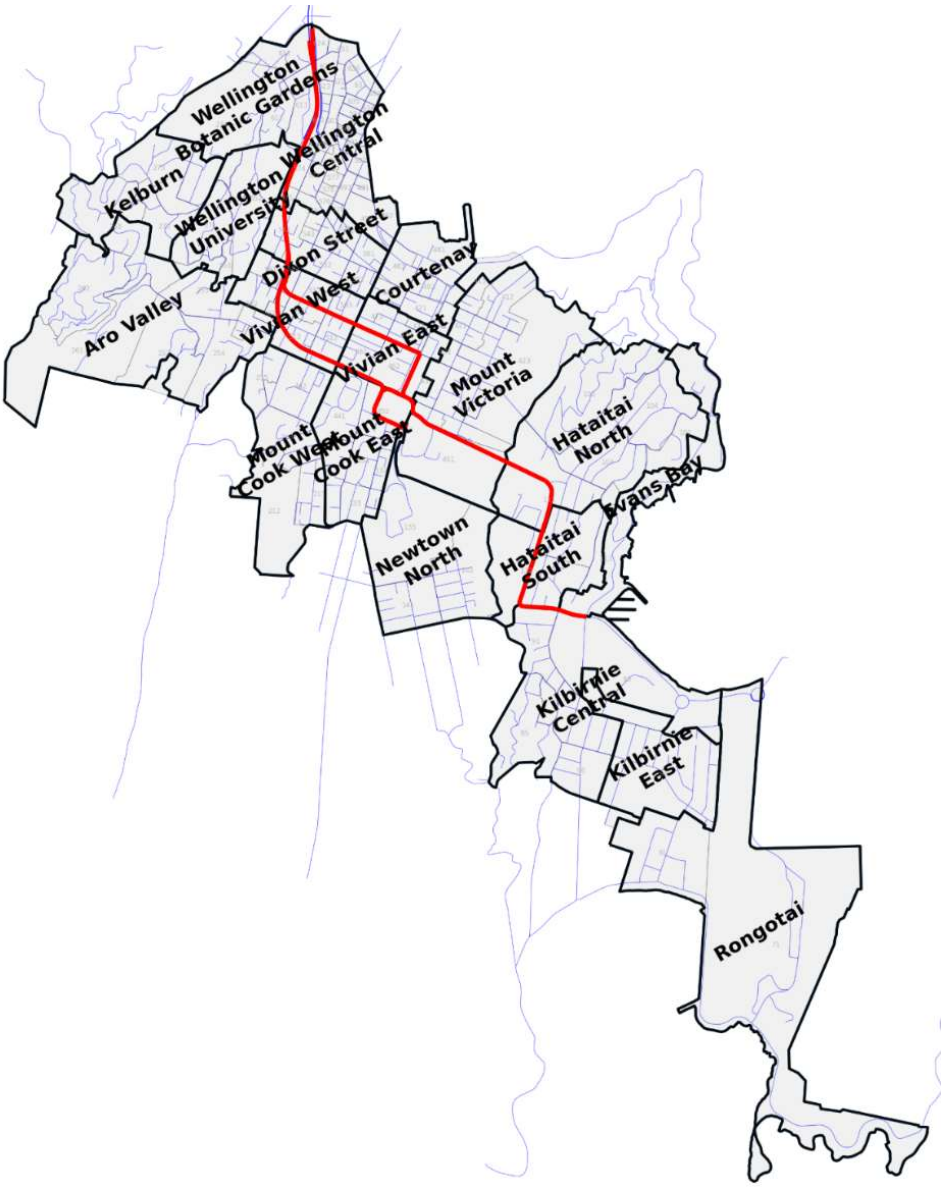

Figure 1 – The SH1 corridor showing SA2s included in the corridor definition

Growth in employment in Wellington based on "Business As Usual"

51. An estimated 121,000 workers worked in the corridor as of 2024.[9] A key element to estimating the impact of the SH1 improvements is to consider how employment in the area, and across Wellington more widely, may be affected without improvements on the corridor.

52. The Arc Advisory population and employment forecasts used in the Investment Case were based on Stats NZ and Sense Partners population and employment projections for the

[9] Stats NZ Business Demography dataset

Greater Wellington Regional Council for the next 30 years. The Investment Case numbers provide employment growth rates from 2018 to 2053, with a sectoral breakdown that assumes different rates of growth in different industry sectors.

53. The assumed growth rates from the Investment Case were applied to the actual 2024 employment data available from Stats NZ to estimate total employment growth by sector to 2053 for the corridor and the rest of Wellington. From 2054 onwards, it was assumed that annual growth in employment in the corridor and the rest of Wellington was constant based on the absolute change in employment from 2053 to 2084, allowing for a declining growth rate.[10]

54. The Investment Case growth rates as applied to actual 2024 employment figures implicitly assume "a transport solution along SH1" that accommodates expected growth in the city over the next several decades, without a link-by-link consideration of different transport interventions that may or may not occur. It is a "Business As Usual" approach that assumes that transport challenges get resolved somehow over time such that people are not dissuaded from locating in Wellington. But increasing congestion in the central city, particularly in peak times but growing across all times of the day, likely already does and certainly will in future supress growth in employment without an intervention to improve transport efficiency and access.

Growth in employment without SH1 improvements

55. There is no specific population and employment modelling available that considers how growth in Wellington may be affected **in the absence of a solution to growing congestion along the SH1 route**. But several factors point strongly to population and employment growth being stunted in the absence of a transport solution along SH1 in Wellington:

    i. **Current congestion**: There are already congestion challenges along the SH1 corridor from north of the Terrace Tunnel through to the Airport. The transport modelling on this Project demonstrates that there are approximately $2.0 billion in travel time savings and travel time reliability benefits from the proposed intervention. Estimated average speeds from north of the Terrace Tunnel (Bowen Street) to the Airport during morning peak time is currently just 17 km/h along a state highway. Previous work considering transport options for Wellington also identified congestion as an issue, pointing out that "the transport system… is already at capacity during peak times. Traffic congestion is a regular occurrence, indicating that the transport network is unable to support current or expected growth in travel demand"[11]

    ii. **Worsening congestion**: Do-Minimum modelling (i.e. modelling of how traffic may be affected in the absence of an intervention) suggests that congestion will worsen on the route substantially over the next several decades. By 2053, the Bowen Street to Airport route is expected to worsen to 33 minutes, or an average speed of around 14 km/h along the highway route, during the morning peak in the absence of a transport solution

    iii. **Other interventions don't resolve the problem**: While the consenting process will focus on the merits of the proposed intervention rather than a full range of other interventions

[10] One further assumption is a lower long-term growth rate in central government employment, which grew very sharply in recent years. Adjusting this growth rate down reduces the estimated benefits stream presented here

[11] NZTA, Greater Wellington Regional Council and Wellington City Council. (2022). *Let's Get Wellington Moving: Travel Behaviour Change - Single Stage Business Case*, p.1

that may affect the efficiency of the transport network, considering the expected impact of one of those interventions is instructive. One change in the Do-Minimum scenario since the Investment Case is allowing for the planned bus lanes on the Harbour Quays.[12] The goal of that bus laning project is to make public transport access into the city easier and to encourage a switch in transport mode to public transport. However, the transport modelling underpinning the SH1 improvements, having accommodated this change since the original Investment Case, indicates that bus laning increases congestion on the rest of the transport network. In other words, a proposed public transport project is expected to exacerbate congestion and strengthen the case for improvements along SH1. Public transport and active mode interventions alone are unlikely to resolve growing congestion issues

iv. **Congestion likely already affects location choice:** Data provided by Wellington City Council in Figure 2 demonstrates the much slower increase in population in the east of the city (and to some extent the south) than in other Wellington City Wards. There are many factors likely at play here, but the stunted growth in the east is likely to reflect at least in part the limited transport access there, which makes it an unattractive location choice, particularly when compared to growth in other parts of the city. This weak historical growth in population and employment especially in the east implies that the growth forecasts adopted by Greater Wellington Regional Council are already likely to underestimate growth potential in the east if transport improves

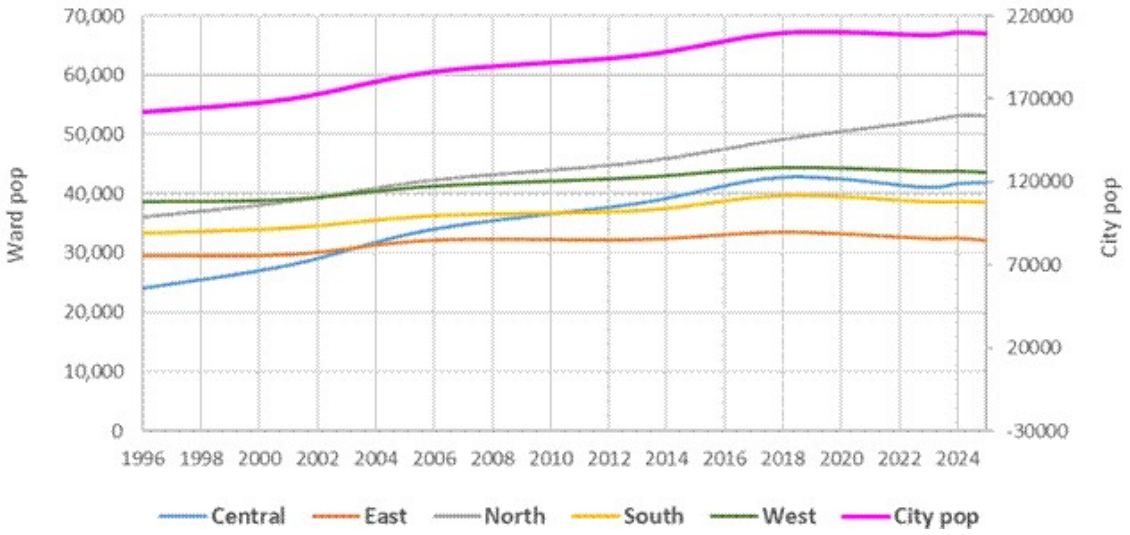

Figure 2 – Growth by Wellington City Ward (*supplied by WCC*)

56. My approach has therefore been to work backwards from the estimates of growth in employment in the corridor and the rest of Wellington, to a defensible, modest view of what job growth may occur in the area **in the absence** of the SH1 improvements. I ignore two other effects that would strengthen the argument for the SH1 improvements:

[12] Harbour Quays Bus Corridor in the Greater Wellington RLTP. Stage 1 scheduled for 2024-27 and stage 2 for 2025-2031

i. I ignore the fact that Business As Usual growth projections probably underestimate growth in employment and population in the east that could be unlocked by SH1 improvements (and therefore undercount the benefit of improved transport access)

ii. I ignore the potential shift that the Project could have in encouraging employment and residents to shift from more distant parts of the city into the high-GDP-per-worker city centre, which would create its own productivity benefits. Instead, I focus only on a modest estimate of employment that may be generated in the corridor that may not otherwise occur at all

57. My approach implicitly includes what Economists call:

i. **Static impacts**: The increase in labour productivity because of improved travel times that effectively "bring people and jobs closer together" (effective job density)

ii. **Dynamic impacts**: The increase in total employment and GDP because land is used more efficiently in the area along the corridor due to improved access that stimulates more efficient use of land and property in the area as the corridor becomes more attractive

58. My assumptions are shown in Table 5. SH1 improvements are assumed to only mildly affect the number of jobs added into the Wellington economy that would not otherwise be added. In other words, I likely understate the benefits of the Project on productivity and total production.

59. On these assumptions, only around 300 jobs are added in Wellington by 2053 explicitly because of the improved transport efficiency of the SH1 corridor. There is some continued growth through to 2084 that would not otherwise occur, such that by 2084 the SH1 improvements is assumed to generate around 555 additional workers (only around 1.4% of the total workers added in the corridor during this time, and only 0.3% of all workers in the corridor by 2084). I sensitivity test a higher rate of support from better transport later in this assessment.

Table 5: Assumed growth in employment with and without SH1 improvements, 2025 to 2084

Economic sector	Worker growth 2024-2084		Net gain (rounded)
	Without SH1	With SH1	
Agriculture	-5	-5	0
Mining	26	27	0
Manufacturing	42	42	1
Utilities	288	292	4
Construction	556	564	8
Wholesale	-83	-81	1
Retail	373	378	5
Accommodation and food	-357	-352	5
Transport postal and warehousing	297	301	4
Information and communication tech	-15	-14	0
Finance and insurance	5,361	5,437	76
Rental hiring and real estate	551	559	8
Professional, scientific and technical	6,806	6,903	97
Administrative support	248	252	4
Public admin and safety	11,918	12,087	169
Education and training	3,114	3,158	44
Healthcare and social services	7,937	8,050	113
Arts and recreation	166	169	2
Other services	922	935	13

Economic sector	Worker growth 2024-2084		Net gain (rounded)
	Without SH1	With SH1	
Rental hiring	38,147	38,702	555

Labour productivity and production growth

60. However, even this relatively small number of additional workers generates a significant contribution to GDP. Labour productivity (value generated per worker or, in broad terms, salaries plus profits) in the corridor in 2024 was estimated at $127,400 per worker. As job density rises in the corridor and the rest of Wellington, even without the SH1 improvements, labour productivity is assumed to rise from the level it is at today. I therefore modelled growth in labour productivity from today's levels for both the corridor and the rest of Wellington, with and without the SH1 improvements. There are small additional gains in labour productivity per worker in the corridor because of the assumption that total job density rises a small amount there due to the transport improvements' role in stimulating greater job density.

61. Accordingly, the overwhelming share of the agglomeration benefits come from the small number of extra workers it was conservatively assumed are added to the Wellington economy within the corridor.

Agglomeration analysis results

62. The results of the agglomeration analysis are shown in Figure 3, as well as the present value for total growth in GDP from higher labour productivity and from an increase in the number of workers. The benefits are not assumed to commence until financial year 2035, after construction is assumed to complete.

Table 6: Production impacts by selected years of implementing SH1 improvements

Agglomeration benefits from SH1 improvements	GDP benefits ($m)	
	Annual (undiscounted)	Cumulative (Present Value)
2034	$0.0	$0.0
2035	$4.9	$4.0
2044	$33.3	$164
2054	$55.9	$444
2064	$71.8	$777
2084	$104.6	$1,507

Imperfect competition

63. The economic gains to businesses from the Project are likely greater than just the travel time savings because businesses are able to maintain higher prices than if competition forced them to pass through all those travel savings as reduced costs to customers. These business benefits from imperfect competition are assumed to be 10.7% of conventional **business user benefits** from travel time, that accrues to businesses in the form of additional profits from the Project. This WEB is therefore estimated from the transport benefits already presented.

64. The discounted value of these benefits to 2084 is $7.9 million.

Other wider economic benefits

65. Our analysis also considered four other economic benefits that are not routinely considered as part of the MBCM analysis or under the monetised WEBs analysis. These should be seen as

additional to the benefits expressed in dollars above, and although not expressed in dollar values, are no less real or meaningful. Three of these can be expressed in non-monetised terms as shown in Table 7.

Table 7: Other wider economic benefits

Non-monetised economic benefits	2053	2084
Net additional Full-Time Equivalent (FTE) jobs with SH1 improvements	297	555
Net additional businesses with SH1 improvements	18	39
Net additional houses with SH1 improvements	81	178

Employment increase

66. The employment increase supported by the SH1 improvements has already been introduced as an intermediate step to estimating the agglomeration benefits. Net additional jobs added to the Wellington (and national) economy using the modest assumptions set out previously results in the gains shown in Figure 3[13]

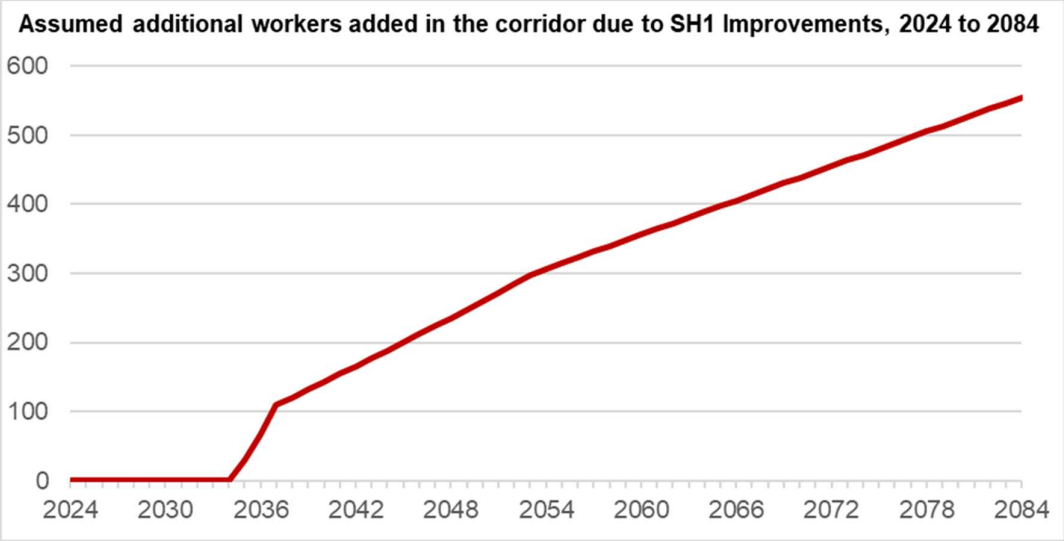

Figure 3 – Estimated net gain in jobs in the corridor due to transport intervention

67. I expect a step-change in employment in the corridor after the Project is completed, unlocking potential growth. My assumption is the step-change is spread over three years after construction completes as a consequence of more businesses being attracted to the corridor as the primary employment location in Wellington, over and above what would otherwise be the case. With similar **rates** of growth in the Do Minimum and the Base Option after 2053, by

[13] I would note that some argue that if growth is stunted in Wellington because of a lack of a transport solution that growth would simply go elsewhere. I disagree, for the following reasons. First, those alternative locations would need to have a similar industry profile and scale to compete with the competitive advantages that have encouraged businesses to locate in Wellington, limiting the number of viable alternatives in New Zealand. Second, those alternative locations would need to have the infrastructure capacity that Wellington would lack, a particularly bold assumption given the nationwide infrastructure shortfall. Third, given the modest nature of the employment and housing benefits I am attributing to the Project, even if some jobs and housing is delivered somewhere else as a consequence of the Project not being built, that is likely to be additional to any impact I am suggesting here

2084 the modest assumption is that there will be around 555 more workers in Wellington than there would otherwise be, located in the corridor.

68. I would highlight again the modest nature of this assumption. The assumption is that only around 1.4% of **additional** workers added in the corridor over the next 60 years are added because of the transport improvements made through the SH1 improvements, and that this change in growth pattern takes three years to materialise after the Project is completed.

Access to goods and services

69. Because the number of workers in the corridor is assumed to grow slightly faster with the SH1 improvements than without them, this will also likely result in more new businesses than would otherwise be the case.

70. The corridor had larger average business sizes than for Wellington overall, at around 10.6 workers per business, compared to 4.8 for the rest of Wellington in 2025. This is a function of the types of business that operate in the corridor. Far higher proportions of workers in the corridor are working in Energy, Transport/Logistics, Public Service (as the seat of central government), Education and Health than in Wellington overall. Further, within practically every industrial sector, businesses in the corridor tend to be bigger than the average business in that sector in Wellington.

71. Consequently, I assume that business sizes in the corridor will likely stay larger than in Wellington overall and will change in line with the expected growth in sectors. The modest estimate of additional jobs that the SH1 improvements is assumed to add, implies an extra 39 business by 2084. These extra businesses will improve goods and services choice for other businesses and consumers within reasonable travel distance of the transport improvements.

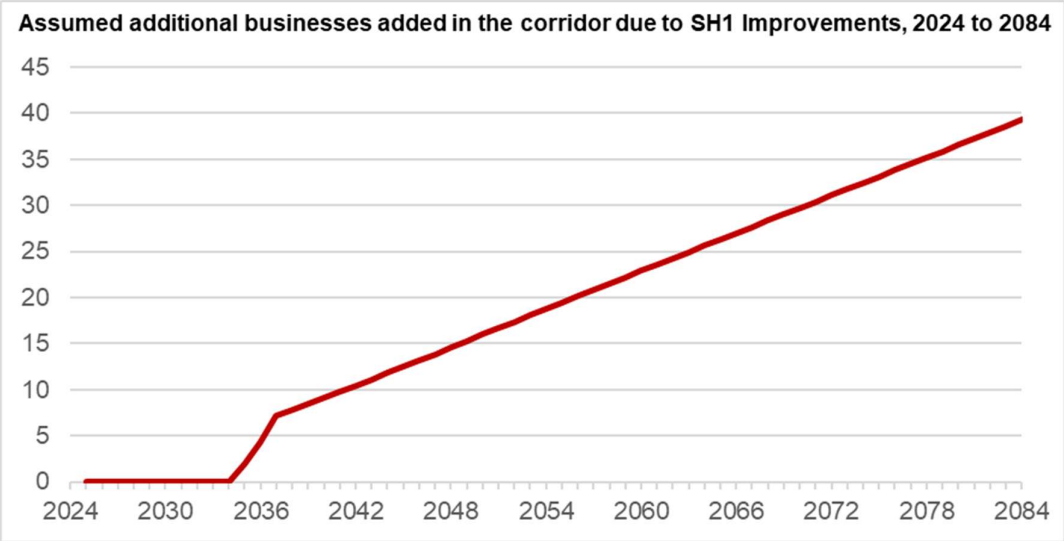

**Figure 4 – Estimated net gain in businesses in the corridor due to transport intervention **

Business resilience increase

72. Improving travel times improves the number of other businesses, suppliers and consumers within reasonable access time of the corridor. Not only does this improve productivity (already covered), but it also increases the size of the market that businesses in the corridor have access to. This improves business resilience by giving businesses a wider variety of other businesses and consumers on which to rely for profitability.

Housing enabled

73. The proposed SH1 improvements are expected to improve access to and from residential development capacity within the corridor.

74. As with employment, forecasts to 2053 are predicated on an improvement in transport connections through the SH1 improvements corridor. In other words, current modelling by Stats NZ and by Greater Wellington Regional Council implicitly assumes that traffic does not come to a standstill through central Wellington over the next 60 years through lack of a transport solution along this spine. Yet the congestion problem has been well-documented in previous work. In the absence of a transport solution, it is appropriate to assume a reduction in housing development due to resultant congestion although my assumptions here are particularly modest.

75. The growth rates from the earlier Investment Case work indicate that the number of households in the corridor will increase by 21% between 2024 and 2053 with a transport solution along the corridor as I have defined it in Figure 1, or an increase of around 5,760 households. I acknowledge that households and dwellings are not the same, but households provide a useful proxy for dwellings, and I assume a similar rate of increase in dwellings. The significant growth in dwellings in the corridor is in part reliant on the SH1 improvements solution being implemented that improves travel times.

76. I make the following further assumptions:

    i. Extend growth in housing in the corridor at a flat rate after 2053 to allow for the likelihood that growth will slow over time. As a result, total housing in the corridor is expected to grow by 12,730 between 2024 and 2084

    ii. Modestly estimate that just one in 70 additional dwellings built in the corridor between 2035 and 2084 is attributable to the stimulatory effect of the Project. In reality, one would expect that in the absence of a transport solution, congestion would become such a challenge in the corridor that there would be a much bigger stunting effect on growth in housing supply, given how stunted growth in the east in particular already appears to be. However, in the absence of hard data, I am using a particularly modest estimate; I assume that only around 180 of the expected **additional** 12,730 dwellings to be delivered in the corridor to 2084 would not be delivered without SH1 improvements (or just 0.4% of **all** dwellings in the corridor by 2084)

77. The assumption here is that these are **net additional houses** added to the Wellington economy (with the assumption they are added within the corridor, which is a low emissions and low congestion way to grow) that would not otherwise be built in Wellington, having accounted for any dwellings removed as part of the construction process. The result is the pattern of extra homes being delivered set out in Figure 5.

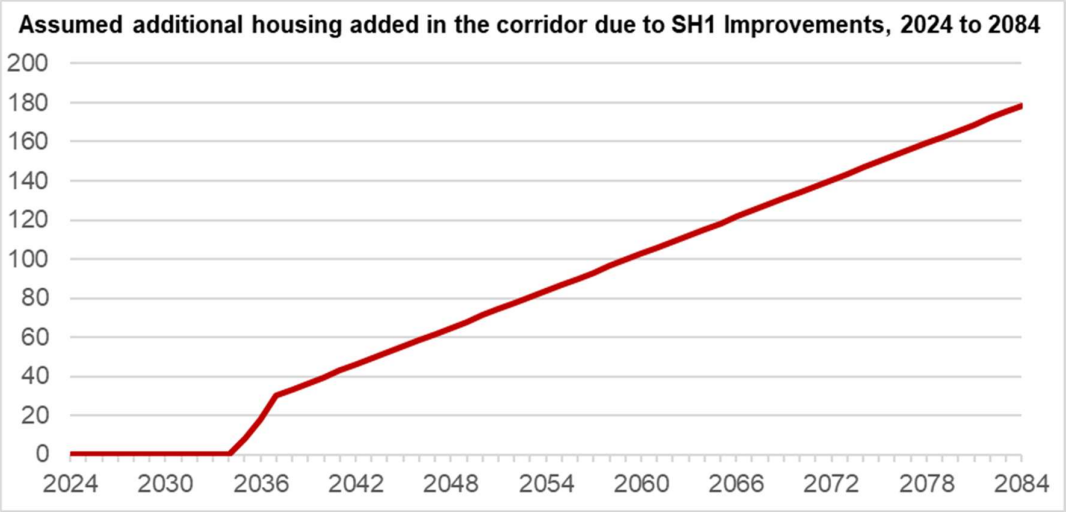

Figure 5 – Estimated net gain in dwellings in the corridor due to transport intervention

78. Based on the assumptions set out above, the SH1 improvements are **modestly** estimated to enable around a further 180 dwellings in the corridor by 2084 that would not otherwise be added.

7. NATIONAL AND REGIONAL SCALE OF THE BENEFITS

79. The purpose of the FTAA is to facilitate the delivery of infrastructure and development projects that have "significant regional or national benefits".

80. The Project is along the State Highway network, linking the international and domestic airport to the central city that is the seat of government. The NPS-UD defines **nationally significant infrastructure** as including State highways and any airport that services aircraft capable of carrying more than 30 passengers, both of which are included in the corridor covered by the SH1 improvement proposals.[14]

81. In terms of specific focuses of the FTAA legislation, there are several ways in which the Project is expected to deliver significant benefits that are nationally and regionally important:

    i. The Project improves functioning of the most regionally important transport corridor in Wellington. The stretch of road from Johnsonville to the Terrace Tunnel is the busiest section of highway in New Zealand outside of Auckland, making it a nationally-significant corridor. At the point where SH1 and SH2 split, approximately 85,000 vehicles per day travel north or south along SH1. Around 45,000 vehicles proceed through Terrace Tunnel every day, while around 40,000 vehicles use the Mt Victoria Tunnel

    ii. The Project **contributes to a well-functioning urban environment** in Wellington as per the definition provided in the NPS-UD, by improving “accessibility for all people between housing, jobs, community services, natural spaces, and open spaces”. The Project improves travel in New Zealand's capital and the largest centre in the region, by increasing efficiency of travel. Travel time, congestion reduction and reliability benefits are estimated at $2.0 billion in present value terms, or 4% of regional GDP in net present value terms. The Project further provides better resilience in the event of incidents in the tunnels

    iii. The Project **delivers significant economic benefits.** The area along the corridor as defined in my analysis produces an estimated 41% of Wellington Region’s entire GDP and 4.6% of New Zealand’s entire annual GDP. Through supporting job creation, boosting labour productivity and regional GDP (by an estimated $1.5 billion in present value terms, or about 3% of the Region’s annual GDP), the Project provides nationally and regionally significant economic benefits. This stimulus is expected to generate over 550 jobs that would not otherwise be created in Wellington on an ongoing basis and almost 40 new businesses that will improve access to goods and services for residents

    iv. The Project **contributes to recovery from natural hazard events** and unplanned tunnel closures (e.g. through crashes) by providing a more resilient spine through central Wellington which will assist emergency vehicles and help central and local government and residents resume normal economic activity more rapidly. The new tunnels are anticipated to reduce downtime in the Terrace Tunnel and Mt Victoria Tunnel corridors from one year for a 1/500 year event to 6 weeks, for instance, and will reduce the frequency of head-on collisions

[14] National Policy Statement on Urban Development 2020. (2022) Ministry for the Environment, p. 7

v. The Project **supports intensification of housing supply** along the corridor, which is where most high-paying jobs in Wellington Region are, by improving the connectivity of areas along the corridor and further to the east and north that can use the corridor. I modestly estimate that around 180 additional homes will be delivered in the corridor area directly because of the transport improvements although the figure may be much higher

Regional stimulus of the Project delivery phase

82. The Project is expected to result in around $2.6 billion in direct spending in the Wellington region in present value, unescalated dollars. While this money is expected to mostly come from taxpayers, some of whom live in Wellington, this is by far the largest proposed central government investment in Wellington today and is likely to be particularly welcomed by the local construction sector. An estimated 12.5% of the New Zealand tax take is contributed by Wellington region residents, meaning around $2.3 billion of the total project cost will be a net contribution into the region. Every dollar of tax contributed to the Project by Wellington taxpayers unlocks $7 from taxpayers across the country. This is a significant opportunity for the region to tackle its congestion challenges along one of the busiest sections of highway in New Zealand.

83. This spending on a project that may otherwise be lost to the region will provide a large economic stimulus or impulse. Considering only the construction stimulus (i.e. ignoring any of the pre-construction spending on other elements such as design services), the project is expected to support around 525 direct construction full-time equivalents (FTEs) **a year every year for the assumed seven-year construction period** on average.

84. The construction businesses employing these workers will also create jobs in upstream supplier industries (called “Indirect stimulus”) and the workers at the construction businesses will spend their wages, creating jobs downstream (“Induced stimulus”) via their grocery spending, purchases in the hospitality sector and other household costs. These Indirect and Induced stimuli support hundreds more jobs, at an average of around **775 FTEs a year over the seven years** of construction.

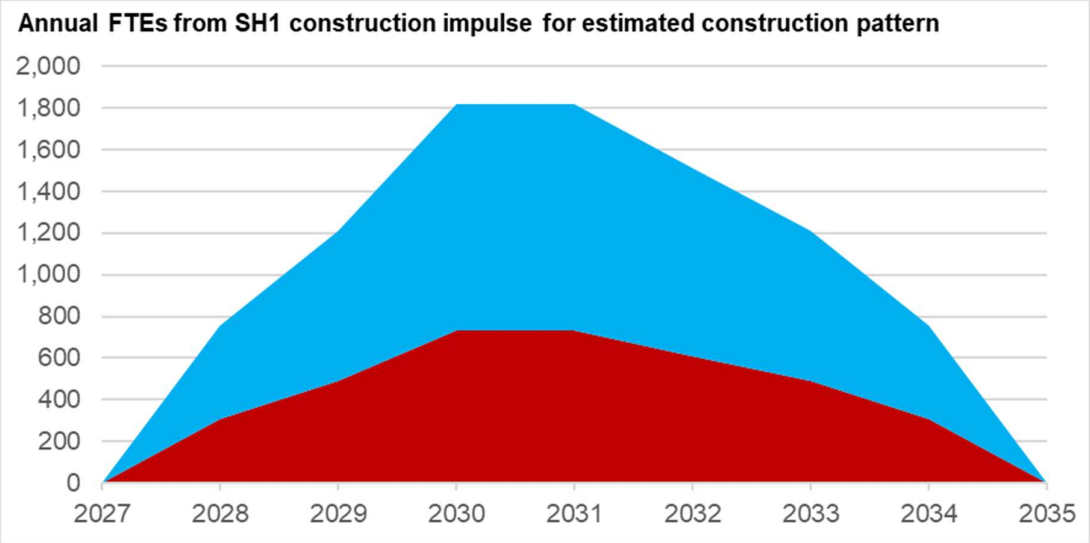

Figure 6 – Estimated jobs supported by the construction economic impulse

85. At its peak, the construction of the project is expected to **support more than 1,800 jobs** directly and through upstream and downstream employment.

8. CONSTRUCTION AND MAINTENANCE COSTS

Project development, construction and maintenance

86. As highlighted previously, the project delivery costs to the applicant (construction, maintenance and so on) are not central to decision-making in the FTAA (or RMA) process. However, for the purpose of full transparency and completeness, construction and maintenance costs are set out here.

87. Three direct costs associated with the Project were evaluated and data provided to me by NZTA.

i. **Project Development and Pre-Implementation**, consisting of property purchases and relocations, approvals and other pre-implementation costs, and a commensurate share of the budget estimated to cover administration costs of the Project, are estimated at $465 million in unescalated, present terms over the pre-development phase of the Project

ii. **Construction Costs and Associated Administration Costs**, consisting of capital costs, implementation costs plus a commensurate share of the budget estimated to cover administration costs of the Project, are estimated at $1.91 billion in unescalated, present value terms

iii. **Maintenance costs** are estimated at $217 million in present value terms over the analysis period of the Project, assumed to be the 60 years to 2084 in line with MBCM guidance for large scale RoNS analysis periods, as benefits are likely to endure beyond a typical 40-year analysis period on a project of this scale and impact on the regional transport system

88. In present value terms, these costs associated with developing the Project are an estimated $2.6 billion.

Table 8: Estimated construction costs

Project delivery and operation costs	P50 present value ($m)
Project development and pre-implementation costs	$465
Constructions costs	$1,906
Maintenance costs	$217
Total	**$2,589**

Construction disruption impacts

89. Construction disruption impacts are of two types. I discuss both of these below:

i. One-off impacts on road users (whether commuters or businesses relying on the road network)

ii. Ongoing impacts on businesses which may be harder to access during and after construction due to loss of car parks or changes to road layout or turning rules

Impact on road users

90. I have undertaken analysis that can provide a reasonable **sense of scale** of the potential impacts of construction disruption. Not every element of the Project has been able to be individually modelled and a disruption impact estimated. But because we do have modelling estimates for the closure of the main artery through the city – the tunnels – we can estimate the scale of the likely disruption impacts across the network because of the construction of the Project.

91. These tunnel closure impacts by definition include effects on commuters in a private vehicle and also effects on commercial vehicle operators and therefore impacts on businesses from disruption to the road network.

92. I have adopted a methodology for estimating construction disruption impacts such that I believe I have erred on the side of overestimating these disruption impacts.

93. My assessment has been informed by the Hoffcon report as well as Mr Tindall's transport assessment, which taken together suggest while there will be localised disruption, the vast bulk of the network will operate largely as normal most of the time. This expectation underpins my assessment and is predicated on the following important elements that have supported my approach to estimating the construction disruption impacts:

    i. The majority of construction activities allow for an equivalent number of existing SH1 traffic lanes in each direction to remain open during works although there may be some speed reductions and queuing[15]

    ii. Most other works can be accommodated through short duration closures or closures during night or interpeak times to minimise traffic disruption[16]

    iii. Closures of the existing Mount Victoria tunnel to accommodate blasting of the new tunnel will be scheduled for overnight periods around 8pm, when traffic is lighter than in peak and interpeak periods. The regularity of these closures will be well-signalled and it is expected that road users will use other parts of the road network that have adequate spare capacity at that time during these regular nightly closures. For instance, vehicle movements from the Airport would likely instead use the bays and waterfront route to bypass the central city and then head north on SH1 north of the Terrace Tunnel

    iv. Traffic switches that move live traffic from an existing carriage way onto a newly constructed pavement (typically built offline from live traffic) are expected to be accommodated overnight or via short full closures an estimated 30 minutes' duration[17]

    v. In line with Mr Tindall's recommendations, I assume SH1 is not closed for long periods of time, and certainly not for long periods of time during peak hours.[18] His work acknowledges that at different points along the corridor there will be temporary lane reductions, closures, traffic switches, detours and speed reductions, but the intent is to keep one lane open at least in each direction through the tunnels during peak and interpeak hours

    vi. At the same time, faced with a long period of defined changes to travel routes, network users tend to adjust. For instance, Mr Tindall also points out that there may be some temporary mode shift as people switch from cycling onto public transport or into cars for the duration of construction. There may also be some shift from cars to public transport

[15] Hoffman Consultants Limited (Hoffcon). (2026). *SH1 Wellington Improvements: Constructability Report – For Consenting*, p.11

[16] Ibid

[17] Hoffcon, p.12

[18] Duncan Tindall. *State Highway 1 Wellington Improvements Project Transport Assessment*

vii. Considering all the effects during construction, Mr Tindall concludes that if the Project were to be constructed using the approach outlined, there would be low to moderate adverse effects in several areas across the city, but this would not be excessive

94. It is therefore acknowledged that although the Project's design and planning endeavour to minimise disruption to the existing network, there will be some impacts, at least temporarily, in various locations. The impacts described above are, overall, expected to be quite minor relative to the long-term benefits of the Project.

95. My analysis allows for some disruption due to work associated with the tunnels (even though this is expected to be overnight after 8pm rather than during peak or interpeak periods), and for some disruption impacts on other local roads, particularly around the Basin Reserve section of the Project. My goal here is not to suggest the estimate is the exact figure, but that it provides a suitable order of magnitude for the likely small disruptions across the network at various times. The impact is not zero, but also not in the hundreds of millions of dollars.

96. To provide some sense of scale, I estimate construction disruption impacts as if the two existing tunnels were closed overnight for the full period from all of FY28 to all of FY34 (seven years). In reality, the tunnels will be closed for a fraction of this time (expected to be just a couple of hours a night for up to a year for Mt Victoria for example, or 1/20th of the total impact I estimate here). But using this approach provides a significant allowance to cover the disruption impacts on the wider network due to short-duration closures, detours and disruption on less busy roads.

97. This assumption likely leads to a significant overestimate of travel-related disruption impacts due to construction but provides a sense of scale. At around $48 million in present value terms across the construction period, travel-related disruption impacts are a tiny fraction of the estimated benefits of the Project (about 1.4% of gross Project benefits).

98. Caveats on these figures to bear in mind (with impact on the disruption costs shown in brackets) are:

i. Many users of the Mount Victoria Tunnel continue their journey into the Terrace Tunnel or vice versa (therefore disruption impacts are potentially overstated)

ii. They exclude the impact on individual businesses where the construction activity makes it more difficult to visit that business, which I discuss in more detail below

Ongoing impacts on businesses

99. I acknowledge that there is a further impact on businesses, particularly directly along Vivian Street. Impacts are of three types:

i. Construction disruption including closed footpaths for verandah modification

ii. Loss of car parks

iii. Reduced access through new road layouts, temporary closures or re-routing of adjacent streets

100. My analysis of the WEBs, specifically agglomeration benefits (see paragraph 62), provides a modest estimate of the potential for the Project to unlock more jobs and therefore more production along the corridor as a consequence of the transport improvements improving access and therefore making development in this area more attractive. The Project has regionally and nationally significant benefits for economic activity, in the region of $1.5 billion in productivity and production benefits alone in today's dollars.

101. However, this agglomeration benefit is a **net gain**, indicating that over the next several decades economic development will be significantly better with the Project than without it. Some businesses may be negatively affected by loss of ease of access through reduced parking or limits to removed turning options. But overall, the benefits to the regional economy are expected to be significant, as demonstrated by the estimate of agglomeration benefits, such that the benefits are substantially larger than the costs.

102. The analysis cannot provide detail on specific businesses that may benefit most strongly or businesses that may be negatively affected by the loss of car parks or less easy access. However, the agglomeration estimates implicitly account for the fact that there may be some job losses and some change in industry composition in the city as a consequence of the transport solution. It is therefore correct to interpret the agglomeration results as implying that while some businesses may be challenged by construction impacts and access during and after construction, these challenges will be disproportionately offset by net gains in employment and productivity.

103. I acknowledge that the impact of construction disruption or ongoing loss of car parks and changed road layouts will make it harder on some workers and customers of businesses along parts of the corridor to reach the business location. This impact matters:

    i. Most for businesses relying on impulse, foot-traffic or transactional purchases, such as fast-food restaurants, pubs or general retail

    ii. Less for business that may still require on-site visits by customers but where that service is specialist or requires advance booking, such as lawyers, hairdressers, banking services, health services, specialist retail, travel services, accommodation services, or education services

    iii. Least for businesses that rely on travelling to client sites or that are internal or online-focused, such as construction, professional services, real estate services, insurance services, government services, ICT, wholesale, logistics and utilities businesses

104. Overall, however, this effect is expected to be significantly smaller than the significant gains to businesses along the corridor that will benefit from much improved transport connections.

9. COMMENTS ON ENGAGEMENT RESPONSES

105. In addition to preparing this economic assessment, I was asked to review the feedback received by NZTA during its large public engagement process regarding the Project and from adjacent properties and respond to comments relevant to my economic assessment. There were two common themes among comments that are appropriate for me to respond to from an economics perspective.

Theme One: There is a limited economic case for the Project

106. The evidence as set out above shows something quite different to this view. The Project delivers improved travel times, greater reliability of travel time, and effectively brings people closer to jobs by reducing these travel times, raising productivity. Together, these benefits constitute a regionally and nationally significant economic benefit in the billions of dollars, including a stimulatory impact on the local economy long beyond the construction period as demonstrated in my analysis.

Theme Two: Property values in the neighbourhood will decline

107. Two primary factors affect property values. The first is the size, design and condition of what is on a property. For example, bigger houses sell for more than smaller houses, all else held equal. When changes are made on a property they can increase or decrease its value. The proposed transport improvements will have no impact on what is on these adjacent properties.

108. The second factor that affects a property value is the environment around the property. Various studies in New Zealand have demonstrated that factors such as proximity to the city centre, public parks or other amenities increase property values. In contrast, noise, higher crime or distance from amenities are examples of factors that decrease property values.[19] For the proposed transport improvements to decrease a property's value, the environmental factors outside of the property would need to deteriorate to the extent that they offset the improved access to the city centre and other key destinations such as the Airport that residents near the upgraded SH1 will have. Any long-term adverse effects are expected to be moderate or low on the Project, so these effects are expected to be offset by the increase in property value associated with improved transport access.

[19] See for instance (a) Martin and Norman. (2020). *An evidence-based approach: Does the Rural Urban Boundary impose a price premium on land inside it?*
(b) Grimes and Liang. (2009). *Spatial determinants of land prices: Does Auckland's MUL have an effect?*
(c) MBIE and MfE. (2017). *NPS-UDC: Price efficiency indicators technical report: Rural-urban differentials*

10. SENSITIVITY TESTS

109. In this report, I summarise the results of two sensitivity tests:

i. Higher estimate of WEBs (agglomeration specifically), which yields higher estimates of productivity and production benefits

ii. Impact of tolling the corridor, which yields lower transport benefits and WEBs, and higher costs

Higher estimate of WEBs

110. The scale of the Project could generate significantly more WEBs than modestly estimated in the Base Untolled scenario.

111. In the case of a higher WEBs estimate, I assume that 1/50 of additional jobs added in the corridor are due to the SH1 improvement, rather than 1/70 in the base case. This is a highly plausible outcome, given the role the new transport solution will play in improving access for workers and between businesses in the city, stimulating economic activity. I would therefore highlight that given what previous work has identified about the scale of congestion on the Wellington network, the current constraints on development to the east in particular, and the anticipated travel time and reliability benefits of the SH1 improvements, this is still quite a modest assumption.

112. Even this less modest estimate attributes only 792 workers to the transport improvements by 2084, or just 0.5% of total jobs along the corridor by 2084 being attributable to the transport solution.

The possible operating state of Tolling the corridor

113. The government has requested NZTA to consider tolling for new Roads of National Significance which indicated that in future the Project may be tolled as a means of road pricing and raising revenue as a funding source. Separate transport modelling was undertaken to determine how the regional transport network would perform in the case of the SH1 corridor being tolled.

114. Economic theory argues that when a cost is imposed for using a certain route, it will both incentivise people to use alternative routes or destinations to avoid that cost or discourage travel at all. The scale of this change in behaviour naturally varies based on how big the additional cost (of tolling) is. i.e. Tolling often diverts traffic onto local streets, increasing congestion with resultant reduction in travel time, reliability and agglomeration benefits.

115. In transport modelling, the generalised cost of travel on a route is increased by the assumed cost of the toll, therefore changing people's choices about whether to travel at all, and how they travel. To fairly compare the performance of the Untolled option and the impact of tolling, the transport modelling was run for the Tolled option using the same set of travel demand outputs from the Base Untolled scenario (what modellers call using a "fixed matrix"). The Base Option enables more trips to occur across the region, and this improved economic opportunity has been "fixed" as the comparator for a Tolled scenario.

116. This approach estimates the economic opportunity cost of imposing a toll, measuring it as outputs such as reduced travel time savings and reduced travel reliability. In reality, a toll is likely to discourage some people from travelling at all or will cause them to travel to different locations or on different routes. By using fixed matrices, I have a way of calculating this opportunity cost for transport network users, where they choose their "next best option" because their preferred travel has become more expensive. The results should not be interpreted specifically as lower travel time benefits or

reduced reliability. Instead, in aggregate, they represent the opportunity cost to users who make different choices because of the imposition of a toll.

117. A simple way to summarise the difference in effects of the Tolled scenario is that it will improve travel time and reliability along the SH1 route due to less traffic use and therefore decongestion but more people will try to avoid the cost by travelling on less efficient other routes, worsening travel time across the rest of the transport system.

118. In addition to the impact of the toll on discouraging people to use the network as they would prefer, it will make the area along the corridor less attractive to businesses and is therefore likely to reduce WEBs relative to the Base Untolled scenario. For most businesses, tolls are likely to be a small portion of total operating costs, but businesses that rely on vehicle traffic for their customers are likely to be more affected. I therefore adjusted my estimate of WEBs downwards somewhat for the likelihood that a toll would dampen some of the production and productivity gains one would expect to see in the absence of a toll.

119. Because the transport modelling and WEBs modelling supports a view that the Tolled scenario will deliver lower standard transport benefits and lower WEBs, it stands to reason that this scenario would also deliver less employment and less housing development within the corridor than the Tolled scenario. The assessment suggests that the Tolled scenario will support:

    i. Around 130 fewer jobs than the Untolled scenario by 2084 (but 420 more than the Do Minimum)

    ii. Around 40 fewer dwellings (but 140 more than the Do Minimum)

    iii. Around 10 fewer businesses (but 30 more than the Do Minimum)

120. A summary table comparing both sensitivity tests against the Base scenario is shown in Table 9.

Table 9: Sensitivity test results presented against Base option

Component	Present Value ($m)		
	Base	Higher WEBs estimate	Tolled Option
Benefits			
Standard transport benefits			
Travel time savings	$1,580	$1,580	$1,241
Travel reliability savings	$386	$386	$261
Walking & Cycling	$12	$12	$12
Safety benefits	$27	$27	$57
Public transport benefits	$11	$11	-$46
Emissions health benefits	-$6	-$6	-$11
Emissions climate benefits	-$7	-$7	-$10
Vehicle operating cost reductions	-$86	-$86	-$131
Wider economic benefits			
Resilience benefits	$25	$25	$24
Agglomeration	$1,507	$2,153	$1,152
Imperfect competition	$8	$8	$6
Quantified benefits	**$3,457**	**$4,103**	**$2,554**
Costs			
Project development a pre-implementation costs	$465	$465	$465
Construction costs	$1,906	$1,906	$1,915
Maintenance costs	$217	$217	$228
Disruption costs	$48	$48	$48
Quantified costs	**$2,637**	**$2,637**	**$2,657**

11. CONCLUSION

121. The FTAA allows for consideration of the regional and/or national significance of a proposed investment, the extent of regional and/or national benefits, and the proportionality of those benefits and adverse impacts.

122. In my view the proposed improvements meet the standard set for having significant national and regional benefits, with the support they provide to:

i. Improved functioning of the busiest highway corridor in New Zealand outside of Auckland, the most regionally important transport corridor in Wellington, and the trunk route between the airport and the seat of government

ii. A well-functioning urban environment as defined by the NPS-UD by improving efficiency of travel by $2.0 billion

iii. Significant economic benefits by boosting labour productivity, job creation, business creation and consequently regional GDP by an estimated $1.5 billion within a corridor that accounts for 4.6% of New Zealand's total GDP

iv. Resilience to natural hazard risks (reducing potential downtime in the Terrace Tunnel and Mt Victoria Tunnel locations from one year to six weeks for a 1/500 year event), to unplanned events such as vehicle accidents, and to planned maintenance outages along the route

v. Intensification of housing supply along the corridor

123. In this assessment, I have set out the likely scale of the monetisable transport, resilience and wider economic benefits of the Project and the construction disruption impacts. However, it is important to reiterate that:

i. While some businesses will be impacted more than others by the construction disruption and potentially after the fact by changes to road layouts, the analysis indicates that the overall benefits for employment, profits and salaries ($1.5 billion in today's terms) are likely to be many times higher than the costs to some businesses and through some changes in accessibility over the next several decades, suggesting the net gains to the economy far outweigh potential disruption costs

ii. There are several additional benefits that are not expressed in dollar terms but that are additive to the benefits expressed in the monetised benefits, notably additional housing enabled, more consumer choice through more businesses being established in the corridor, and increased business resilience for businesses due to a higher number of residents in the corridor than would occur in the absence of a transport intervention

Table 10: Summary of quantified benefits and costs

Component	Present value ($m)
Benefits	**Present value ($m)**
Standard transport benefits	
Travel time savings	$1,580
Travel reliability savings	$386
Walking & Cycling	$12
Safety benefits	$27
Public transport benefits	$11
Emissions health benefits	-$6
Emissions climate benefits	-$7
Vehicle operating cost reductions	-$86
Wider Economic Benefits	
Resilience benefits	$25
Agglomeration	$1,507
Imperfect competition	$8
Quantified benefits	**$3,457**
Costs	**Present value ($m)**
Project development and pre-implementation costs	$465
Construction costs	$1,906
Maintenance costs	$217
Disruption costs	$48
Quantified costs	**$2,637**

Why this conclusion likely understates benefits

124. Throughout this analysis, I have erred on the side of underestimating benefits and overestimating costs. This provides decision-makers confidence that the benefits estimated here are likely to eventuate while some of the costs may not. Specific examples of areas where I have potentially underestimated benefits (listed from likely greatest scale to smaller scale impacts) include:

    i. Assuming standard transport benefits flat-line after 2053, a standard approach used for that far out into the future, but also a particularly modest assumption

    ii. Excluding safety benefits on local roads as more traffic moves onto the safer highway corridor

    iii. Attributing only 1/70 of new jobs added in the corridor to the Project (only 0.3% of all jobs in the corridor by 2084), despite the corridor accounting for 40% of the region's total GDP

    iv. Assuming no jobs are added more broadly across the region as a consequence of the improvements, nor that more jobs move from lower-productivity parts of the city into the higher-productivity centre along the corridor

    v. Capturing only the travel impacts of disruption to the corridor from an earthquake and excluding the flow-on impacts on businesses and GDP from loss of a major lifeline in the event of no tunnel duplication

    vi. The fact that some benefits generated by the Project cannot be easily expressed in dollar terms, but are no less real, such as more housing being delivered along the corridor and greater consumer access to goods and service