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Wellington Regional Land Transport Strategy Review

Regional Transport Programme - Modelling and Analysis

May 2006

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Unpublished technical paper

Regional Transport Programme - Modelling and Analysis

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In July 2005, three strategic scenarios were developed, reflecting different investment priorities between passenger transport, roading and travel demand management. These were identified and modelled to understand the transport consequences of each option. These three scenarios were Advanced Passenger Transport [APT], Planned Investment [PI], and Advanced Roading [AR].

Following the outcomes of the Western Corridor Plan review, a proposed **Regional Transport Programme [RTP]** was developed and this has now been modelled as a fourth scenario. The initial three strategic scenarios and their associated projects have been left in the following analysis tables for the purpose of comparison.

Modelled schemes and projects

This document provides a summary of the schemes and projects included in the modelling for each scenario, as well as how they are modelled in the Wellington Transport Strategic Model (WTSM).

Each of the first three scenarios has the same total expenditure, but the amounts allocated to roading improvements, passenger transport (rail and bus) and travel demand management varies. Details of these differences are given in below. The fourth scenario, Regional Transport Programme, involves an increased total expenditure.

Passenger transport (rail and bus)

The Advanced Passenger Transport scenario includes light rail from Johnsonville to Courtenay Place, along with heavy rail electrification extensions to Waikanae and Timberlea (along with associated stations). The Advanced Roading scenario will result in a reduction in the frequency of bus services and reduced attractiveness for all rail journeys and peak period bus services. The Regional Transport Programme scenario is the same as the Planned Investment scenario, but includes new Lindale and Raumati stations and a 15 minute frequency of the Western Corridor rail line.

Table A1 provides a complete list of the passenger transport projects modelled.

Table A1: Modelled projects – Passenger transport

	Project Type	APT	PI	AR		RTP
Bus Frequency Change (Regionwide)	Level of Service	-	-	-10%		-
CBD Bus Lanes	Level of Service	✓	-	-		-
Cruickshank Station	Coverage	✓	-	-		-
Featherston Peak Period Express	Level of Service	✓	-	-		-
Light Rail – Johnsonville to Courtenay Place	Level of Service	✓	-	-		-
Lindale Station	Coverage	✓	-	-		✓
Petone-Grenada PT Service	Coverage	-	✓	✓		✓
Porirua Interchange	Level of Service	✓	✓	✓		-
Raumati Station	Coverage	✓	-	-		✓
Revised Wellington City Bus Routes	Level of Service	✓	-	-		-
Timberlea Electrification	Coverage	✓	-	-		-

Timberlea Station	Coverage	✓	-	-		-
Waikanae Electrification	Coverage	✓	-	-		-
Western Corridor rail line 15min frequency	Level of Service	-	-	-		✓

Roading network improvements

The Advanced Passenger Transport scenario does not include the Petone-Grenada link and Ngauranga-Aotea 8-laning. The current capacity constraints around Ngauranga (on both SH1 and 2) remain, acting as a deterrent to car travel through this area. The Advanced Roading scenario brings the Basin Reserve to Evans Bay four-laning forward into the ten year programme. This improves road access between Wellington's eastern suburbs and the Wellington CBD. In the Regional Transport Programme Transmission Gully Motorway replaces the Coastal Highway 4-laning and includes a new tidal lane between Petone – Ngauranga.

Table A2 provides a complete list of the roading projects modelled.

Table A2: Modelled projects – Roading network

	Project Type	**APT**	**PI**	**AR**		**RTP**
Basin Reserve	Capacity/Safety	Option H	Option H	Option H		Option H
Basin Reserve to Evans Bay 4-laning	Capacity	-	-	✓		-
Centennial Highway 4-laning	Capacity/Safety	✓	✓	✓		-
Dowse-Petone Upgrade	Capacity/Safety	✓	✓	✓		✓
ICBP Stage I	Capacity	✓	✓	✓		✓
MacKays Crossing	Capacity/Safety	✓	✓	✓		✓
Otaihanga Grade Separation	Safety	-	-	-		✓
Paekakariki Grade Separation	Safety	✓	✓	✓		signals
Grenada – Gracefield Stg 1, SH1 – Petone Link	New Route	-	✓	✓		✓
Petone to Ngauranga tidal lane	Capacity	-	-	-		✓
Plimmerton to Mana	Capacity	✓	✓	✓		-
Pukerua Bay Bypass	Capacity/Safety	✓	✓	✓		-
Pukerua Bay to Plimmerton 4-laning	Capacity/Safety	✓	✓	✓		✓
SH1 Ngauranga-Aotea	Capacity	6 Lanes	8 Lanes	8 Lanes		8 lanes
SH1/Whitford Brown Grade Separation	Capacity/Safety	✓	✓	✓		-
SH2/SH58 Grade Separation	Capacity/Safety	✓	✓	✓		✓
Terrace Tunnel (capacity)	Capacity	Tidal	Tidal	Tidal		Tidal
Transmission Gully Motorway	New Route	-	-	-		✓
Western Link Road Stage I	New Route	✓	✓	✓		✓
Western Link Road Stage II	New Route	✓	✓	✓		✓
Western Link Road Stage III	New Route	✓	✓	✓		✓

Travel Demand Management

Travel demand management (TDM) programmes are expected to result in a reduction in the number of peak period car trips. It is expected that these programmes will be focussed on workers in the Wellington CBD (as per the TDM Strategy currently under development).

The varying levels of expenditure on TDM under each of the four scenarios will produce different net reductions in these trips. For the purposes of modelling the strategic options, the following reductions in peak period commuting vehicles to the Wellington CBD are expected:

- Advanced passenger transport 10% reduction
- Regional Transport Programme 5% reduction
- Planned investment 5% reduction
- Advanced roading 1% reduction

Interpreting the Analysis Tables

The tables set out on the following pages use a range of indicators to measure the performance of the different scenarios or packages.

The tables first set out 2001 base year levels for each indicator, followed by the expected/forecast outcome in 2016 for each of the scenarios.

A scale of ticks and crosses are used to illustrate the performance of each package depending on the degree of variance from the 2001 base. Where no significant change is shown compared with the 2001 base, a dash [-] is used for neutral. A small positive change in the indicator is represented by a tick [✓] and a significant variance represented by two ticks [✓✓] strongly positive. Likewise, a negative changes in the in the indicator are represented by one or more crosses [✗] depending on the degree of change.

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Analysis of strategic scenarios against RLTS objectives [2016 AM peak compared to 2001 base unless stated otherwise]

RLTS objective	Indicator (AM peak)	2001	Advanced Passenger Transport	Planned Investment	Advanced Roading	Regional Transport Programme	• [WTSM Measure] • Comments
Assist economic and regional development	• Reduced congestion	41%	47% [××]	41% [–]	41% [–]	33% [✓✓]	[Percentage of strategic road network vehicle hours at LoS E & F] • RTP improvement over PI credited to Western Corridor rail and Petone to Ngauranga roading upgrades.
	• Reduced HCV costs	$14.65	$14.95 [×]	$14.70 [–]	$14.70 [–]	$14.77 [–]	[Average HCV cost per trip]
	• PT Passenger Trip Time	40min	38min [✓]	40min [-]	40min [-]	40min [-]	[Average PT Passenger trip time(min)]
Assist safety and personal security	• Reduced road traffic injuries as evidenced by PT trips; and private car use	28,100 121,900	34,400 134,900 [✓✓]	32,000 137,800 [✓]	30,600 139,100 [–]	33,500 136,300 [✓]	[Total PT trips in AM peak period] [Total private car trips in AM peak period] • General trend of road and vehicle safety improvements • All strategic options include roading projects which will be built to modern safety standards • Advanced PT scores better due to higher usage of PT, an inherently safer mode and smaller increased usage of cars; and

✓✓strongly positive – neutral ×× strongly negative (××× very strongly negative)

RLTS objective	Indicator (AM peak)	2001	Advanced Passenger Transport	Planned Investment	Advanced Roading	Regional Transport Programme	• [WTSM Measure] • Comments
							• Advanced Roading scores worse due to higher private car usage and lower growth of PT use.
	• Qualitative assessment of personal security improvements		[✓]	[✓]	[✓]	[✓]	• All options have investments in PT security eg park and ride carpark security patrols, CCTV on new rolling stock and at stations, etc; and • Increased PT and active mode usage will increase people's feelings of security due to "safety in numbers".
Improve access, mobility and reliability	• Increased PT network coverage		[✓✓]	[–]	[–]	[✓]	• PT Service Design are continually refining bus routes • Coverage will not be significantly increased under the PI and AR scenarios; and • The APT scenario has a range of coverage improvements including rail extension, additional stations and bus improvements (refer Table A1). • RTP performs slightly better compared to PI due to new Raumati and Lindale stations.
	• Improved PT services		[✓✓]		[××]	[✓]	• APT significantly improves service levels eg light rail • The improvement of rolling stock and timely replacement of buses in PI provides improved service levels compared with 2001; and

RLTS objective	Indicator (AM peak)	2001	Advanced Passenger Transport	Planned Investment	Advanced Roading	Regional Transport Programme	• [WTSM Measure] • Comments
				[✓]			• AR, by definition, reduces PT level of service. • RTP performs slightly better than PI due to WC rail frequency improvements.
	• Increased road network coverage		[✓]	[✓✓]	[✓✓]	[✓✓]	✓✓strongly positive – neutral ×× strongly negative (××× very strongly negative) significantly increases road network coverage in PI, AR and RTP.
	• Reduced congestion	41%	47% [××]	41% [–]	41% [–]	33% [✓✓]	✓✓strongly positive – neutral ×× strongly negative (××× very strongly negative) network vehicle hours at LOS E & F] • RTP improvement over PI credited to Western Corridor rail and Petone to Ngauranga roading upgrades.
	• Increased car ownership	0.53 cars/ person 224,050	0.60 cars per person 281,600 [✓]	0.60 cars per person 281,600 [✓]	0.60 cars per person 281,600 [✓]	0.60 cars per person 281,600 [✓]	[Cars per person/ total cars] • Car ownership is expected to increase under all scenarios, both in terms of average number of cars per person and total number of cars.
	• Improved active mode facilities		[✓]	[✓]	[✓]	[✓]	• Expecting moderate improvements to walking and cycling facilities in line with national and regional strategies and LTCCPs.

RLTS objective	Indicator (AM peak)	2001	Advanced Passenger Transport	Planned Investment	Advanced Roading	Regional Transport Programme	• [WTSM Measure] • Comments
Protect and promote public health	• Increased opportunities for physical activity	15.3% none	16.8% 90 4,500 [✓✓]	15.5% 90 4,500 [✓]	14.8% 90 4,500 [–]	16.3% 90 4,500 [✓✓]	[PT mode share] [School travel plans] [Community travel plans, households targeted] • Increased PT usage necessitates ıss. he APT scenario, as indicated by PT mode share. • $10m investment in Travel Planning over 10 years is expected to encourage increased walking & cycling.
	• Reduced road traffic injuries as evidenced by PT trips; and private car use	28,100 121,900	34,400 134,900 [✓✓]	32,000 137,800 [✓]	30,600 139,100 [–]	33,500 136,300 [✓]	[Total PT trips in AM peak period] [Total private car trips in AM peak period] • General trend of road and vehicle safety improvements • All strategic options include roading projects which will be built to modern safety standards • Advanced PT scores better due to higher usage of PT, an inherently safer mode and smaller increased usage of cars; and • Advanced Roading scores worse due to higher private car usage and lower growth of PT use.
	• Reduced air pollution	15,600 3,200 330	7,600 3,000 430	8,200 3,000 430	8,300 3,000 430	7,800 3,000 430	[CO(kg), NOx(kg), PM10 (kg), VOC (kg)]

✓✓strongly positive – neutral ×× strongly negative (××× very strongly negative)

RLTS objective	Indicator (AM peak)	2001	Advanced Passenger Transport	Planned Investment	Advanced Roading	Regional Transport Programme	• [WTSM Measure] • Comments
		2,000	1,300 [✓]	1,400 [✓]	1,400 [✓]	1,300 [✓]	Most emissions are forecast to reduce: • Carbon Monoxide (CO) by 50%; • Volatile organic compounds (VOC) by 30%; and • Nitrous Oxide (NOx) by 5%. Particulate matter (PM10) emissions On balance, air quality is forecast to improve under all scenarios.
	• Reduced traffic noise		[–]	[–]	[–]	[–]	• Not anticipating any significant changes. Vehicle volumes need to double to cause a perceptible increase in noise levels.
	• Enhanced social cohesion	15.3% 0 0	16.8% 90 4500 [✓✓]	15.5% 90 4500 [–]	14.8% 90 4500 [×]	16.3% 90 4500 [✓]	[PT mode share] [School Travel Plan] [Household Travel Plans] • Increased walking and PT provide opportunities for social interaction.
	• Reduced severance		[×]	[×]	[×]	[✓]	• The PI, AR and APT scenarios all included the coastal highway 4 laning with some likely severance impacts. The RTP with the TG alternative is likely to reduce severance impacts on Western Corridor coastal communities.
	• Decreased CO_2 emissions	234	284 [××]		296 [×××]	287 [××]	[Carbon dioxide (T)] • All scenarios result in significantly increased CO2 emissions compared with 2001. The best

✓✓strongly positive – neutral ×× strongly negative (××× very strongly negative)

RLTS objective	Indicator (AM peak)	2001	Advanced Passenger Transport	Planned Investment	Advanced Roading	Regional Transport Programme	• [WTSM Measure] • Comments
				295 [×××]			result is achieved by APT & RTP, but there is still 21% more CO2 than in 2001. The PI and AR produce 26% more CO2 than in 2001. • Due to the significant magnitude of this increase, we have scored APT & RTP as being strongly negative, scoring the other scenarios with three crosses to indicate that these are significantly worse.
				✓✓strongly positive – neutral ×× strongly negative (××× very strongly negative)			
Ensure environmental sustainability	• Decreased CO_2 emissions	234	284 [××]	295 [×××]	296 [×××]	287 [××]	[Carbon dioxide (T)] • See comments above
	• Reduced air pollution	15,600 3,200 330 2,000	7,600 3,000 430 1,300 [✓]	8,200 3,000 430 1,400 [✓]	8,300 3,000 430 1,400 [✓]	7,800 3,000 430 1,300 [✓]	[CO(kg), NOx(kg), PM10 (kg), VOC (kg)] • See earlier comments under public health objective.
	• Reduced traffic noise		[–]	[–]	[–]	[–]	• Not anticipating any significant changes. Vehicle volumes need to double to cause a perceptible increase in noise levels.
	• Reduced contaminants in surface water runoff	121,900	134,900 [×]	137,800 [×]	139,100 [×]	136,300 [×]	[Total car trips]
	• Reduced fuel consumption	97,200	115,800 [××]	120,500 [×××]	121,000 [×××]	117,000 [××]	[Total fuel consumption]

RLTS objective	Indicator (AM peak)	2001	Advanced Passenger Transport	Planned Investment	Advanced Roading	Regional Transport Programme	• [WTSM Measure] • Comments
	• Supports efficient landuse		[-]	[–]	[–]	[–]	• To be defined by the WRS process. • No significant change in landuse patterns expected within 10 year timeframe of RLTS
Consider economic efficiency and affordability	• Package BCR >1		1 [✓]	1 [✓]	1 [✓]	1 [✓]	calculated by WTSM indicate that each scenario has a BCR of at least one. These tangible benefits do not include: • Trip reliability; • Site specific safety benefits; • National strategic factors; and • Other intangibles.
	• Package cost in line with affordability envelope		$3,432M [✓]	$3,432M [✓✓]	$3,432M [✓✓]	$4,107M [××]	[Package Cost] • All indicative strategic scenarios have been developed within the affordability envelope. However, the increased local share cost of the advanced PT makes it less affordable.

✓✓strongly positive – neutral ×× strongly negative (××× very strongly negative)

✓✓strongly positive – neutral ×× strongly negative (××× very strongly negative)

Analysis of strategic scenarios against RLTS outcomes [2016 AM peak compared to 2001 base unless stated otherwise]

RLTS outcome	Indicator (AM peak)	2001	Advanced Passenger Transport	Planned Investment	Advanced Roading	Regional Transport Programme	• [WTSM Measure] • Comments
Roading							
• Maintained vehicle travel times between communities and regional destinations	• Strategic road network average speed	71 kmh	72 kmh [–]	72 kmh [–]	72 kmh [–]	71kmh [–]	
• Reduced road congestion	• Strategic road network % at LoS E & F	41%	46% [××]	40% [–]	41% [–]	33% [✓✓]	• See comments in earlier table for this indicator.
• Improved reliability of the strategic roading network	• Subjective considering LoS and availability of alternative routes		[×]	[✓]	[✓]	[✓]	• PI and AR both provide a bypass (Petone-Grenada) to the most heavily congested part of the strategic road network (in the vicinity of Ngauranga), as well as an increase in road capacity south of Ngauranga. • The Western Link Road provides an alternative route through the Kapiti area, which will improve SH1 reliability. • Western Corridor Plan improvements will also improve reliability on this route.

✓✓strongly positive – neutral ×× strongly negative (××× very strongly negative)

RLTS outcome	Indicator (AM peak)	2001	Advanced Passenger Transport	Planned Investment	Advanced Roading	Regional Transport Programme	• [WTSM Measure] • Comments
Passenger transport							
• Increased peak period mode share	• Peak PT mode share	15.3%	16.8% [✓✓]	15.5% [–]	14.8% [×]	16.3% [✓]	• RTP includes additional WC rail improvements.
• Enhanced off peak mode share and community connectedness	• Inter peak PT mode share	6.3%	6.5% [–]	6.3% [–]	6.1% [–]	*6.4%* [–]	
• Improved accessibility and customer satisfaction	• Subjective considering new services, frequency & standard		[✓✓]	[✓]	[××]	[✓]	• APT significantly improves service levels eg light rail • The improvement of rolling stock and timely replacement of buses in PI & RTP provides improved service levels compared with 2001; and • AR, by definition, reduces PT level of service.

RLTS outcome	Indicator (AM peak)	2001	Advanced Passenger Transport	Planned Investment	Advanced Roading	Regional Transport Programme	• [WTSM Measure] • Comments
Travel Demand Management							
• Reduced traffic demand	• Total car trips	121,900	134,900 [××]	137,800 [××]	139,100 [××]	136,300 [××]	
• Reduced greenhouse gas emissions	• Total CO2 (T)	234	284 [××]	295 [×××]	296 [×××]	287 [××]	
• Reduced fuel consumption	• Total fuel (L)	97,200	115,800 [××]	120,500 [×××]	121,100 [×××]	117,000 [××]	
• Reduced road congestion	• Strategic road network % at LoS E & F	41%	47% [××]	41% [–]	41% [–]	33% [✓✓]	• Desire this as outcome of TDM measures.

✓✓strongly positive – neutral ×× strongly negative (××× very strongly negative)

RLTS outcome	Indicator (AM peak)	2001	Advanced Passenger Transport	Planned Investment	Advanced Roading	Regional Transport Programme	• [WTSM Measure] • Comments
• Improved journey to work mode share	• PT JTW mode share to Wellington CBD	45%	55% [✓✓]	49% [✓]	46% [–]	50% [✓]	• TDM measures expected to be focussed on journey to work car trips to this geographical area.
• Increased vehicle occupancy	• Subjective considering likely TDM measures		[✓✓]	[✓]	[–]	[✓]	• This correlates with our TDM assumptions, which seek reductions of 10%/5%/2% under each respective scenario in JTW car trips to Wellington CBD.
• Increased resident satisfaction	• Subjective considering congestion and PT LoS		[–]	[✓]	[×]	[✓✓]	• Surveys consistently show road congestion to be a significant issue for the community, along with PT LoS and reliability. Results for this outcome are based on results for reduced road congestion and improved PT services.
• More efficient land use (to be defined by the WRS process)	• Subjective considering land use changes		[–]	[–]	[–]	[–]	• No significant change in land use patterns expected within 10 year time frame of RLTS.
• Minimise adverse impacts on economic development (to be defined by the WRS process)	• Subjective considering the transport investment programme		[✓]	[✓✓]	[✓✓]	[✓]	• All scenarios will increase the transport investment program, which is significantly larger than that undertaken over the last 20 years.However, this benefit is offset in APT due to unfavourable congestion outcomes. • RTP will require tolls & significant debt funding which may be a drag on the regional economy.

✓✓strongly positive – neutral ×× strongly negative (××× very strongly negative)

RLTS outcome	Indicator (AM peak)	2001	Advanced Passenger Transport	Planned Investment	Advanced Roading	Regional Transport Programme	• [WTSM Measure] • Comments
Pedestrian							
• Increased level of service for pedestrian facilities	• Subjective considering LTCCP pedestrian investment		[✓]	[✓]	[✓]	[✓]	• The local roading investment includes $66M for walking infrastructure improvements over the next 10 years (mainly for footpath renewal); and • It is expected that all major (non-motorway) roading improvements will include upgraded provision for pedestrians.
• Increased mode share for pedestrians, especially for short trips	• Subjective considering pedestrian investment and PT accessibility		[✓]	[✓]	[–]	[✓[	• Based on results for increasing level of service for pedestrian facilities and improved PT services, with greater weighting given to pedestrian LoS.
• Increased safety for pedestrians	• Subjective considering general safety investment		[✓]	[✓]	[✓]	[✓[	• Expect continuing improvements to pedestrian safety, coming out of local road improvements eg WCC's Safer Roads project, and National and Regional pedestrian and road safety strategies.
• Improved perception of pedestrian safety for children	• Subjective considering school journey programmes		[✓]	[✓]	[✓]	[✓[	• Expect continuing improvements to pedestrian safety, coming out of local road improvements e.g. WCC's Safer Roads project, and National and Regional pedestrian and road safety strategies, along with increasing emphasis on Safer Routes to School and Walking School Bus programmes.

✓✓strongly positive – neutral ×× strongly negative (××× very strongly negative)

RLTS outcome	Indicator (AM peak)	2001	Advanced Passenger Transport	Planned Investment	Advanced Roading	Regional Transport Programme	• [WTSM Measure] • Comments
Cycling							
• Improved level of service for cycling	• Subjective considering LTCCP cycle investment		[×]	[×]	[×]	[×]	• The local roading investment includes $8M for cycling infrastructure improvements over the next 10 years • It is expected that all major (non-motorway) roading improvements will include upgraded provision for cycling • People cycle for different purposes, which require different facilities. Achieving service improvements for the diverse needs of cyclists is expected to remain difficult; and • The modest investment in cycling improvements is not expected to maintain the current LoS in the face of increasing motorised traffic.
• Increased proportion of all trips cycled and perception of cycling safety, convenience and ease	• Subjective considering increase in car trips		[××]	[××]	[××]	[××]	• Surveys show cyclists desire improved facilities, indicating a desire for segregated road space. The current very low cycling numbers are a reflection of this poor LoS. • Increasing vehicle numbers will deter cycling without the provision of suitable cycling facilities; and • Due to the difficulty and cost of providing high quality segregated facilities, and the concurrent increase in motorised traffic, we anticipate a decline in cycling.
• Reduced relative risk of cycling as a transport mode	• Subjective considering cycle LoS		[×]	[×]	[×]	[×]	• Same as Cycling LoS

✓✓strongly positive – neutral ×× strongly negative (××× very strongly negative)

RLTS outcome	Indicator (AM peak)	2001	Advanced Passenger Transport	Planned Investment	Advanced Roading	Regional Transport Programme	• [WTSM Measure] • Comments
Road safety							
• Improved regional road safety and safer roading environment	• Reduced road traffic injuries as evidenced by PT trips; and private car use	28,100 121,900	34,400 134,900 [✓✓]	32,000 137,800 [✓]	30,600 139,100 [–]	33,500 136,300 [✓]	[Total PT trips in AM peak period] [Total private car trips in AM peak period] • General trend of road and vehicle safety improvements • All strategic options include roading projects which will be built to modern safety standards • Advanced PT scores better due to higher usage of PT, an inherently safer mode and smaller increased usage of cars; and • Advanced Roading scores worse due to higher private car usage and lower growth of PT use.
• Improved perceptions of road safety	• Subjective considering road safety improvements		[✓]	[✓]	[✓]	[✓]	• Perceptions derive from when people feel vulnerable, which will normally be when in a car or walking, rather than using PT. Consequently, road safety improvements have been used an indicator, with road safety improvements featuring in all scenarios.

✓✓strongly positive – neutral ×× strongly negative (××× very strongly negative)

RLTS outcome	Indicator (AM peak)	2001	Advanced Passenger Transport	Planned Investment	Advanced Roading	Regional Transport Programme	• [WTSM Measure] • Comments
Freight							
• Improved level of service for freight	• HCV congested Travel Time • Reduced HCV costs	$0.93 $14.65	$1.22 $14.95 [×]	$1.06 $14.70 [-]	$1.07 $14.70 [-]	$1.09 $14.77 [-]	[Congested travel time cost per million VKT] [HCV average cost/trip]
• Improved freight linkages	• Projects improving 'Golden Triangle', airport and port routes		[–]	[✓]	[✓]	[✓✓]	• The following key projects are included in the RTP: • Petone - Grendada • Petone – Ngauranga tidal lane • Ngauranga – Aotea 8 lanes
• Improved rail freight efficiency	• Subjective considering rail freight level of service		[–]	[–]	[–]	[–]	• No planned projects under any scenario.

✓✓strongly positive – neutral ×× strongly negative (××× very strongly negative)