

# Land Transport Benefits Framework

June 2023

Note that measures can be used as evidence for more than one benefit, not only for the primary association provided in this table. For more information about the Land Transport Benefits Framework, see [Benefits management guidance](#) on the Waka Kotahi website.

Transport outcome	Benefit cluster	Benefit Benefits marked \$ are monetised. For more information see the <a href="#">Monetised benefits and costs manual</a>	Quantitative and qualitative benefit measures (primary associations) Measures marked # are quantitative, and those marked * are qualitative. For more information see the <a href="#">Land Transport Benefits Framework measures manual</a>			Monetised benefits Value proxy and measure of changes in option compared to do-minimum	
			No.	Measure name	Measure		
Healthy and safe people	1. Changes in user safety	1.1 Impact on social cost of deaths and serious injuries <sup>\$</sup>	1.1.1	Collective risk (crash density) <sup>#</sup>	Average annual fatal and serious injury crashes per kilometre of road section	\$ crash costs by crash type and severity	
			1.1.2	Crashes by severity <sup>#</sup>	Number of crashes by severity		
			1.1.3	Deaths and serious injuries <sup>#</sup>	Number of deaths and serious injuries		
			1.1.4	Personal risk (crash rate) <sup>#</sup>	Average annual fatal and serious injury crashes per 100 million vehicle-kilometres		
		1.2 Impact on a safe system	1.2.1	Road assessment rating - roads <sup>#</sup>	Infrastructure risk rating		
			1.2.2	Road assessment rating - state highways <sup>#</sup>	KiwiRoad Assessment Programme (KiwiRAP) star rating (for state highways)		
			1.2.3	Travel speed gap <sup>#</sup>	Difference between safe and appropriate speed (SAAS), and actual speed (under development)		
	2. Changes in perceptions of safety	2.1 Impact on perceptions of safety and security	2.1.1	Access - perception <sup>#</sup>	Perception of safety and ease of walking and cycling		
	3. Changes in human health	3.1 Impact of mode on physical and mental health <sup>\$</sup>	3.1.1	Physical health benefits from active modes <sup>*</sup>	User to describe	- \$/pedestrian * 1km of a new facility - \$/conventional cyclist *3km of a new facility - \$/electric assisted cyclist *3km of a new facility	
			3.2 Impact of air emissions on health <sup>\$</sup>	3.2.1	Ambient air quality - NO <sub>2</sub> <sup>#</sup>	Concentration of NO <sub>2</sub> in µg/m <sup>3</sup>	\$ damage cost/tonne of pollutant * number of people exposed
		3.2.2		Ambient air quality - PM <sub>10</sub> <sup>#</sup>	Concentration of PM <sub>10</sub> in µg/m <sup>3</sup>		
		3.3 Impact of noise and vibration on health <sup>\$</sup>	3.3.1	Noise level <sup>#</sup>	Noise level in dB L <sub>Aeq(24h)</sub>	\$/dB noise level per household or person affected per year	

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Resilience and security	4. Changes in impact of unplanned disruptive events on access to social and economic opportunities	4.1 Impact on system vulnerabilities and redundancies	4.1.1	Availability of a viable alternative to high-risk and high-impact route#	Percentage of high-risk, high-impact routes with a viable alternative	
			4.1.2	Level of service and risk#	Percentage of network assessed as having a major or extreme risk rating	
Economic prosperity	5. Changes in transport costs	5.1 Impact on system reliability\$	5.1.1	Punctuality – public transport#	Percentage of scheduled service trips between 59 seconds before and 4 minutes 59 seconds after the scheduled departure time of selected point	- \$/minutes PT vehicle travel time (VTT)* delay time (min)* number of passengers affected - \$/h travel time value*changes in network variability* traffic volume*0.9
			5.1.2	Travel time reliability – motor vehicles#	Coefficient of variation; standard deviation of travel time DIVIDED BY average minutes travel time (as per Austroads)	
			5.1.3	Travel time delay#	Difference between average travel time A and average travel time B in minutes per kilometre	
			5.1.4	Temporal availability – road#	Number and duration of resolved road closures: urban >=2 hours; rural >=12 hours	
			5.2.1	Spatial coverage – freight#	Percentage completion of the strategic high productivity motor vehicle freight network	
		5.2.2	Freight – mode share value#	Number of vehicles TIMES average load per vehicle in NZ\$, expressed as percentages	- \$/h for person or vehicle travel time - \$ Vehicle operating cost (VOC)/vehicle - \$/minute vehicle occupant time for PT users - \$ PT fares for users	
		5.2.3	Freight – mode share weight#	Number of vehicles TIMES average load per vehicle in tonnes, expressed as percentages		
		5.2.4	Freight – throughput value#	Number of vehicles TIMES average load per vehicle in NZ\$		
		5.2.5	Freight – throughput weight#	Number of vehicles TIMES average load per vehicle in tonnes		

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<b>Economic prosperity</b> (continued)	5. Changes in transport costs (continued)	5.2 Impact on network productivity and utilisation\$ (continued)	5.2.6	Access to key economic destinations (all modes)#	Proportion of population living within travel threshold (15 minutes, 30 minutes or 45 minutes) of key economic opportunities (including work) by different modes (walking, cycling, public transport, private motor vehicle) in the morning peak	
	6. Wider economic impact	6.1 Wider economic benefit (productivity)\$				\$ productivity increase as the result of changes effective density
		6.2 Wider economic benefit (employment impact)\$				\$ tax wedge on additional labour income
		6.3 Wider economic benefit (imperfect competition)\$				\$ total conventional business user benefits * imperfect competition uplift
		6.4 Wider economic benefit (regional economic development)\$				\$ value added as the result of increased international visitor activity

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Environmental sustainability	7. Changes in natural environment	7.1 Impact on water	7.1.1	Water quality*	User to describe		
			7.2.1	Biodiversity*	User to describe		
		7.2.2	Productive land*	User to describe			
	8. Changes in climate	8.1 Impact on greenhouse gas emissions <sup>\$</sup>	8.1.1	Greenhouse gas emissions (all vehicles) <sup>#</sup>	Tonnes of CO <sub>2</sub> equivalents emitted		\$ damage cost/tonne of CO <sub>2</sub> as a function of motor vehicle fuel consumption
			8.1.2	Mode shift from single occupancy private vehicle*	User to describe		
			8.1.3	Light vehicle use impacts <sup>#</sup>	Light vehicle kilometres travelled (light VKT)		
			8.1.4	Freight transport impact on greenhouse gas emissions <sup>#</sup>	Tonnes of CO <sub>2</sub> equivalents emitted by trucks, rail and ships used for freight (excludes light commercial vehicles and aviation)		
	9. Changes in resource efficiency	9.1 Impact on resource efficiency	9.1.1	Resource efficiency*	User to describe		
			9.1.2	Embodied carbon <sup>#</sup>	Tonnes of CO <sub>2</sub> equivalents emitted		
			9.1.3	Energy use*	User to describe		
Inclusive access	10. Changes in access to social and economic opportunities	10.1 Impact on user experience of the transport system <sup>\$</sup>	10.1.1	People - throughput of pedestrians, cyclists and public transport boardings <sup>#</sup>	Number of pedestrians, cyclists and public transport boardings	- \$/vehicle per kilometre of constructed passing lane - \$/vehicle per kilometre sealed roads. - \$/minutes PT passengers in-vehicle time in relation to infrastructure and bus and train attributes - \$/minutes PT passengers vehicle occupant time for probability of being left and proportion of standing passengers	
			(Repeat) 2.1.1	Access - perception <sup>#</sup>	Perception of safety and ease of walking and cycling		
			10.1.2	Pedestrian delay <sup>#</sup>	Pedestrian time lost due to intersection delay		
			10.1.3	Ease of getting on/off public transport services <sup>#</sup>	Percentage of low floor and wheelchair accessible services		
			10.1.4	Network condition - cycling <sup>#</sup>	Percentage travel on cycle network classified as complying with defined level of service (facility type)		

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Inclusive access (continued)	10. Changes in access to social and economic opportunities (continued)	10.1 Impact on user experience of the transport system\$ (continued)	10.1.5	Network condition - road#	Percentage travel on road network classified as smooth as per defined level of service	- \$ relative value for different types of cycling facility's quality improvements - minutes additional time someone would be willing to spend walking to obtain the improvement of different aspects of the pedestrian realm
			10.1.6	People - throughput#	Number of pedestrians, cyclists, public transport boardings and motor vehicles (excl. public transport) TIMES average number of people per vehicle	
			10.1.7	People - throughput (UCP)#	Number of pedestrians and cyclists	
			10.1.8	Traffic - throughput#	Number of pedestrians, cyclists and motor vehicles by vehicle type	
			10.1.9	Travel time#	Average travel time in minutes	
		10.2 Impact on mode choice	10.2.1	People - mode share#	Number of pedestrians, cyclists, public transport boardings, and motor vehicles (excl. public transport) TIMES number of people per vehicle, expressed as percentages	
			(Repeat) 8.1.2	Mode shift from single occupancy private vehicle*	User to describe	
			10.2.2	Accessibility - public transport facilities#	Number of bus or train stops that are fully accessible	
			10.2.3	Spatial coverage - cycle lanes and paths#	Percentage completion of the strategic cycle network	
			10.2.4	Spatial coverage - cycling facilities#	Number of people living within 500m of a high-quality cycling facility	
	10.2.5		Spatial coverage - public transport - employees#	Number of employees within 500m of a bus stop or 1km from a rail or bus rapid transit station		

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Inclusive access (continued)	10. Changes in access to social and economic opportunities (continued)	10.2 Impact on mode choice (continued)	10.2.6	Spatial coverage – public transport – resident population#	Number of people within 500m of a bus stop or 1km from a rail or bus rapid transit station		
			10.2.6a	Spatial coverage – public transport – new residential dwellings#	% of recently built residential dwellings with access to public transport services (subset of 10.2.6)		
			10.2.7	Temporal availability – public transport#	Public transport frequency per hour weighted by percentage of the population living within 500m of a bus stop or 1km from a rail or bus rapid transit station		
			10.2.8	Cost of access to key destinations – all modes*	User to describe		
			10.2.9	Pricing – more efficient*	User to describe		
			10.2.10	Traffic – mode share (number)#	Number of transport users by mode pedestrians, cyclists and motor vehicles by vehicle class, expressed as percentages		
			10.2.10b	Traffic – mode share (distance)#	Average trip distance per person in urban areas by mode		
			10.3.1	Access to key social destinations (all modes)#	Proportion of population living within travel threshold (15 minutes, 30 minutes or 45 minutes) of key social opportunities (including education, health care, supermarkets) by different modes (walking, cycling, public transport, private motor vehicle) in the morning peak		
			10.4.1	Social connectedness*	User to describe		
			10.4.2	Isolation*	User to describe		
		10.4 Impact on community cohesion		10.4.3	Severance*	User to describe	

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Inclusive access (continued)	11. Changes in liveability of places	11.1 Impact on heritage and cultural values	11.1.1	Amenity value - natural and built environment*	User to describe	
			11.1.2	Heritage and cultural values*	User to describe	
		11.2 Impact on landscape	11.2.1	Landscape*	User to describe	
		11.3 Impact on townscape	11.3.1	Townscape*	User to describe	
	12. Changes in te ao Māori values	12.1 Impact on te ao Māori	12.1.1	Te ao Māori*	User to describe	