

Rolleston Improvements Construction

Construction 2024-2026
Intersection improvements and 2 lane overpass

	Units	Emissions Factor	Unit	Sources and notes
Do Intervention				
Material Quantities Estimate				
Construction Fuel Use				
Diesel	- L	0.0027	tCO ₂ e/L	MfE 2020
Construction Materials				
Concrete	8,683 tonnes	0.11	tCO ₂ e/tonne	AECOM derived factor (See assumptions below)
Steel	1,609 tonnes	2.85	tCO ₂ e/tonne	MfE 2020
Road Surface				
Crushed rock or recycled material	tonnes	0.0082	tCO ₂ e/tonne	IS Calculator NZ v2.0
Gravel	905 tonnes	0.0182	tCO ₂ e/tonne	IS Calculator NZ v2.0
Bitumen	tonnes	0.3966	tCO ₂ e/tonne	IS Calculator NZ v2.0
Asphalt	245 tonnes	0.0542	tCO ₂ e/tonne	IS Calculator NZ v2.0
Project Breakdown Total	5,570 tonnes of CO ₂ e			
Calculated Emissions				
Best estimate of calculated emissions	5,570 tonnes of CO ₂ e			

Assumptions

Emissions for construction have been calculated from data provided by Waka Kotahi for this project. When possible assumptions have been made in a consistent manner to ensure comparability. Refer to construction schedule worksheet for indicative schedule of quantities of concrete, steel, aggregates, gravels and fuels used during construction.

Based on previous research for Waka Kotahi, only emissions from the largest emission sources from construction of infrastructure projects have been estimated (concrete, steel, aggregates, asphalt, and Materials and works related to bridge abutments have been included where relevant).

Fuel used in the construction is assumed to be 2 litres of diesel for every m³ of earth works (AECOM derived fuel-use ratio).

The following were not included in the estimate: fuel used in quarrying activity; emissions from the transportation of construction materials to/from site.

Emission factors are sourced from MfE's 2020 Guide (see link below) where appropriate, or from the ISCA-IS Calculator v2.0.

<https://environment.govt.nz/publications/measuring-emissions-detailed-guide-2020/>

The ISCA-IS Calculator v2.0 is available for ISCA members at <https://www.isca.org.au/Tools-and-Resources>

The emission factor for concrete is based on MfE 2020 and ISCA guidance and is based on a standard concrete mix.

Rolleston Improvements Construction Schedule

Source: Derived by AECOM based on cross section and plan detail per Jacobs drawing SKT-015 Rolleston Flyover Options

Description	Quantity	unit	Material	Unit	Material	Unit	Material	Unit	Material	Unit	Material	Unit	Assumptions/ Notes
			Concrete	t or m3	Steel	t or m3	Asphalt	t or m3	Aggregates	t or m3	Fuel	l or kg	
250 deep concrete slab	2720	m2	2040 t		322.32 t		244.8 t						In general assumed concrete weight of 2.5t/m3
60mm asphalt surfacing	2720	m2											
TL5 Concrete Barriers	340	m	311.1 t										https://www.nzta.govt.nz/assets/resources/road-safety-barrier-systems/docs/m23-road-safety-barrier-systems-appendix-a.pdf https://www.csppacific.co.nz/uploads/literature/technical/elliptical_tube_for_bridge_rail_2.pdf
T80-HT rail	340	m											7.48 t
2500 Deep steel trough girders	510	m	3618		408 t								Assumed volume based on sectional dimensions, 1.71m3 per m. Steel weight 7.9t/m3
Steel cross bracing	1360	m			13.464 t								
Concrete columns below girders	67	no	2713.5 t		571.644 t								Assumed 4 braces per channel Assumed 2x2 Average height of 4.5m assumed 8m spacing
Footings below columns	67	no											285.822 t
Total			8,683 t		1,609 t		245 t		905 t		-	L	Assumed 3x3x1.5 Assumed compacted fill 1m below

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