Brougham Street Multimodal Improvements

CONSTRUCTION

Expected construction 2023-2025

Pedestrian/cycle bridge

Range of traffic management options including pedestrian/cycle overpass

		Units	Emissions Factor	Unit	Sources and notes
Do Intervention					
Material Quantities Estimate					
Construction Fuel Use					
Diesel	0	L	0.0027	tCO2e/L	MfE 2020
Construction Materials					
Concrete	2,339	tonnes	0.11	tCO2e/tonne	AECOM derived factor (See assumptions l
Steel	788	tonnes	2.85	tCO2e/tonne	MfE 2020
Road Surface					
Crushed rock or recycled material		tonnes	0.0032	tCO2e/tonne	IS Calculator NZ v2.0
Gravel	1,150	tonnes	0.0182	tCO2e/tonne	IS Calculator NZ v2.0
Bitumen		tonnes	0.3966	tCO2e/tonne	IS Calculator NZ v2.0
Asphalt	68	tonnes	0.0542	tCO2e/tonne	IS Calculator NZ v2.0
Project Breakdown Total	**2,528**	tonnes of CO2e			
Calculated Emissions					
Best estimate of calculated emissions	**2,528**	tonnes of CO2e			

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 between
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 on-site fuel use).
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 guidance and is based on a standard concrete mix.

Brougham Street Multimodal — Construction Schedule

Source: Quantities derived by AECOM based on Brougham St overbridge concept drawing, as provided by WK. (Beca drawing 3811752-SE-0020 & 0021, April 2021)

Description	Quantity	unit	Concrete	t or m3	Steel	t or m3	Asphalt	t or m3	Aggregates	t or m3	Fuel	l or kg	
													Assumed all concrete weights are 2.5t/m3 concrete
Pedestrian Walkway													Assumed all steel reinforcing is 5% volume of item at 7.9
200mm concrete slab	1136	m2	568.03	t	89.75	t							
800mm Substructure to overpass	1136	m2			327.19	t							Allowed 250kgs/m2 for substructure (6m steel rows x 40
40mm Ashphalt surfacing	1136	m2					68.16367	t					
1.8m guardrail and fencing	227	m			5.77	t							https://www.nzta.govt.nz/assets/resources/road-safety-ba
3m Steel bracing along sides	274	m			67.95	t							Assumed from elevations 9 posts, 10 single cross braces
Staircases	2	no	105	t	16.59	t							
Columns to staircases	4	no	5.4	t	0.8532	t							Assumed 300x300 columns
Concrete posts to ramp	16	no	120.6371	t	19.06065	t							Assumed 800 diameter posts average height of 4m
Footings to above	16	no	250	t	56.88	t			150	t			Assumed 2.5x.2.5x1 hard fill to 1.5 below
Concrete beams between posts	8	no	300	t	47.4	t							Assumed 2m width 1.5m depth
Post to overpass	6	no	129.6	t	20.4768	t							Assumed 1200x1200 posts 6m height allowed for additio
Footings to above	6	no	135	t	21.33	t			81	t			Assumed 3x3x1 hard fill to 1.5 below
Concrete beams between posts	3	no	112.5	t	17.775	t							Assumed 2m width 1.5m depth
Resurfacing to below ramp	2450	m2	612.5	t	96.775	t			918.75	t			Assumed 35x35 area on each side. Assumed 100mm co
Total			2338.668	t	787.7983	t	68.16367	t	1149.75	t			