ROAD INFRASTRUCTURE MANAGEMENT FORUM

Our Carbon Equation

New Zealand IPWEA
INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA

Quantitative embodied carbon reporting and investment optimisation in a TCFD landscape

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WSP

RIMS
Roading Infrastructure Management Support

in association with
IDS Infrastructure Decision Support

Quantitative embodied carbon reporting and investment optimisation in a TCFD landscape

Performance modelling, CAESAR, and the Paris Agreement

TCFD's Recommended Disclosures

Governance
- What oversight does the board have over climate-related risks and opportunities?

Strategy
- How will your business be impacted by the risks and opportunities of climate change?

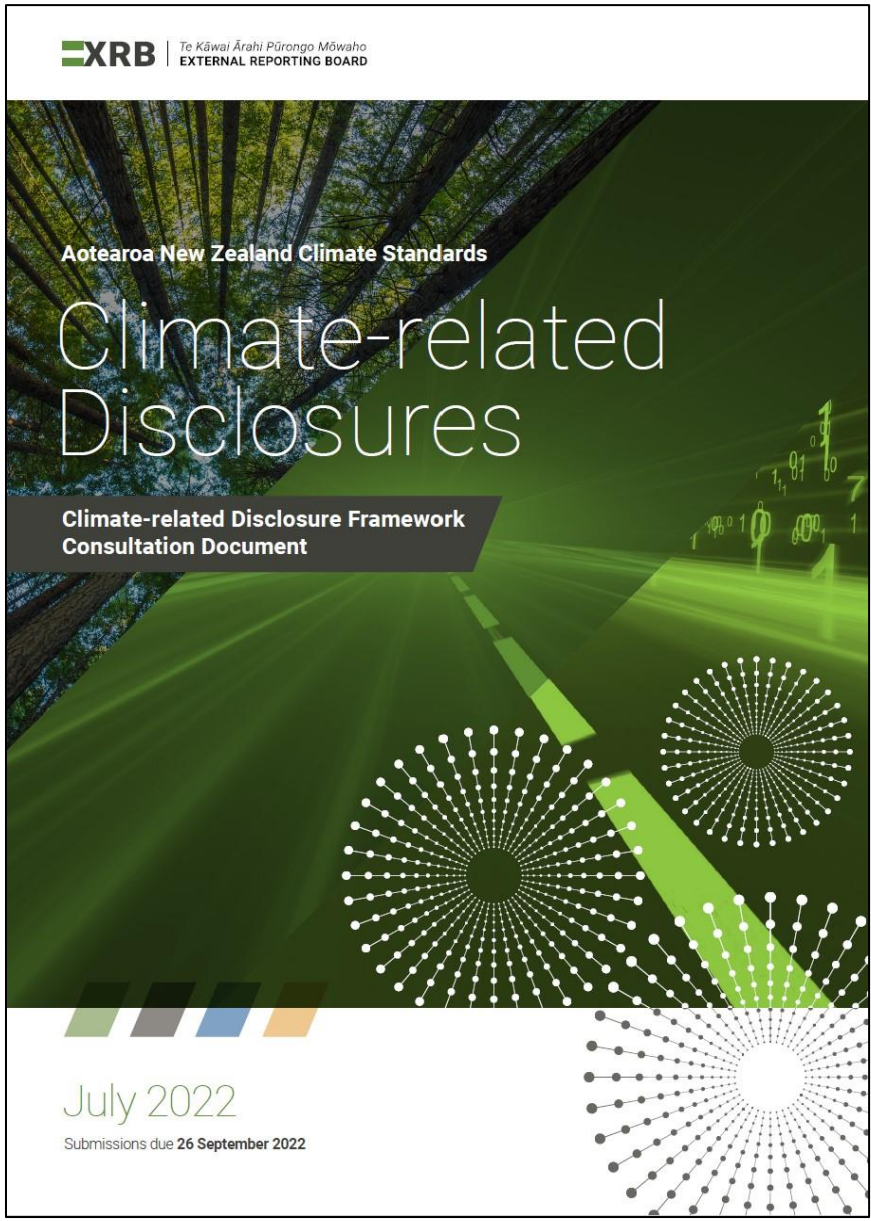
Risk Management
- How do you identify, assess, and manage climate-related risks?

Metrics and Targets
- What are your KPIs and Scope 1–3 GHG emissions?

Source: www.fsb-tcfd.org

The XRB and CREs

Oct 2021	Financial Sector Amendment Bill passed,
Oct 2021 – Sept 2022	External Reporting Board (XRB) disclosure framework under consultation,
2023	~200 large financial institutions designated as Climate Reporting Entities (CREs) to begin making disclosures.



Source: www.xrb.govt.nz/standards/climate-related-disclosures/

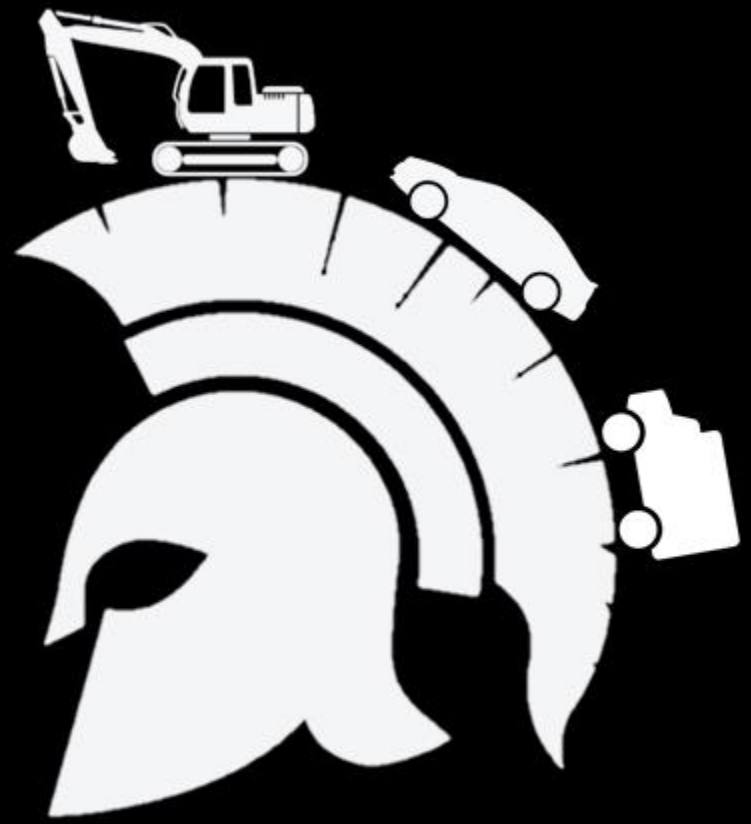
Environmental group asks court to overturn NZTA's $24 billion transport plan

Geraden Cann • 05:00, Dec 09 2021

Source: www.stuff.co.nz and www.transport.govt.nz/assets/Uploads/Paper/GPS2021.pdf

WSP will halve the carbon footprint of designs and advice provided to our clients by 2030

Pledged in November 2021



CAESAR

Carbon Approximation Engine for Strategic Asset Renewal

wsp

Key Differentiating Factors

CAESAR

- Models existing assets,
- Calculates whole-of-life carbon at a network level,
- Forecasts carbon going forward.

An advisory tool

Existing tools (generally)

- Model greenfield construction sites,
- Calculate whole-of-life carbon at a project level,
- Retrospectively assess carbon.

Design tools

CAESAR

Stage 1

- **Report** on carbon,
- Forecast business as usual,
- A starting point.

Stage 2

- **Optimise** by carbon,
- Set annual carbon budgets,
- Determine how funding requirements vary by constraining carbon.

	Year									
ID	1	2	3	4	5	6	7	8	9	10
1	specCS	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL
2	NULL	NULL	NULL	NULL	NULL	NULL	NULL	majCS	NULL	NULL
3	NULL	NULL	NULL	NULL	NULL	NULL	NULL	majCS	NULL	NULL
4	NULL	NULL	NULL	NULL	NULL	NULL	NULL	majCS	NULL	NULL
5	NULL	NULL	NULL	majAC	NULL	NULL	NULL	NULL	NULL	NULL
6	NULL	NULL	NULL	NULL	NULL	NULL	majCS	NULL	NULL	NULL
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8	specCS	NULL	NULL	NULL	specCS	NULL	NULL	NULL	NULL	NULL
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11	NULL	majCS	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL
12	NULL	majCS	NULL	NULL	NULL	NULL	NULL	NULL	NULL	majRHAB
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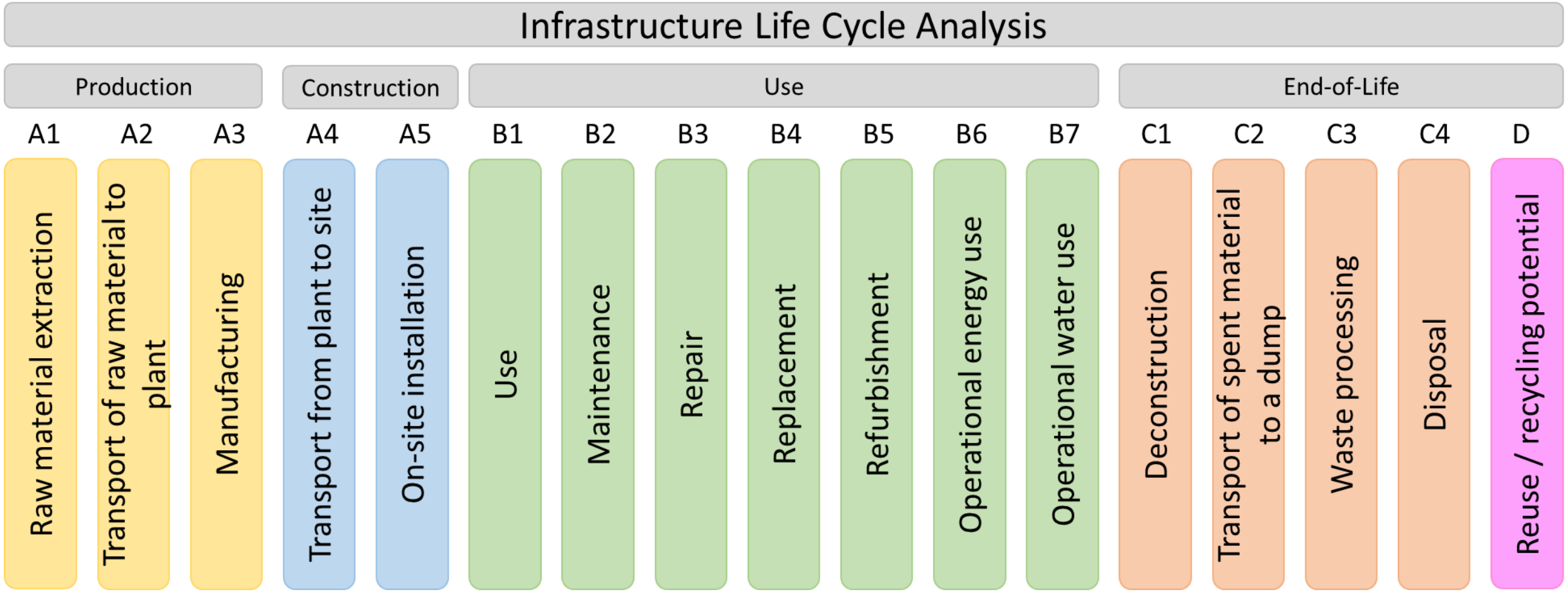
16	NULL	NULL	NULL	NULL	NULL	majRHAB	NULL	min2ndCo	NULL	NULL
17	NULL	NULL	NULL	majCS	NULL	NULL	NULL	NULL	NULL	NULL
18	NULL	NULL	majCS	NULL	NULL	NULL	NULL	NULL	NULL	NULL
19	NULL	NULL	majRHAB	NULL	min2ndCo	NULL	NULL	NULL	NULL	NULL
20	NULL	NULL	majRHAB	NULL	min2ndCo	NULL	NULL	NULL	NULL	NULL

Forward Works Programme

Infrastructure Life Cycle Analysis



Infrastructure Life Cycle Analysis

Production	Construction	Use	End-of-Life
A1: Raw material extraction	A4: Transport from plant to site	B1: Use	C1: Deconstruction
A2: Transport of raw material to plant	A5: On-site installation	B2: Maintenance	C2: Transport of waste material to a dump
A3: Manufacturing		B3: Repair	C3: Waste processing
		B4: Replacement	C4: Disposal
		B5: Refurbishment	D: Reuse / recycling potential
		B6: Operational energy use	
		B7: Operational water use	

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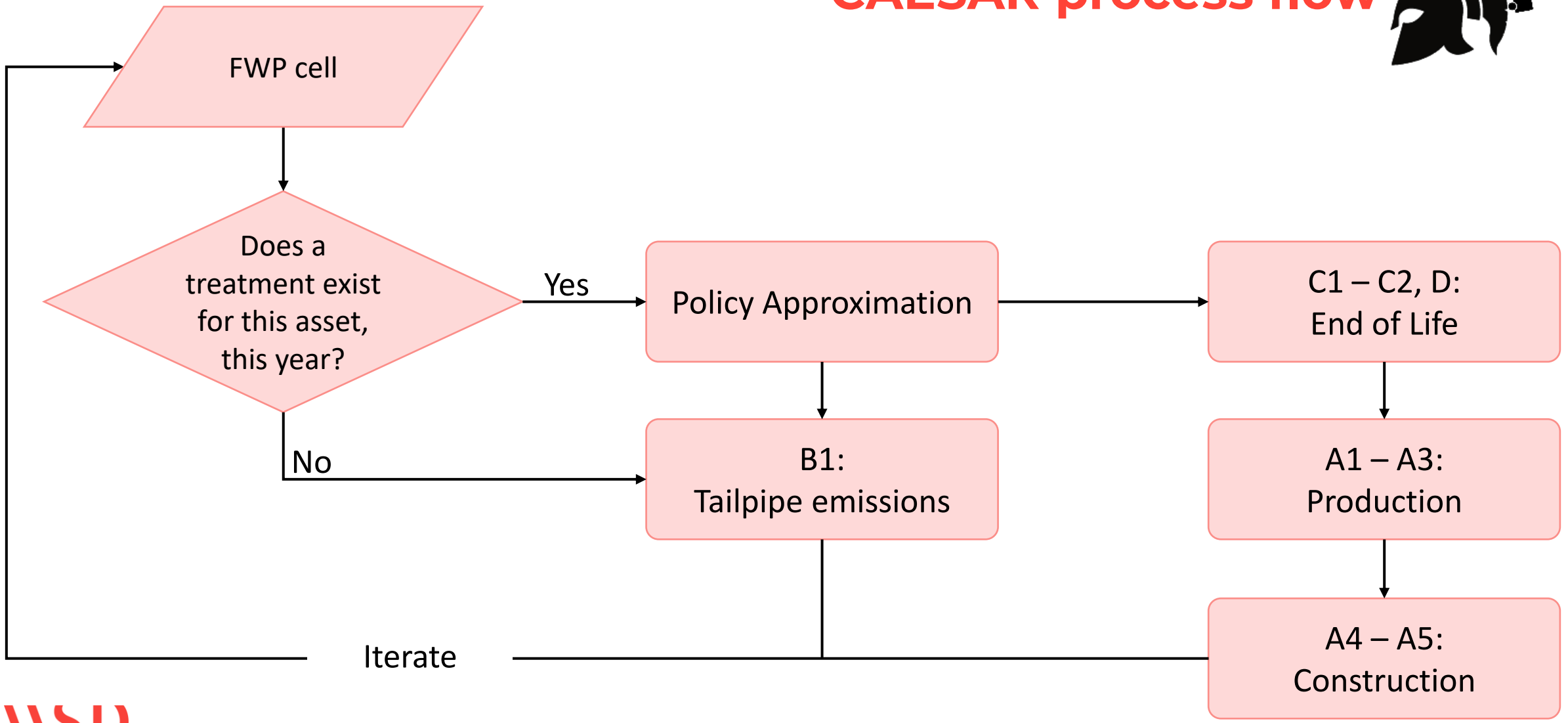
A2: Transport of raw material to plant	A5: On-site installation	~~B2: Maintenance~~	C2: Transport of waste material to a dump
A3: Manufacturing	A6: Congestion Impacts	B3: Repair	~~C3: Waste processing~~
		B4: Replacement	~~C4: Disposal~~
		~~B5: Refurbishment~~	D: Reuse / recycling potential
		~~B6: Operational energy use~~	
		~~B7: Operational water use~~	

CAESAR process flow



A1-A3: EPDs

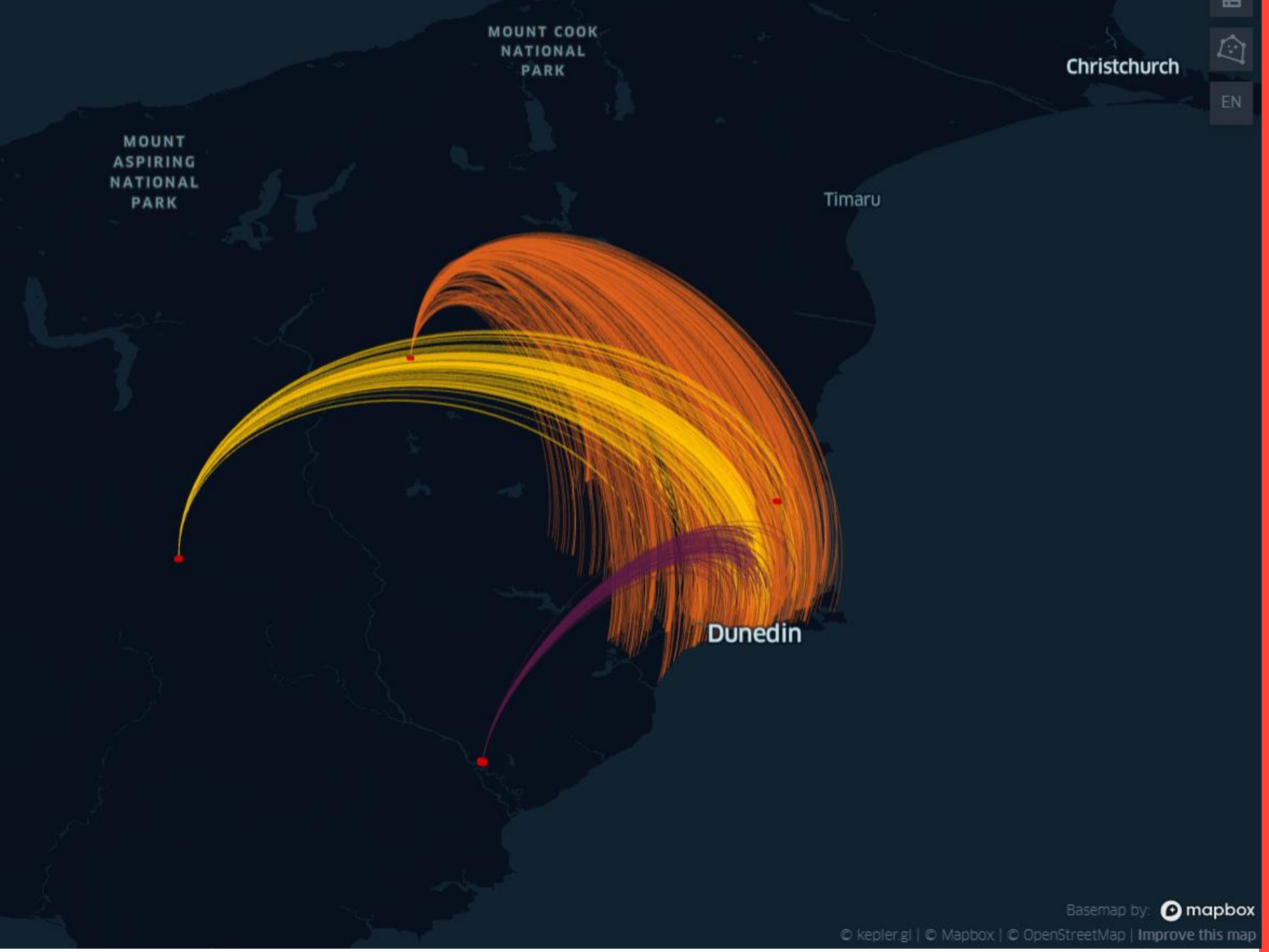
Whitianga: 301 kg CO_2e

Christchurch: 207 kg CO_2e

Allied Concrete's Whitianga plant has **45%** more carbon per cubic metre than their Christchurch plant.*

Source: https://www.alliedconcrete.co.nz/assets/technical-resources/files/Sustainability/Allied-Concrete-Environment-Product-Declaration-2019.pdf?vid=3

* For 17.5MPa Normal Grade



A4: Material Transportation

Closing remarks

Roadmap

- Improved policy approximation,
- Mapping material supply chains,
- Developing a regional EPD emissions factor dataset,
- EV mode shift modelling,
- Better plant productivity figures,
- Congestion impacts,
- Comparison / calibration with current and historical baselines,
- Optimise by carbon.

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Collaboration

New Zealand

- Morphing into an industry initiative,
- Development funded by Waka Kotahi as of July 2022.

Global

- Presenting this to WSP Global in September,
- Building NZ Inc's profile as a net exporter of decarbonisation tools.

Thank you

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