

# How to Implement Low Carbon Concrete

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Fact sheet

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## Acknowledgment of Country

We acknowledge that Aboriginal and Torres Strait Islander peoples are the First Peoples and Traditional Custodians of Australia, and the oldest continuing culture in human history.

We pay respect to Elders past and present and commit to respecting the lands we walk on, and the communities we walk with.

We celebrate the deep and enduring connection of Aboriginal and Torres Strait Islander peoples to Country and acknowledge their continuing custodianship of the land, seas and sky.

We acknowledge the ongoing stewardship of Aboriginal and Torres Strait Islander peoples, and the important contribution they make to our communities and economies.

We reflect on the continuing impact of government policies and practices, and recognise our responsibility to work together with and for Aboriginal and Torres Strait Islander peoples, families and communities, towards improved economic, social and cultural outcomes.

Artwork:

*Regeneration* by Josie Rose



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## Why implement low carbon concrete on projects?

Though concrete is typically made up of just 10–15% cement, cement production contributes up to 95% of concrete’s embodied carbon. The large footprint of cement is due to chemical reactions that happen during the heating process of the raw materials used in the production of Portland cement, combined with combustion emissions from the burning of coal or natural gas necessary to achieve the high temperatures during the calcination process.

Through setting requirements with maximum embodied carbon levels, minimum cement replacement and maximum cementitious material in the mixes, rapid emissions reduction can be achieved in projects.

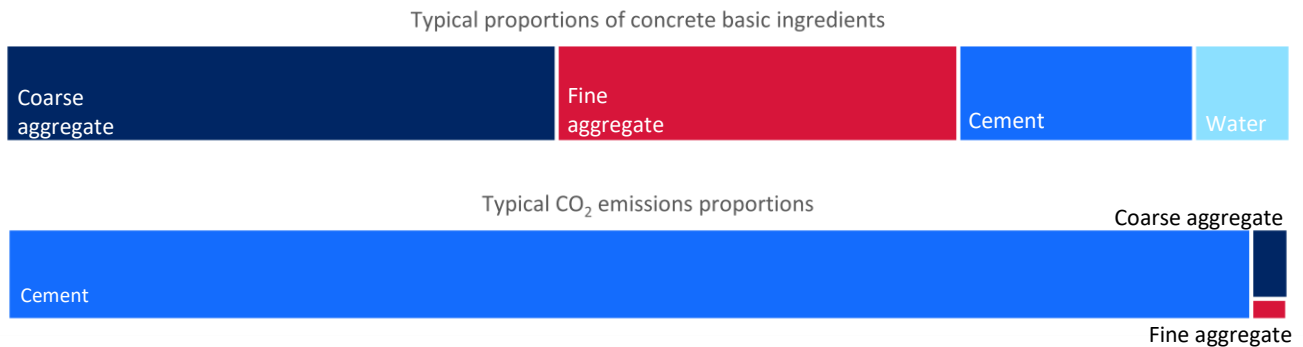


Figure 1 Typical concrete ingredients versus their typical CO<sub>2</sub> emissions

## How are low carbon concrete requirements set?

Low carbon requirements are nominated in the Low Carbon Concrete Specifications Briefing Documents that were produced for Health Infrastructure NSW, Water Infrastructure NSW and Western Parklands City Authority as part of the Low Emissions Building Materials Program.

Whilst the low carbon requirements are based on what suppliers can provide to the broad market, they are also developed to encourage competition between contractors and their suppliers to further reduce the embodied carbon levels of their products and to encourage the use of innovative solutions in a market friendly manner.

## When should requirements be implemented on projects?

Implementing low carbon concrete (LCC) in projects involves a multi-stage process from project inception through the design and construction phases. The earlier the low carbon concrete requirements are introduced to the project requirements and communicated to the supply chain, the greater the influence on the project outcomes and the lower the cost.

In Australia the major concrete suppliers are ready to meet an increased demand for low carbon concrete. However, implementing low carbon concrete is a partnership with all parties that requires early engagement with suppliers to enable them to have time to ensure that they can provide required low carbon concrete.

For regional areas engagement with suppliers may be required 6-9 months in advance, and for Sydney metropolitan areas engagement may be required 4-5 months in advance. Early engagement allows suppliers to schedule and manage their supply chain upgrades and reduces costs for all parties.

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Figure 2 Implementing low carbon concrete requires a multi-stage approach. The best outcomes will be achieved when steps are taken in each phase of the project.

## How to implement?

Implementing low carbon concrete is a partnership that requires the engagement of concrete specialists, designers, procurement teams, sustainability teams, contractor representatives (including their procurement teams, sustainability teams, management, project engineers etc...) as well as suppliers and the principal/project superintendent. Note, that the implementation of low carbon concrete should be considered as one opportunity within the project to reduce the carbon impact of a project. At early stages it is critical that the carbon reduction hierarchy of avoid, reduce, substitute is considered and design efficiencies are sought out.

The actions that can be taken in the different stages of the project to influence the low carbon concrete outcomes are outlined as follows:

### 1. Project Initiation, Master Planning and Feasibility Development

- 1.1. **Low carbon concrete goals:** Low carbon concrete requirements are to be provided with project briefing documents. These requirements will set the target reduction of carbon emissions and/or the cement replacement targets to be implemented in the project.
- 1.2. **Initial engagement with suppliers to access local availability:** Engagement with concrete suppliers to undertake an initial review to assess the practicality of incorporating low carbon concrete for a specific project.

### 2. Schematic Development and Reference Design

- 2.1. **Material selection:** Consultants to incorporate low carbon requirements in developing their specifications.
- 2.2. **Carbon emissions evaluation:** Perform a carbon emission evaluation of various low carbon concrete options to drive the decision making.
- 2.3. **Collaboration and communication:** Encourage collaboration and communication between the design team, concrete and precast suppliers, and other stakeholders to maximise and optimise the use of low carbon concrete in the project.

### 3. Contract Documentation

- 3.1. **Include the Low Carbon concrete requirements specified in the Low Carbon Concrete Specifications Briefing Document in contract documents:** Clearly specify the use of low carbon concrete in the project contract documents and outline the project requirements.

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- 3.2. Include requirements that nominate the implementation of a concrete working group through the delivery of the project which meets every 2-4 weeks and which includes designers, procurement, contractor management, client management, low carbon concrete champion and sustainability manager to work through the incorporation of low carbon concrete on the project.
- 3.3. Nominate that minutes of each concrete working group meeting are to be taken and provided to the project/client leadership teams.
- 3.4. **Incentives:** Consider incorporating incentives for contractors who exceed low carbon concrete targets.

## 4. Procurement

- 4.1. **Low carbon concrete champion:** Establish a project delivery champion who is tasked with driving the implementation of low carbon concrete on the project and to incorporate the requirements into procurement documentation prior to going to market, engaging with suppliers, precasters and contractors to advise them that low carbon concrete will form part of the project requirements.
- 4.2. **Supplier Evaluation:** Require suppliers to demonstrate capability delivering low carbon concrete applications and evaluate their track record of delivering of low carbon concrete projects and their ability to meet the project targets, their previous track record in delivering low carbon outcomes, and track record providing innovative outcomes using low carbon concrete and recycled materials in concrete on projects.
- 4.3. **Contractor Commitment:** When possible, select contractors who can demonstrate a commitment to using low carbon concrete in the project.

## 5. Design and Construction

- 5.1. **Design packages:** Consultant and designers to refer to the low carbon concrete requirements in their specifications and design packages . Targets to be explicitly included in drawings and all relevant project documentation.
- 5.2. **Implementation and Monitoring:** Establish a working group to meet every 2-4 weeks with designers, procurement, contractor management, client management, low carbon concrete champion and sustainability manager to work through the incorporation of low carbon concrete on the project.
- 5.3. **Regular Auditing and compliance:** Conduct regular audits to verify that low carbon concrete is being used as specified and that targets are being met.
- 5.4. **Performance Evaluation:** Evaluate the performance of low carbon concrete options in terms of strength, durability, and environmental impact during and after construction to improve future projects.

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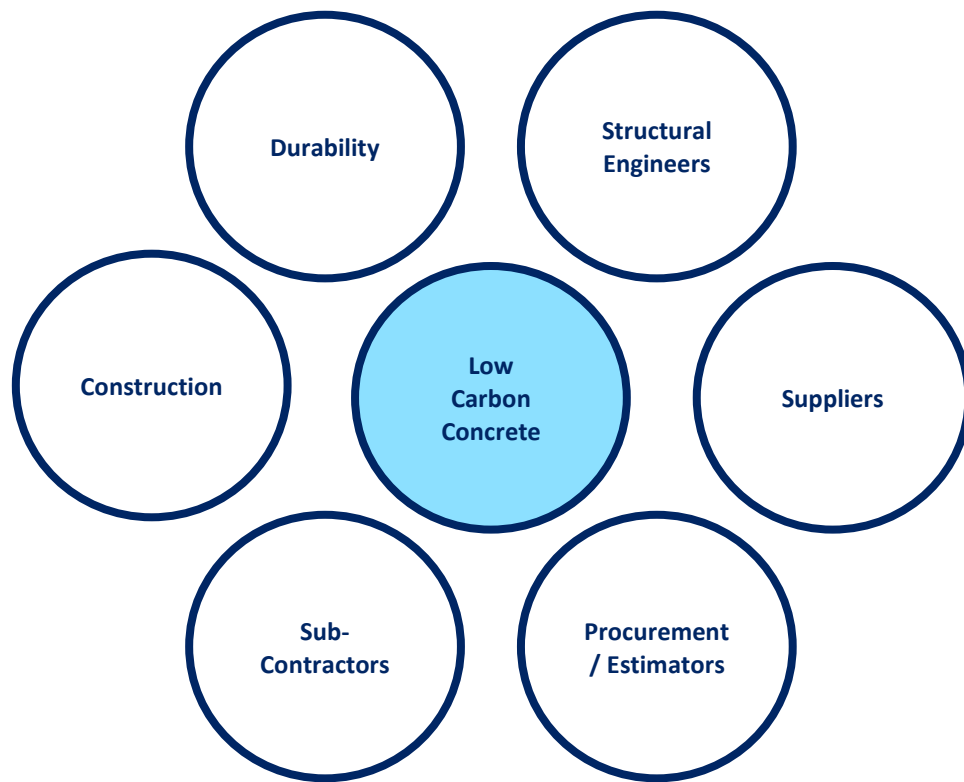


Figure 3 Establishing a working group to work through the incorporation of low carbon concrete on the project is the key for success

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