

# Sustainability Initiative: Geopolymer Concrete

Rozelle Interchange  
WestConnex



The Rozelle Interchange Project has been working closely with a number of partners on the development and implementation of a Geopolymer Concrete (GPC) mix for R53 non-structural applications including footpaths, cycleways and shared user paths. Numerous opportunities to apply trial concrete mixes to both temporary and permanent works have been identified around the Rozelle Railyards and City West Link.

The development of GPC is a joint initiative with industry partners (BORAL), research and development bodies (UNSW), parent companies (John Holland Group), and sustainability specialist (EDGE). The concept originated from the award of a Research Development Grant from the EPA for the diversion of glass waste from landfill through to concrete.

## What is Geopolymer Concrete?

Geopolymer concrete is a type of concrete made by reacting industrial waste materials such as fly ash, glass sand and slag with an alkali activator. The activator is a binder that allows replacement of cement in its entirety, and significantly reduces the embodied emissions (up to 80%) of the mix in addition to diverting the waste materials from landfill.

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## Benefits

### Design and Construction:

- Low shrinkage and higher durability
- Superior chloride attack resistance (corrosion resistance)
- The concrete is able to support foot traffic early on in the curing process

### Environmental and Social:

- Significant reduction of the Project's virgin material consumption and greenhouse gas footprint by substituting Ordinary Portland Cement with geopolymer based products
- Diversion of waste products from landfill
- Longer life span and less maintenance for concrete pavements resulting in a reduced impact on the environment.

Identifying viable and affordable glass sand suppliers and overcoming technical challenges regarding batching and pouring the material have been the main obstacles for the joint research partners to overcome. However, the success of the early trial in 2021 pour has provided the proof of concept required to demonstrate that this type of concrete can become an acceptable, commercial alternative to cement-based concretes. Key learnings from the trial will feed into an updated mix design that will be trialled in 2022, bringing the construction industry one step closer to a carbon-neutral future.

The initiative has also been recognised by the Infrastructure Sustainability Council of Australia 2022 for its significant contribution to environmental outcomes / working to achieve net zero.

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