

City of Sydney Experience with Low Embodied Energy Construction Materials

Net Zero Construction Materials: A
Briefing for Government Executives
and Leaders

27 May 2021

CITY OF SYDNEY 



Strategic Context

- Environment Strategy 2016-2021 – Focus: operational energy / carbon
- 2021-2025 – Clear shift to carbon in wider context
- Multiple touch-points:
 - Own operations (civil works)
 - Specify low-e materials in procurement
 - Supply chain
 - Planning approvals
 - Resource recovery
 - Circular economy
 - Staff capabilities

Direction 1 Smart and resilient City operations

- 1 Deliver energy, water and resilience outcomes through City asset design and management
- 2 Keep City parks green with water efficiency and alternate water sources
- 3 Regenerate the environment through the City's carbon-neutral commitment
- 4 Ensure the City's programs and services use resources efficiently
- 5 Reduce the amount of operational waste sent to landfill through avoidance and resource recovery
- 6 Reduce embodied carbon in our supply chain and support circular economy outcomes
- 7 Manage environmental risks and issues

Direction 2 Efficient, future-proof buildings and transport powered by renewable energy

- 8 Improve energy efficiency, water efficiency and waste management in existing buildings
- 9 Drive all new buildings to be resource-efficient and net zero energy
- 10 Support the transition to zero-emissions transport
- 11 Encourage community uptake of renewable electricity and stimulate the green economy
- 12 Support our residents to reduce utility costs and environmental impact
- 13 Help businesses to reduce utility bills and demonstrate environmental achievement

Direction 3 Regenerative and inclusive city

- 14 Incorporate the perspectives of Aboriginal and Torres Strait Islander people in environmental action
- 15 Address equity issues related to climate change
- 16 Build community resilience and momentum on climate action
- 17 Support the development of circular economy systems
- 18 Drought-proof the city by facilitating water recycling
- 19 Regenerate polluted waterways, air and land
- 20 Reduce the amount of residential waste sent to landfill through avoidance and resource recovery

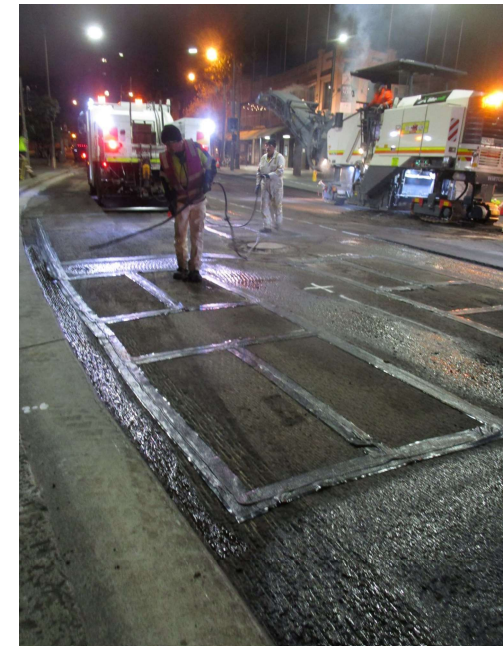
Direction 4 Strong foundations for delivery

- 21 Build staff capability to deliver environmental outcomes
- 22 Deliver high-quality internal and external environmental reporting and communications
- 23 Employ efficient and effective decision-making processes



First Forays

- **2010 - Warm mix asphalt** - temperatures 20 to 50 degrees lower than traditional mixes - less energy inputs for same result
- **2010 - 15% to 20% Recycled asphalt pavement** content - road resurfacing program.
- **2014 - Toner Pave** Downer & cartridge recycling company, Close the Loop toner in asphalt mix reduces bitumen volumes, derived from crude oil
- **2018 - Reconophalt** – extended range of ‘waste’ materials used in asphalt road resurfacing – street sweepings (grit/sand), toner, plastic bags, crumbed rubber (tyres)



Latest initiatives

2019 Geopolymer Trial

- Wyndham Road, Alexandria
- High traffic volumes
- Direct comparability to adjacent standard Portland Cement section
- Sensors installed within slab
- Uses 'waste' materials - slag / fly ash + alkali binders

Video

Next Steps

- July 2021 – Low-e concrete (reduced cement content) for several footpaths, backed by Env. Product Disclosures (EPD)

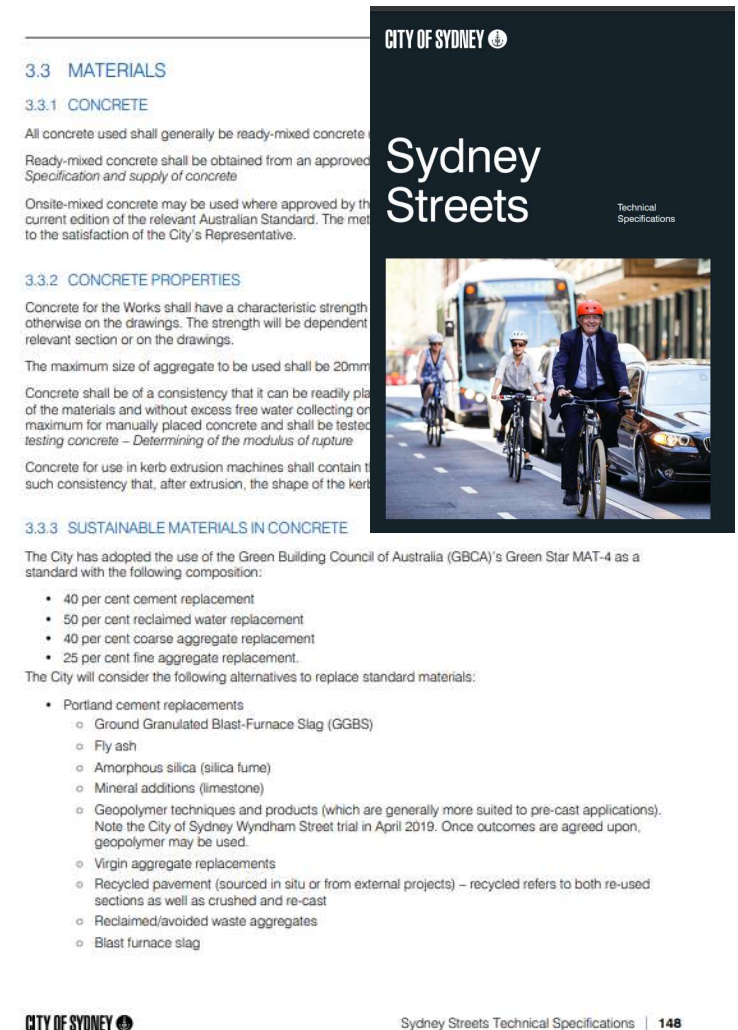


Specifications

- Reference GreenStar as a standard
- Encourage alternative materials – aggregates & binders
- **But** alone have not driven the scale and pace of uptake needed

Circuit breakers have been:

- External partnerships (UNSW, CRC-LCL, SSROC)
- Industry leadership – commercial availability + willingness to partner



People and Process

People

- Executive 'read' community & Councillor support for innovation
- Program Delivery Managers & Senior Project Coordinators implementation 'drivers'
- Specification engineers understandably conservative – need to feel supported to participate in innovation
- Proactive contractors help stimulate innovation

Processes

- Enable flexibility in specifying / avoid excessive prescription
- Use tender processed to trigger contractor innovation
- Insert innovation KPIs into tender and contract documents
- Link to Industry rating schemes