

Annual Sustainability Performance Review

July 2023 to June 2024

Published December 2025



Introduction

The NSW Government is delivering Sydney Metro West, a new underground metro railway which will double rail capacity between Parramatta and the Sydney CBD, link new communities to rail services and support employment growth and housing supply.

Sydney Metro West (SMW) stations have been confirmed at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays, Pyrmont, and Hunter Street in the Sydney CBD.



The project involves nine kilometres of twin metro rail tunnels between Westmead and Sydney Olympic Park, excavation for two new metro stations, two junction caverns, spur tunnels, and a stabling and maintenance facility at Clyde, and a precast facility at Eastern Creek.

- During the FY2023-24 period, GLC progressed detailed design and construction. Key construction activities included:
- Parramatta D-wall construction and station box excavation
- Westmead Station box excavation
- Tunnelling and precast tunnel lining segment production
- MSF earthworks
- Creek diversion works
- Unwin St overbridge works
- Clyde Dive Spur tunnels

This review will focus on the GLC's sustainability performance in the following key areas:

Resource usage



Workforce Development



Stakeholder Engagement



Social Procurement



ISC Rating progress



Opportunities for improvement





ENERGY

electricity and fuel consumption

Project requirements

25% reduction in greenhouse gas emissions (Scope 1 and 2) below a base case footprint.

25% overall, reduction in total greenhouse gas emissions below a base case footprint.

30% offset of Scope 1 and 2 emissions.

Performance

WTP uses energy from electricity, fuels and gas. WTP has high electricity demand from tunnel boring machines (TBMs), roadheaders, temporary tunnel lighting and ventilation, site offices and electrical plant and equipment. Fuels (including diesel, B5 biodiesel, and petrol) are used for construction plant and equipment, including generators. Gas is used to steam cure concrete at the Eastern Creek Precast Yard.

Energy Use

In FY2023-24, the Project consumed 20,740,925 kWh of electricity (Figure 1), representing a 35-fold increase on FY2022-23 due to kick-off of TBMs and roadheaders. 97 per cent of the Project's electricity use came from renewable electricity (Accredited GreenPower and on-site deployable solar units) in the reporting period (Figure 2).

WTP also consumed 1,400 KL of diesel, 1 KL of petrol and 11,959 GJ of gas. The monthly and cumulative fuel use of the Project is shown in Figure 3 and Figure 4.



Roadheader in the Clyde Dive service tunnels

Annual Electricity Usage

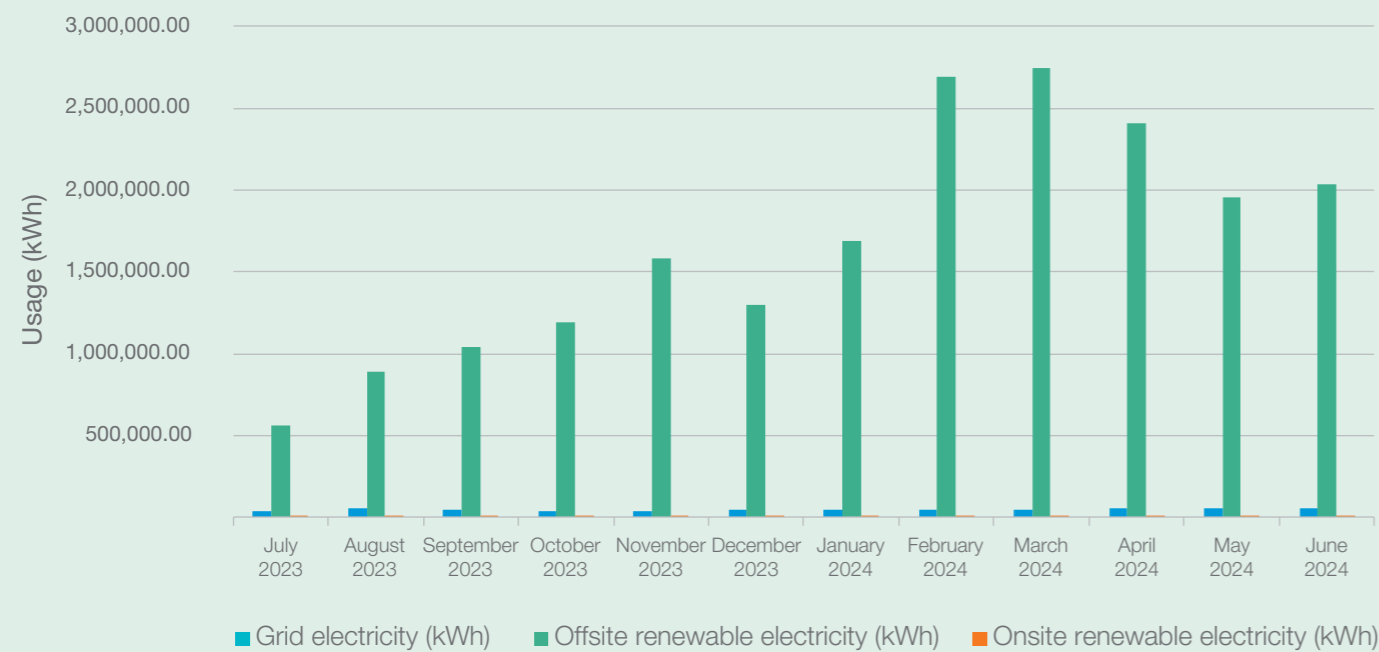


Figure 1: Monthly Electricity Use FY2023-24

Proportion of Renewable and Non-Renewable Electricity

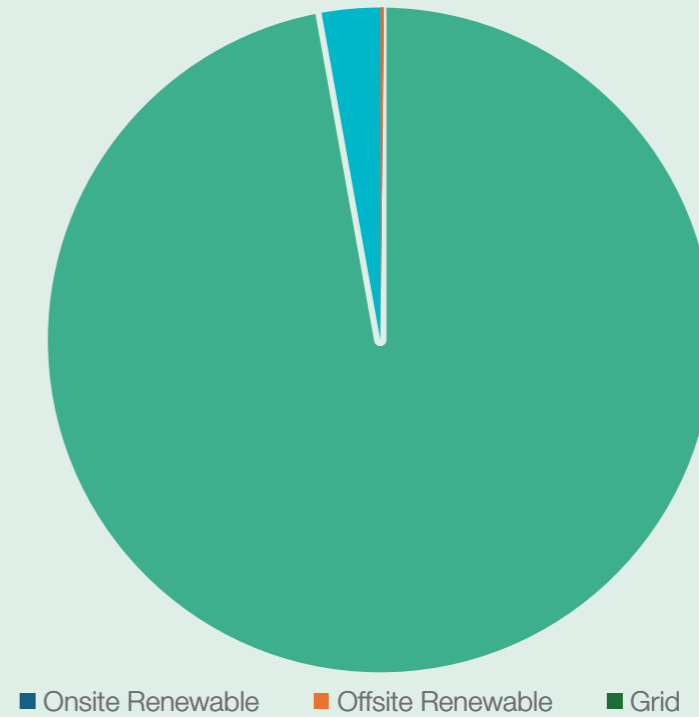


Figure 2: Proportion of Renewable and Non-Renewable Electricity FY2023-24

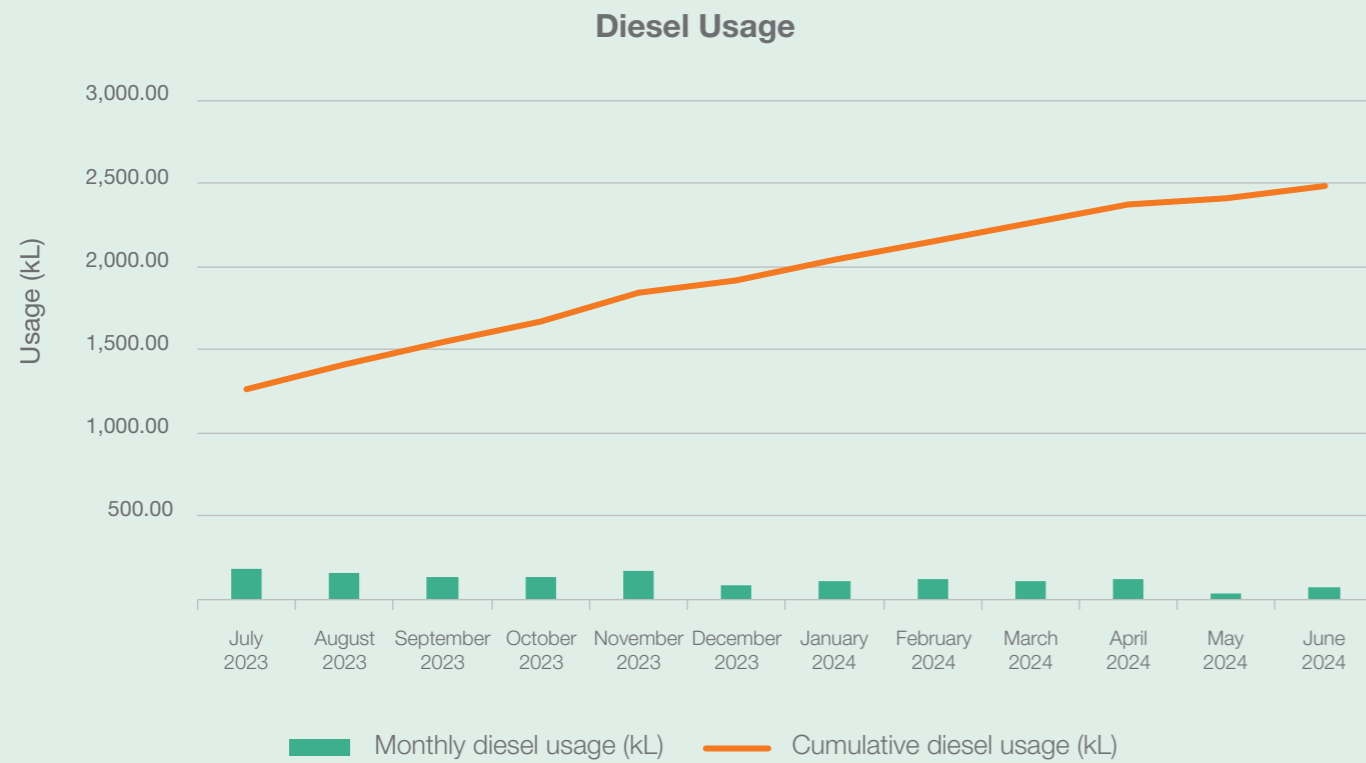


Figure 3: Monthly and Cumulative Diesel Use FY2023-24

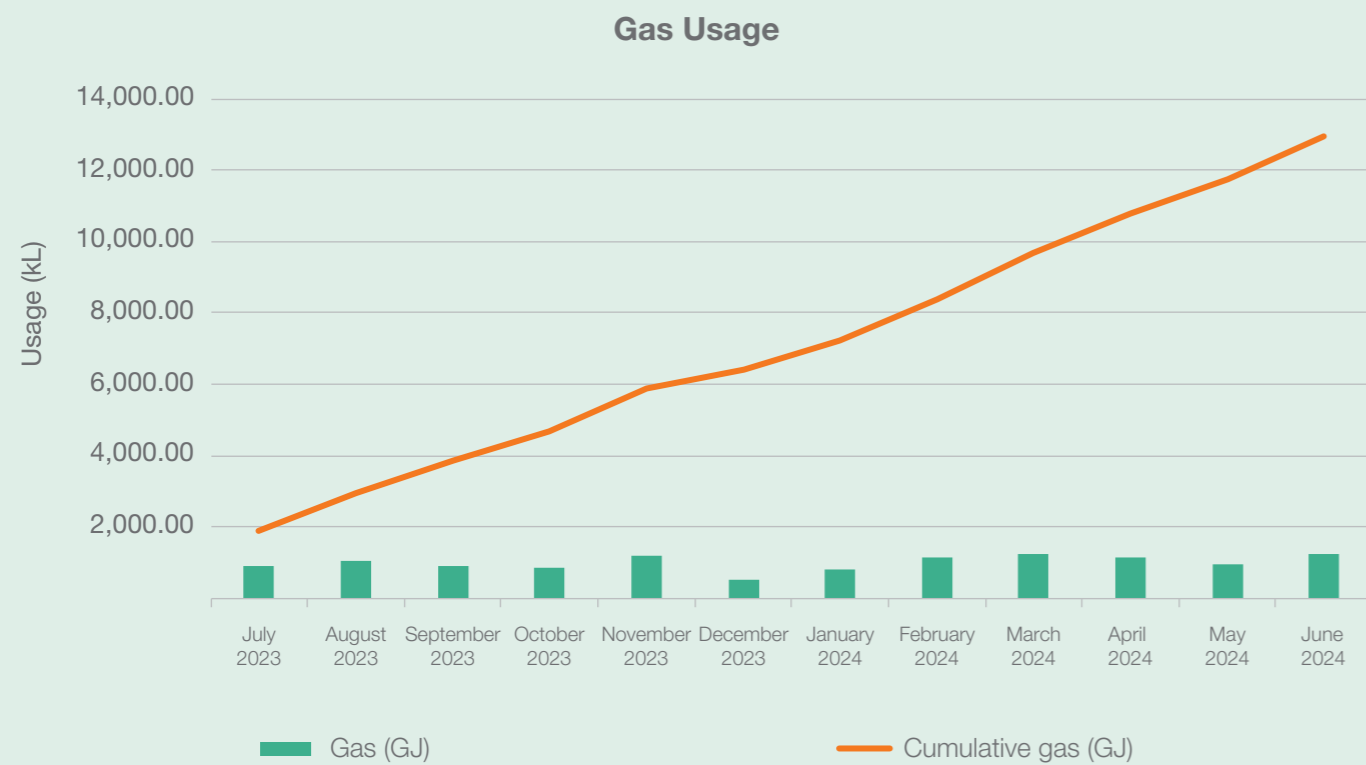


Figure 4: Monthly and Cumulative Gas Use FY2023-24



TBM Betty arrives at Sydney Olympic Park in June 2024

Energy Reductions

GLC reduced energy use via the Sustainability in Design process in collaboration with the Design Joint Venture (GHD and SMEC). Energy emissions can be reduced in two ways in the design phase: minimising the Project’s physical footprint or developing designs that can be built with less carbon (i.e. reducing the fuel and electricity required for construction). On WTP, design initiatives have been modelled to cumulatively reduce more than 1,600 tCO₂e of greenhouse gas emissions. The highest impact energy reduction initiatives saved more than 300 tCO₂e each and include:

- Reduction in the length of the water conveyance structures
- Changes to Clyde Dive which reduced the overall length of the structure
- The construction of an overpass at Unwin Street rather than the proposed underpass

Energy Substitutions

GLC has reduced greenhouse gas emissions by substituting grid electricity for renewable energy to power construction activities. During the reporting period, 97 per cent of the Project’s construction electricity usage coming from GreenPower (Figure 2).

Energy substitution initiatives resulted in more than 14,000 tCO₂e of avoided greenhouse gas emissions in FY2023-24 and include:

- Installation of a 265 kWp solar farm to power site offices and the Tunnelling & Infrastructure Academy (TIA)
- Purchase of GreenPower for site offices and construction activities. This includes 100 per cent GreenPower purchase for high voltage electricity demand such as TBMs and roadheaders



WATER

water consumption and
non-potable replacement

Project requirements

10%

overall reduction in overall
potable water consumption.

40%

of construction water sourced
from non-potable sources.

Performance

Tunnelling projects and large earthworks sites, such as the Clyde stabling and maintenance facility, require high volumes of water for dust management and cooling tunnelling machinery.

Groundwater encountered during tunnelling and construction also needs to be managed and treated.

Water Use

In FY2023-24, the Project consumed 274,247 kL of water, including 132,402 kL of water from non-potable sources (including recycled water, groundwater and stormwater). To date, the Project has consumed 390,845 kL of water (Figure 5).



Water Treatment Plant at the Rosehill site

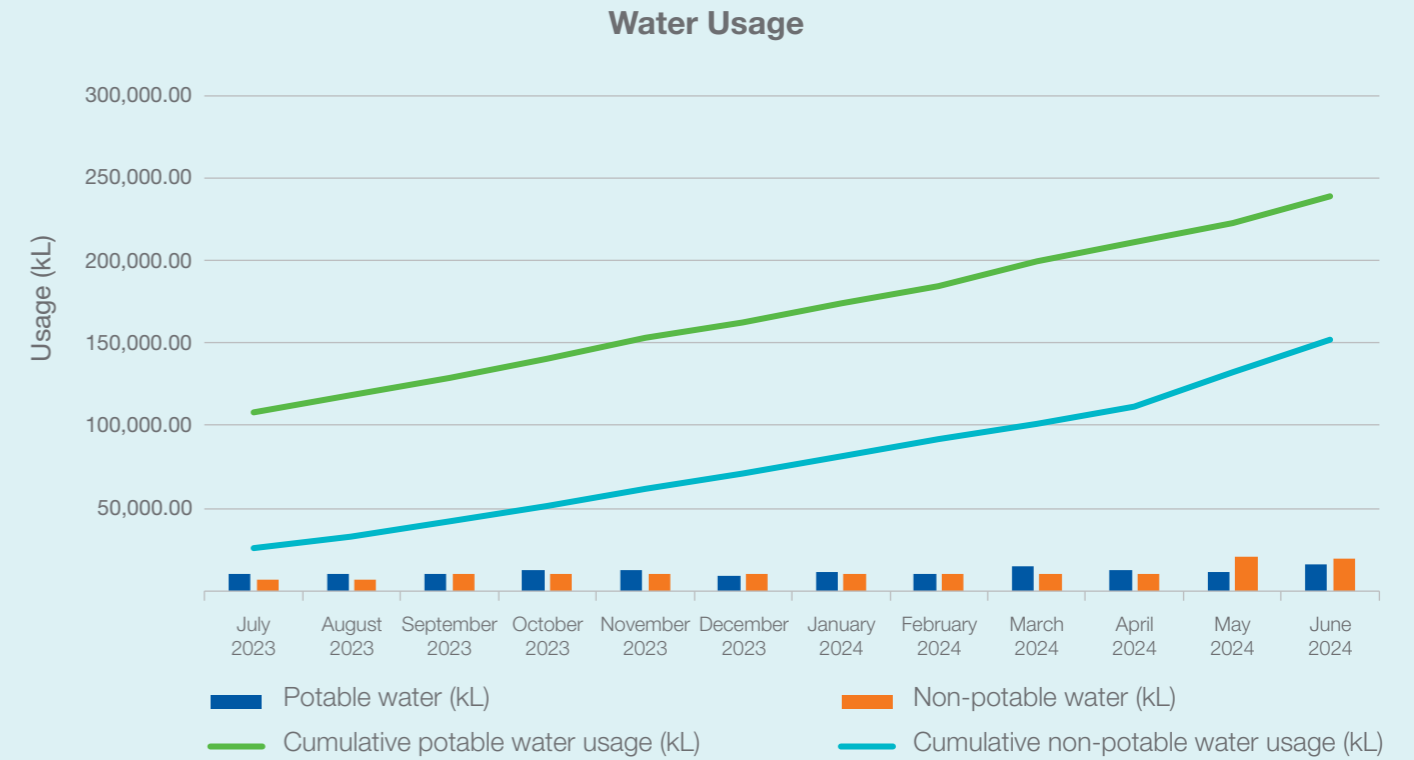


Figure 5: Monthly and Cumulative Water Use FY2023-24

Potable Water Reduction

GLC has embedded initiatives to reduce water use with an anticipated reduction of more than 45,000 kL across the project lifecycle. The highest impact initiatives include:

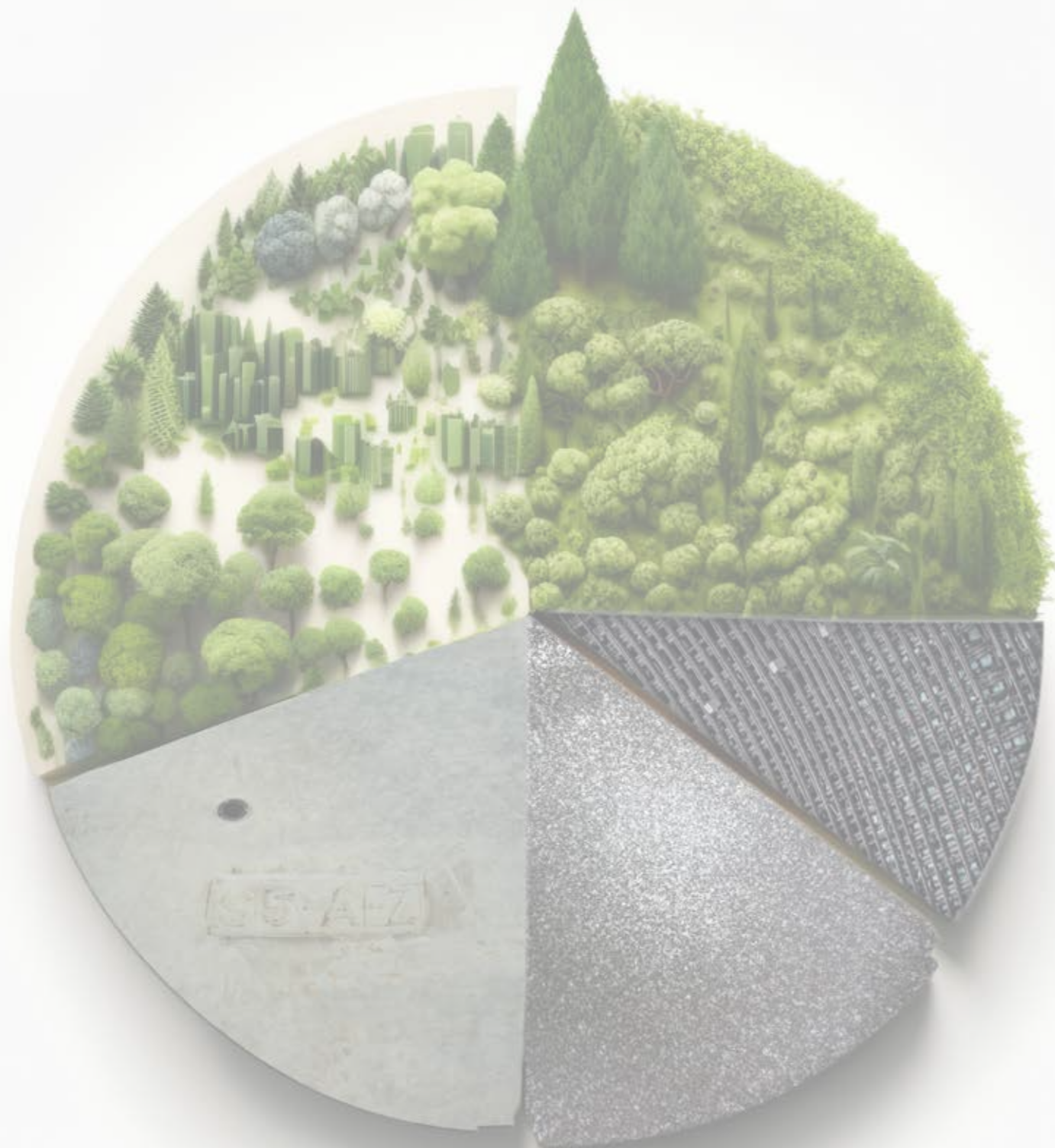
- Low water construction methodologies, including the use of tunnel scrubbers for dust suppression and dry vacuum trucks.
- Installation of site offices with a 4–5-star NABERS rating.

Potable Water Substitution

Potable water substitution represents a priority sustainability opportunity on WTP. Figure 5 presents the usage of potable and non-potable water in FY2023-24. To date, the cumulative potable water replacement rate for WTP is approximately 40 per cent.

The highest impact water substitution initiatives on WTP are

- Reuse of treated groundwater for tunnel boring. GLC has constructed a water treatment plant in Rosehill to process groundwater for use in TBMs.
- Reuse of non-potable water for dust suppression on site.



MATERIALS

material consumption
and embodied energy

Project requirements

15%

reduction in materials lifecycle impacts (Scope 3) compared to a base case footprint.

25%

overall reduction in total greenhouse gas emissions (Scope 1, 2 and 3) below a base case footprint.

35%

Portland cement replacement in concrete with SCMs.

Performance

The construction of WTP requires significant quantities of materials. Materials being used to construct the Project include:

- Precast concrete used for tunnel lining and Unwin St bridge. More than 60,000 precast segments will be produced for the mainline tunnels and spur tunnels.
- In-situ concrete used in structural elements of station boxes, tunnel nozzles, cross passages, station caverns and water conveyance structures.
- Steel used for concrete reinforcement.
- Asphalt used in road surfaces at Unwin Street.
- Aggregates used for scour protection.

Materials Use

In FY2023-24, the Project consumed 108,132 m³ of concrete (Figure 6) and 11,688 tonnes of steel (Figure 7). The Project also consumed 6,305 tonnes of ballast, 4,008 tonnes of gravel, 3,154 tonnes of crushed rock and 761 tonnes of sand (Figure 8).



Unwin Street civil work

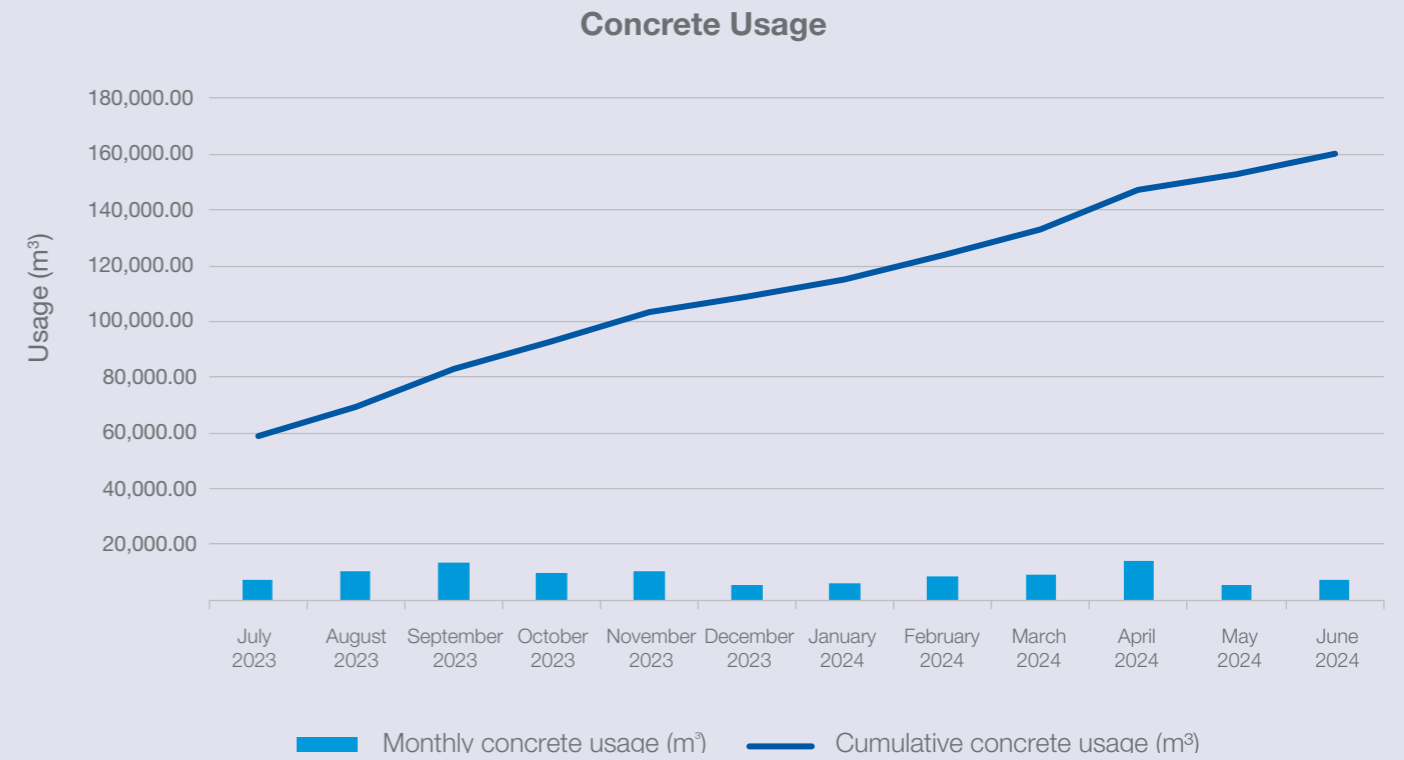


Figure 6: Monthly and Cumulative Concrete Use FY2023-24

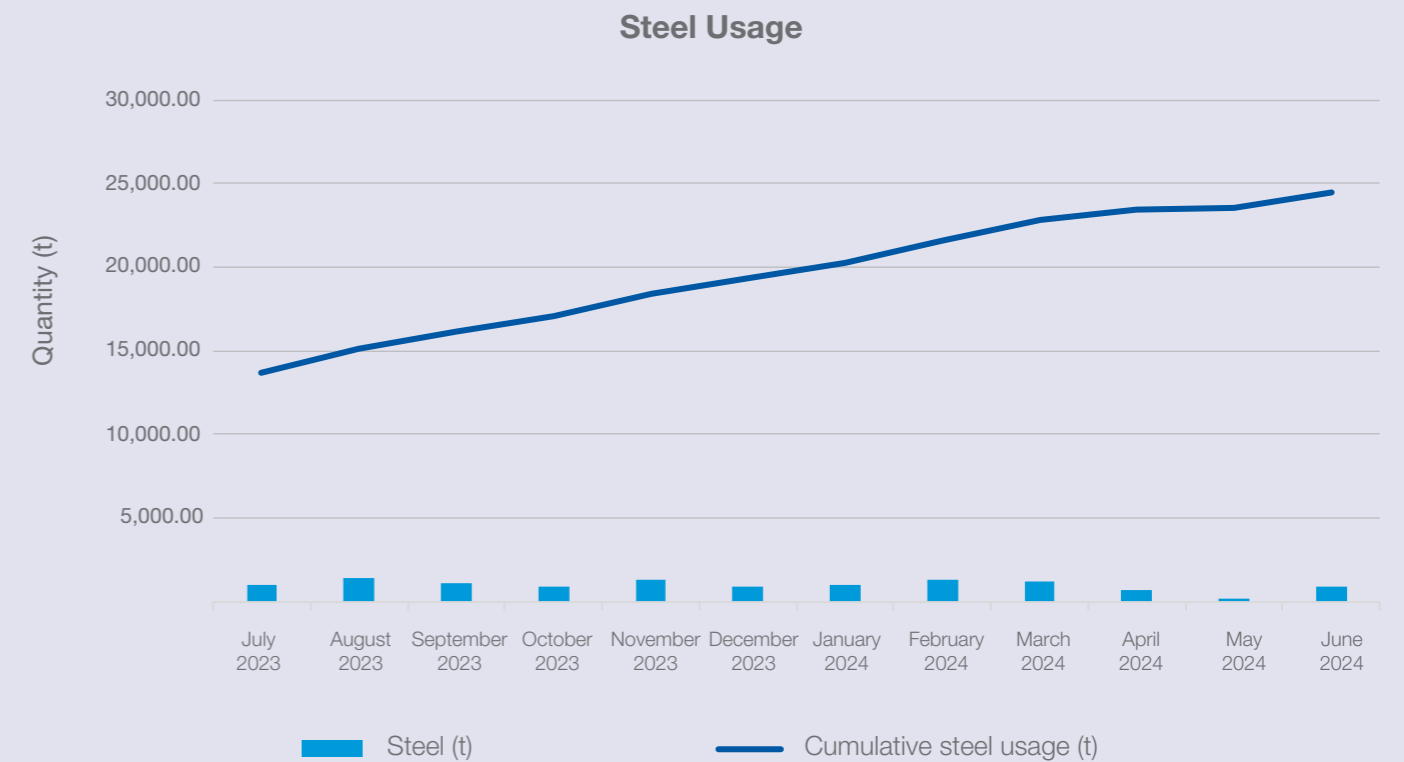


Figure 7: Monthly and Cumulative Steel Use FY2023-24

Annual Aggregate Usage

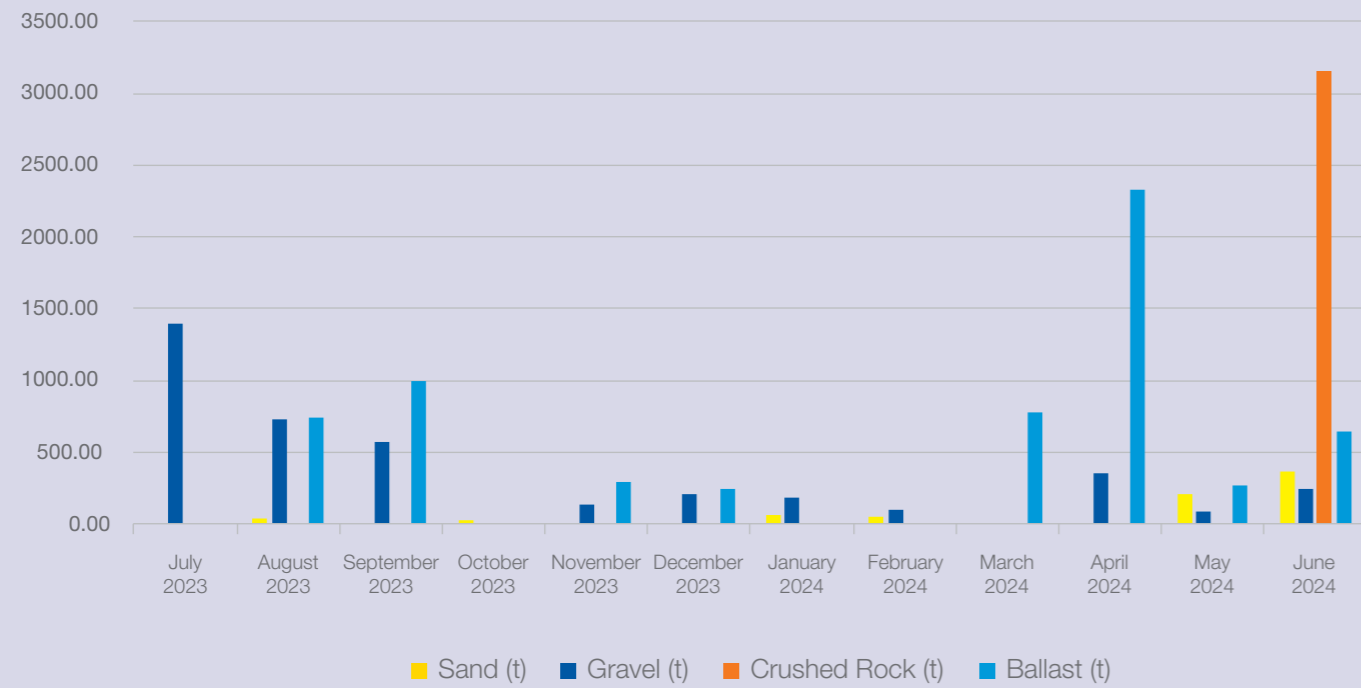


Figure 8: Monthly and Cumulative Aggregate Use FY2023-24

SCM Replacement in Concrete

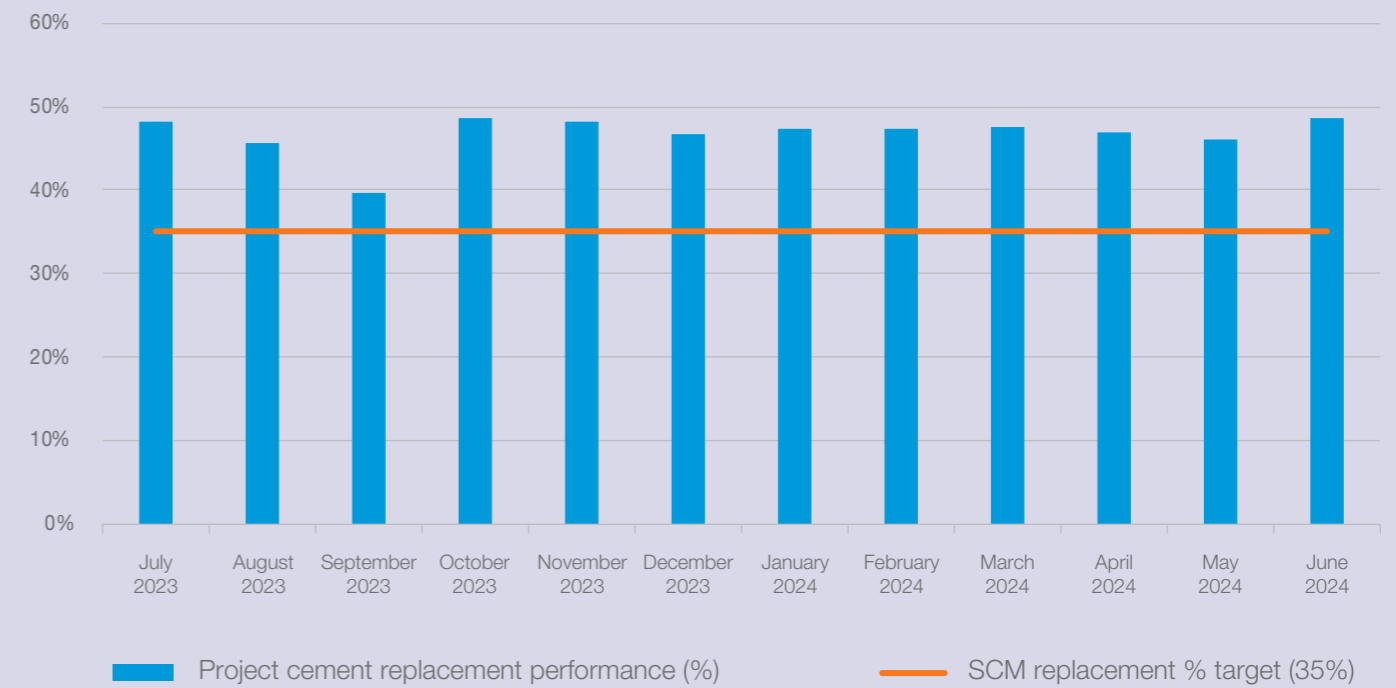


Figure 9: Cumulative steel usage (t).

Materials Reductions

GLC has realised significant reductions in material use via the Sustainability in Design. The highest impact energy reduction initiatives can save more than 2,000 tCO2e each and include:

- Redesign of Rosehill D-wall to reduce steel and concrete quantities
- Redesign of Parramatta D-wall to reduce steel and concrete quantities
- Replacement of underpass with overbridge at Clyde
- Redesign of tunnel rings to reduce steel and concrete quantities and improve construction efficiency
- Replacement of concrete slab with aggregate for use as scour protection

Materials Substitutions

GLC has reduced GHG emissions from energy by substituting traditional construction materials for low carbon alternatives.

Notably, GLC has achieved industry-leading performance for the replacement of Portland Cement for Supplementary Cementitious Materials (SCMs). Portland cement is the most carbon-intensive component of concrete. Therefore, green concrete mixes that replace Portland cement with products with similar properties (e.g. fly ash, slag) represents a significant initiative on projects with high concrete use, like WTP. In FY2023-24, GLC consistent tracked above the 40 per cent Portland cement replacement target (Figure 9). The use of SCMs is the largest contributing initiative to reducing carbon emissions (Scope 1, Scope 2 and Scope 3) on the Project.

The highest impact materials substitution initiatives on WTP are:

- Replacement of Portland Cement with Supplementary Cementitious Materials
- Use of Recycled Asphalt



WASTE

diversion from landfill

Project targets

100% of reusable spoil must be beneficially reused.

95% inert and non-hazardous construction/demolition recyclable waste (excluding spoil) must be recycled or reused.

60% recycle or reuse office waste generated during construction.

Performance

The generation of waste is an inherent part of the construction of large-scale State Significant Infrastructure projects, like WTP. The scale of the Project raises opportunities to encourage a circular economy through recycling and reuse of waste materials that reduces the quantity of waste sent to landfill.

The types of waste generated by the Project include:

- Spoil is uncontaminated excavated clay, gravel, sand, soil or rock
- Construction and Demolition Waste (C&D) is material resulting from construction and demolition activities including concrete, bricks, glass, metal and asphalt
- Office Waste is waste generated from office activities including paper, cardboard, plastic and food waste

Spoil

The project scope involves the construction of twin tunnels between Sydney Olympic Park and Westmead, which is anticipated to require the excavation of more than two million tonnes of spoil. Spoil will either be reused on-site for earthworks (e.g. at the stabling and maintenance facility) or sent off-site for beneficial reuses including waste management and other construction projects around Sydney.

In FY2023-24, 1,359,343 tonnes of reusable spoil was beneficially reused which contributes to the Project’s cumulative beneficial reuse rate of 100 per cent.

Construction and Demolition Waste

In FY2023-24, the Project generated 11,265 tonnes C&D waste of which 11,019 tonnes was beneficially reused. In FY2023-24, GLC has diverted 98 per cent of C&D from landfill as shown in Figure 10.

Office Waste

In FY2023-24, 2,771 m³ of office waste was generated with a cumulative diversion rate of 49 per cent (by volume).

GLC has identified office waste recovery and recycling as an improvement area as the Project tracks under the 60 per cent diversion target (Figure 11). GLC is collaborating with site teams across the Project to raise awareness around waste segregation and recycling through training sessions, as well as investigating and auditing the performance of waste infrastructure at each site.

Construction and Demolition Waste Reuse and Disposal

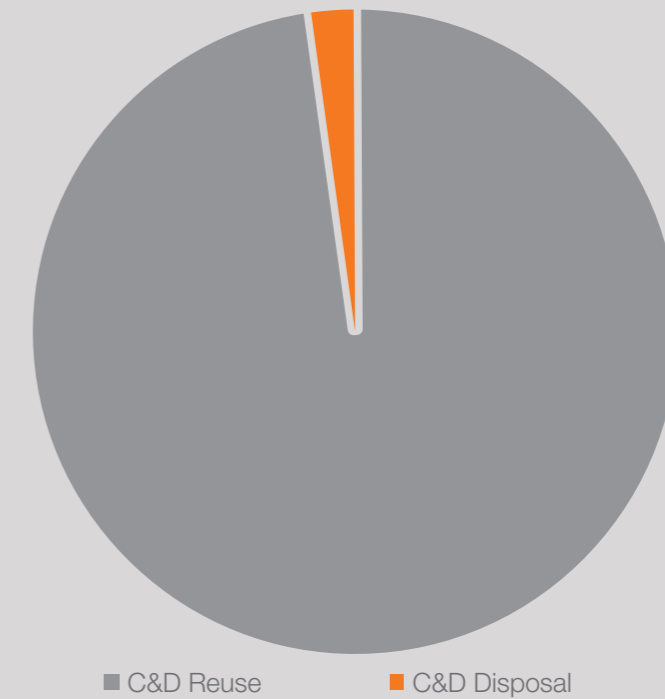


Figure 10: Proportion of Construction and Demolition Waste that was reused and disposed of in FY2023-24

Office Waste Recycling Rate (tonnes)

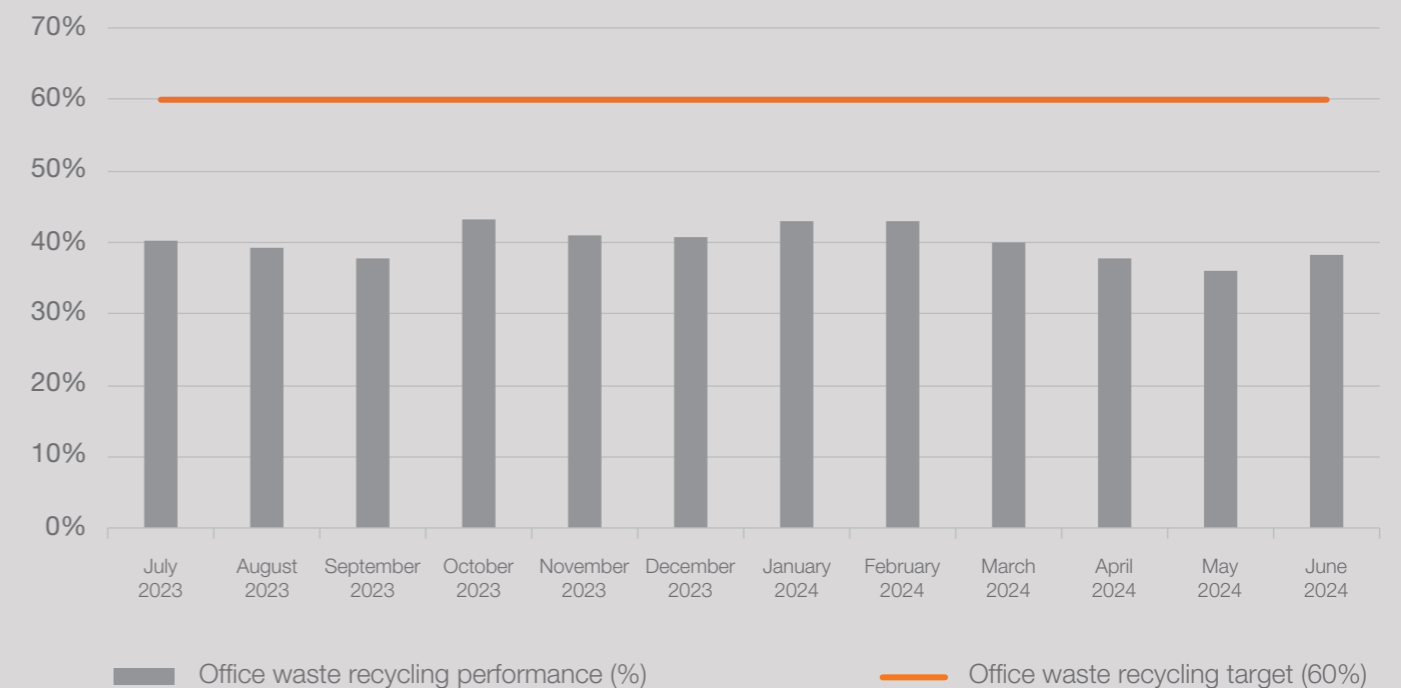
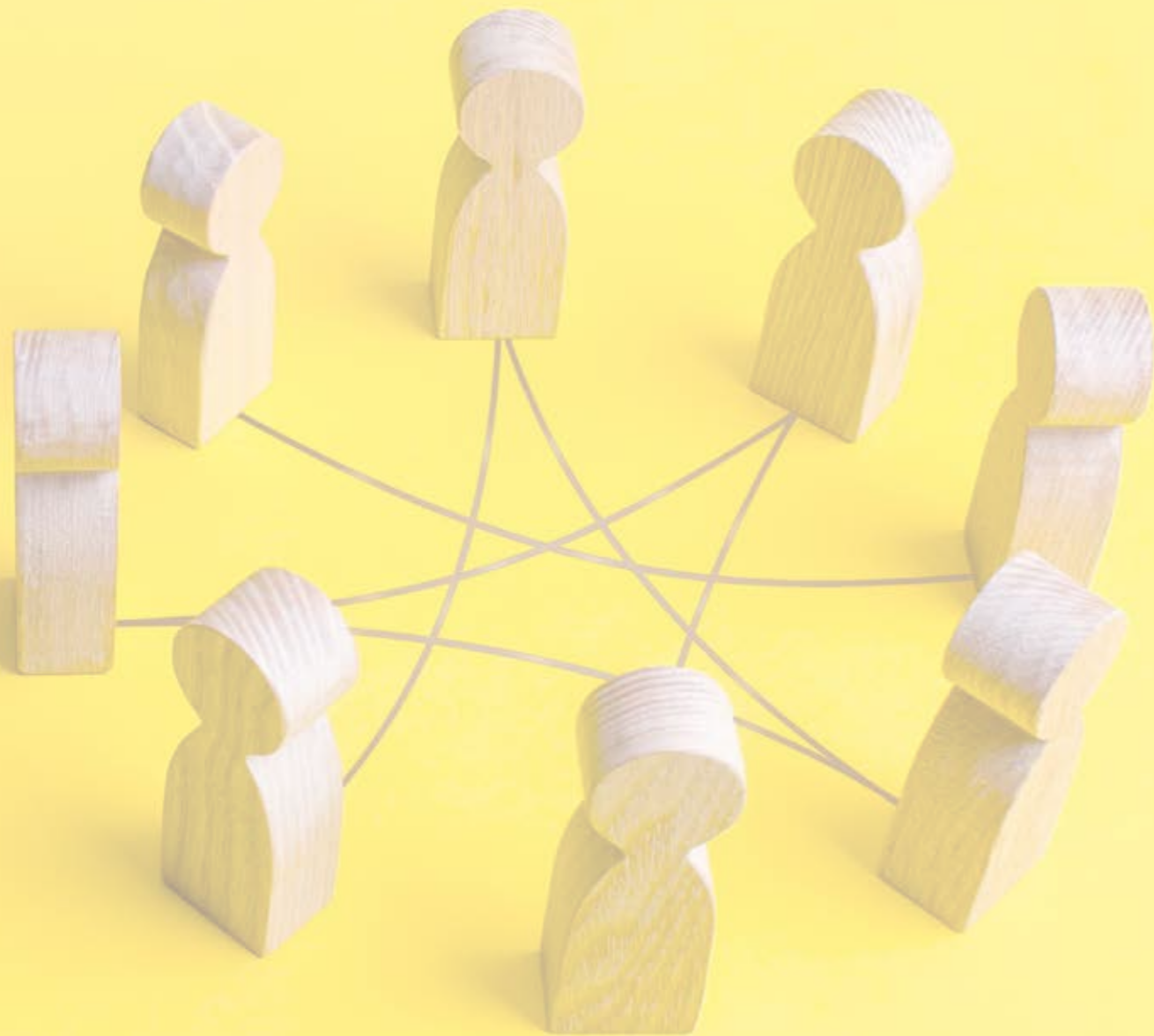


Figure 11: Office Waste recycling rate FY2023-24

INFRASTRUCTURE & SUSTAINABILITY COUNCIL (ISC)



Project targets

85

Design and As-Built rating score of at least 85 points using the ISC IS rating tool (version 1.2).

Performance

The Infrastructure Sustainability (IS) Rating is a third-party sustainability verification administered by the Infrastructure Sustainability Council (ISC). Through the IS Rating, infrastructure projects are rewarded for social, environmental, and economic performance as well as innovation. The IS Rating also identifies the most important sustainability issues to a project. For WTP, the most important issues are energy and carbon, materials lifecycle impact, and climate change.

GLC is targeting a 'Leading' score of at least 85 points in the Design IS Rating (v1.2) and As-Built IS Rating (v1.2). In FY2023-24, the Project developed the modelling and documentation to support the Design IS Rating submission. The IS Rating has been submitted to the ISC for verification and key Project performance is detailed below. The result of the Design IS Rating submission will be confirmed in the FY2024-25 report following formal verification by the ISC.

Energy and Carbon

GLC is on track to exceed energy targets for the Western Tunnelling Package. The Project has rolled out initiatives to reduce energy demand and to substitute traditional energy sources for low-carbon alternatives (including renewable electricity).

In FY2023-24, energy and carbon modelling was undertaken to support the IS Design Rating. The modelling is based on design estimates and anticipates that the Project will achieve the following energy and carbon performance:

- 46 per cent reduction in greenhouse gas emissions (Scope 1 and Scope 2)
- 39 per cent reduction in total greenhouse gas emissions (Scope 1, Scope 2 and Scope 3)
- 57 per cent offset of Scope 1 and 2 emissions

See Section 1 for further details.



Westmead station excavation

Materials Lifecycle Impact

GLC is on track to exceed materials targets for the Western Tunnelling Package. The Project has rolled out initiatives to reduce materials consumption and use low-carbon materials where possible (including recycled materials and concrete mixes with high Supplementary Cementitious Material content).

In FY2023-24, a lifecycle impact assessment was undertaken to support the IS Design Rating. The assessment is based on design estimates and anticipates that the Project will achieve the following lifecycle performance:

- 25 per cent reduction in materials lifecycle impacts (Scope 3 emissions)
- 39 per cent reduction in total greenhouse gas emissions (Scope 1, 2 and 3 emissions)
- 48 per cent replacement of Portland cement with Supplementary Cementitious Materials (SCMs)

See Section 3 for further details.

Climate Change

GLC is delivering the Western Tunnelling Package to service communities and local economies over a design life of 120 years. The CSIRO and Bureau of Meteorology project that over this period, conditions in Western Sydney will become hotter and drier with a greater likelihood of extreme heat and rainfall events.

GLC has undertaken a comprehensive climate change risk assessment to identify and mitigate climate risks to WTP. The assessment considers the likelihood and consequences of climate change in 2050 and 2090 under an RCP8.5 scenario. The greatest risks to the Project arise from extreme heat, extreme rainfall and flooding.

The climate change risk assessment identified 22 risks, including two high and two medium initial risks in the RCP8.5 2090 scenario. Through the design process, GLC has embedded climate mitigations into design which has resulted in no residual high or medium risks to the Project from climate change. This will ensure the delivery of resilient infrastructure that will continue to serve communities under projected climates.



Installation of segment rings on TBM Dorothy

Innovation

Innovation is essential for sustainability. It evolves technologies, designs and processes which can help identify new ways to achieve sustainable outcomes. Innovations adopted by GLC on the Project include:

- **Autonomous Tunnel Boring Machines:** For the first time in Australia, autonomous TBMs are being used to construct the twin metro tunnels. The machines use artificial intelligence software, developed by Gamuda, to automatically steer, operate, and monitor essential TBM functions.
- **Recycled Water in the Tunnel Boring Machine:** Historically, TBMs in urban projects have relied on potable water for industrial use and for cooling circuits. GLC has collaborated with leading TBM manufacturer, Herrenknecht, to understand the water quality requirements and develop a solution to feed TBM operations with treated groundwater. As part of this initiative, GLC has constructed an onsite water treatment plant at Rosehill to treat groundwater to supply the TBM.
- **Low Carbon Tunnel Lining:** The construction of WTP will require approximately 60,000 precast concrete segments as lining for the metro tunnels. GLC has collaborated with concrete supplier Boral to develop a low carbon concrete mix. The mix achieves a 50per cent Portland cement replacement using slag and Boral's proprietary ZEP additive. This is the highest SCM content achieved on any Sydney Metro project and reduces the Project's carbon footprint by 13,000 tCO₂e compared to the Base Case (which assumes 25per cent SCM replacement).



SOCIAL PROCUREMENT

driving social outcomes
through spending

Project targets

Implement procurement initiatives that support Australian and New Zealand small and medium enterprises (ANZ SMEs) and Recognised Aboriginal businesses accessing the scope of works within the supply chain.

90

Engage a minimum of 90 ANZ SMEs in the supply chain, with at least 20 of the ANZ SMEs to be recognised Aboriginal businesses.

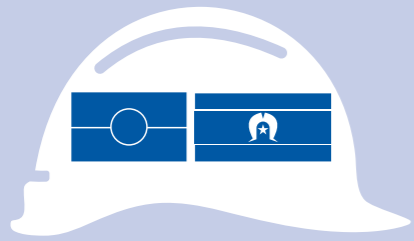
03%

Minimum 3 per cent spend of the contract value (Eligible Spend) to be subcontracted to recognised Aboriginal businesses.

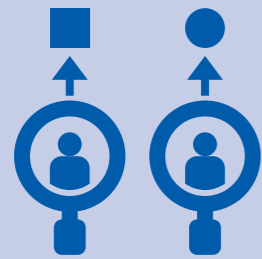
Performance

WTP is a state significant infrastructure project, and its scale provides leverage to prioritise the creation of social value through procurement decisions. Beyond the procurement of goods, services and construction, the Project has been intentional in elevating Aboriginal and Torres Strait Island businesses and Australian and New Zealand owned businesses.

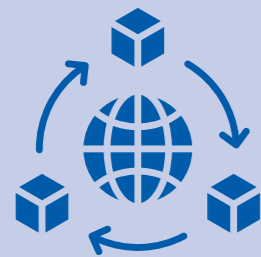
GLC is proud of the social procurement outcomes on WTP. As of June 2024, the Project's cumulative performance includes:



Over \$40 million direct spend on recognised Aboriginal businesses and subcontractors, representing over 110 per cent of WTP's target spend with two years of construction remaining.



22 Aboriginal businesses directly engaged by GLC with an additional seven Aboriginal businesses are engaged by subcontractors on WTP.



116 small and medium-sized enterprises in Australia and New Zealand engaged in the supply chain.



Captions from top to bottom
Aerial view of the future stabling and maintenance Facility in Clyde
Aerial view of the Rosehill site
Installation of the D-Wall at Parramatta
Inspection of Westmead Cavern



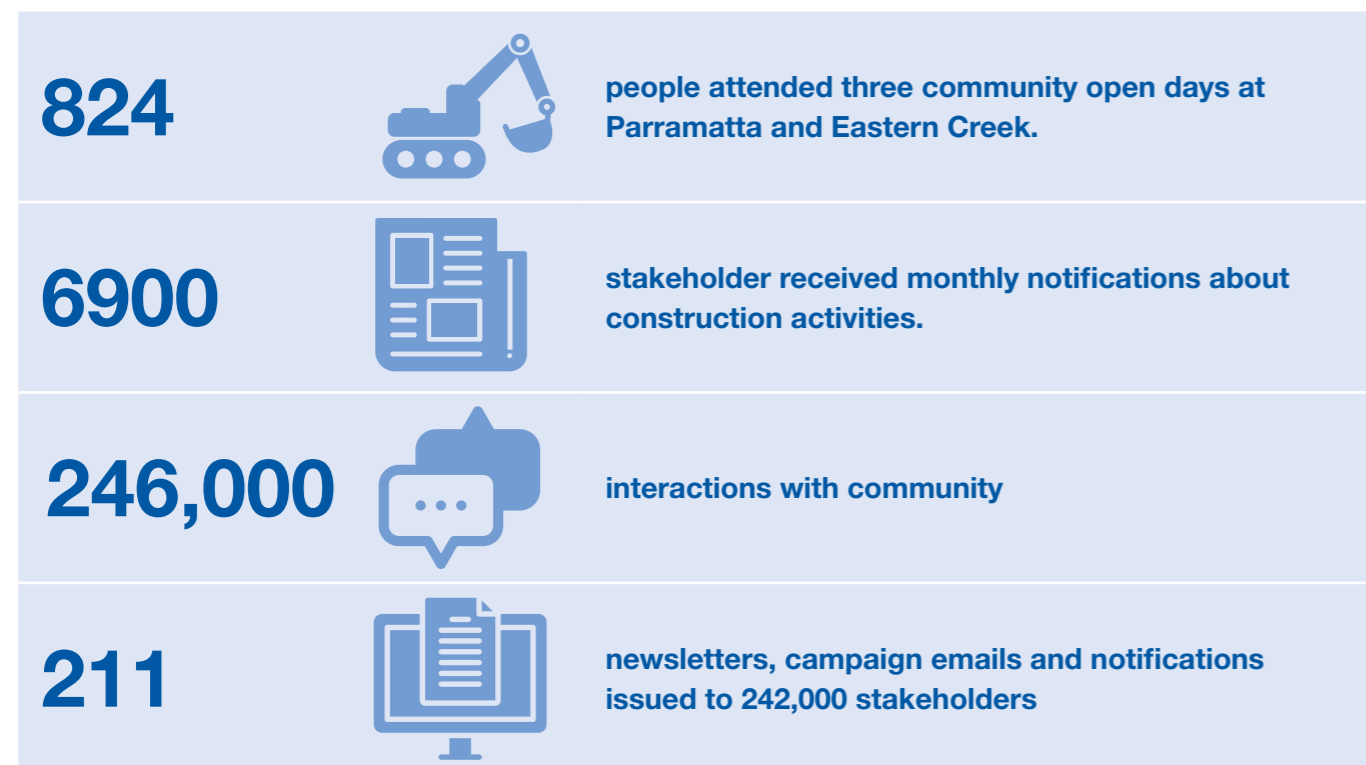
STAKEHOLDER ENGAGEMENT

active and transparent engagement
with all impacted stakeholders

Performance

GLC is committed to delivering benefits to local communities through the Project. This includes meaningful collaboration with stakeholder to ensure local needs and values are reflected through the Project, as well as Community Benefit Initiatives to provide tangible community outcomes.

The following key stakeholder engagements were undertaken in FY2023-24:



Community site tours during the Parramatta Open Day

GLC has also delivered Community Benefit Initiatives to provide a positive community legacy during and post-construction. The initiatives in the FY2023-24 period include:

Parramatta Women’s Shelter

Parramatta Women’s Shelter is a not-for-profit organisation that has helped over 250 women and children with crisis accommodation and outreach support since it opened in December 2019. GLC supported the Shelter by hosting fundraiser BBQs on International Women’s Day and by matching donations to provide a total donation of \$6,000.

Plant a Tree Day

Westmead Public School is a primary school located directly opposite the construction site at the future Westmead metro station. GLC and Westmead Public School collaborated on a Plant a Tree Day, where GLC donated plants and tools for the event. GLC volunteers lead the event and ran education sessions to foster environmental stewardship amongst the students.



Community Plant-a-Tree day at Westmead Public School

Christmas Plate for a Mate

Parramatta Mission is a Not-for-Profit organisation that provides food and support services to assist vulnerable people in Parramatta. Through their Christmas Plate for a Mate initiative, GLC matched employee donations to provide a total donation of \$6,700 to the Parramatta Mission. The donations went to supporting 670 vulnerable community members.



WORKFORCE SKILLS AND DEVELOPMENT

engagement and retention of a diverse, skilled, and sustainable workforce

Project targets

20 apprentices.

15 graduate placements.

15 work experience placements.

03 initiatives that will provide tangible benefits to local employment and retention.

Project targets

02% minimum of under-represented groups (returned servicemen, refugees and asylum seekers, long term unemployed, underemployed).

10% At least 10 per cent of local sustainable workforce across the supply chain to include trainees (where traineeship qualifications are available).

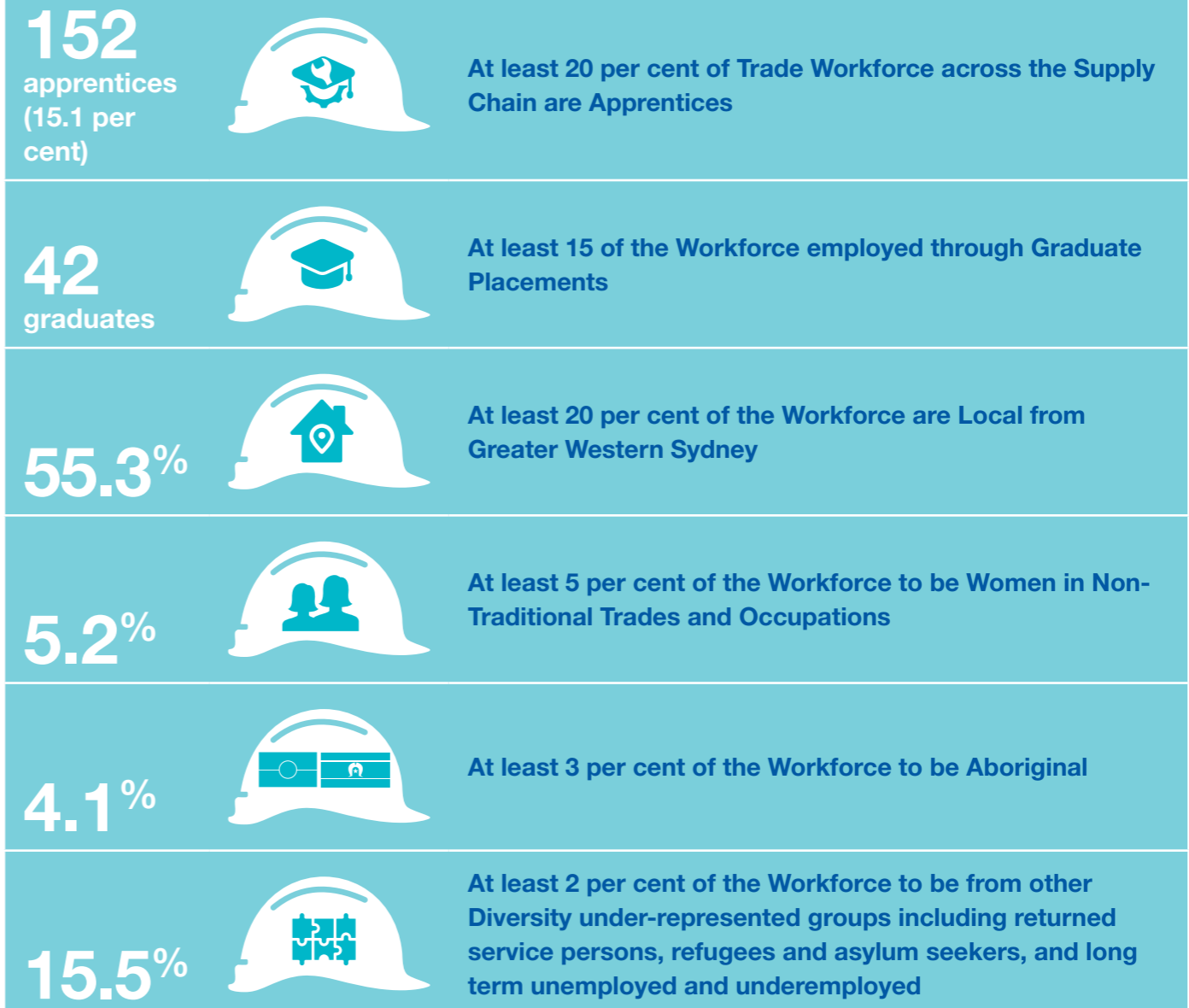


Deliver a structured mentoring and support program that would increase retention of diversity groups.

Performance

The scale of state significant infrastructure projects creates significant opportunity to improve the skill set and capacity of the workforce, address skills shortages, and foster sustainable local employment. GLC has prioritised the development of a diverse workforce through initiatives including training and employment aimed at Aboriginal and Torres Strait Islander people and women pursuing non-traditional roles.

As of June 2024, the WTP workforce includes the below demographics:





Graduating cohort from the Women Who Work in Tunnelling Pre-Employment Program



Women Who Work In Tunnelling Pre-Employment Program

In FY2023-24, GLC partnered with the social Enterprise 'Empowered Women in Trades' to deliver a Women Who Work In Tunnelling Pre-Employment Program. The program upskills women from outside the construction sector who are seeking a career change. After two weeks of paid training, successful participants are offered full-time employment in a tunnelling/civil position on the Project. GLC provides ongoing mentoring and the opportunity to enrol in a Certificate III Apprenticeship as participants as they transition into their new roles. In November 2023, fourteen women graduated from the first cohort of the pre-employment program.

Training and education programs run through GLC's Tunnelling and Infrastructure Academy

Tunnelling & Infrastructure Academy

In July 2023, GLC opened the Tunnelling & Infrastructure Academy (TIA) - a purpose-built facility for civil construction and tunnelling education. The TIA is the first of its kind in NSW and the second in Australia. The facility aims to upskill and provide qualifications to new and existing workers on the Project using learning resources such as virtual reality simulators of underground tunnelling operations. Building up local workers also provides a pool of local talent to support the tunnelling industry as it matures.

Through the TIA, GLC is Australia's first contractor to offer nationally accredited units of competency in tunnel boring operations. At June 2024, 67 individuals are enrolled in a CERT III in Civil Construction including 29 women.

In addition, the TIA delivers non-accredited training in partnership with The Knowledge Academy. Attendees have provided overwhelmingly positive feedback on the monthly modules which include Communication Skills, Compliance Training, Manual Handling, and Leadership Skills.



Hands on training in the Pre-Employment Program



OPPORTUNITIES FOR IMPROVEMENT

What has worked well on the Project?

- GLC collaborated early with the Design team which resulted in a robust Sustainability in Design process and early identification and embedment of initiatives to reduce resource consumption (energy, water, materials).
- In collaboration with the Department of Education and Training, GLC introduced the first nationally accredited training package in Tunnel Boring Machine Operations. Additionally, GLC developed two tunnelling units that have been made available to the broader industry.
- GLC has participated in industry knowledge shares including a case study on the Project's low carbon precast concrete tunnel segments in On Track to a Sustainable Future: Australasian Railway Association Sustainability Guide (ARA, 2023)



Solar Farm at Rosehill

Key challenges on the Project

- As a result of the projects focus on digitalisation, the project has significantly reduced paper waste, which has historically made up a significant percentage of recyclable office waste. The majority of office waste by weight is food waste and other hard to abate waste streams. The project is working hard to minimise these waste streams and identify opportunity for reuse of office furniture at the end of project.
- Despite strong performance on non-potable water substitution, reducing water use on a tunnelling project such as WTP can be a challenge and will continue to be a focus area.



Earthworks at the future stabling and maintenance Facility in Clyde

Opportunities for improvement for 2024-2025

- Encourage waste stewardship in Project offices to improve GLC's diversion of office waste from landfill. Activities may include waste audits, 'waste walks' to ensure sites have sufficient number and signage for bins, and waste training.
- Review and manage the sustainability performance of high-impact suppliers and subcontractors for the remainder of construction and identify any opportunities for improvement.
- Investigate and implement water reduction initiatives in the construction phase and ensure water use is being appropriately monitored to capture the impact of water reduction initiatives.
- Increase the development of case studies to encourage industry knowledge sharing around sustainability best-practise in construction and to celebrate the sustainability achievement of Project suppliers.



LAING O'ROURKE

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