



Sustainability Report 2022

sydneymetro.info



Acknowledgement of Country

Sydney Metro acknowledges the Traditional Custodians of the lands where we work and live. We celebrate the diversity of Aboriginal peoples and their ongoing cultures and connections to the lands and waters of NSW.

We pay our respects to Elders past, present and emerging and acknowledge the Aboriginal and Torres Strait Islander people who contributed to the development of this document.

Cover: Boarding the Metro North West Line.

Below: A Smoking Ceremony, to acknowledge Aboriginal ancestors and pay respect to the land and sea.



OFFICIAL

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Beryl Solar Farm which produces zero emission electricity to power the Metro North West Line operations.



About this report

This is Sydney Metro's fourth Sustainability Report.

The Sydney Metro Sustainability Report 2022 outlines our performance against our sustainability framework from **1 July 2020 to 30 June 2022**.

The report builds on previous Sustainability Reports **2017, 2018** and **2020**, and highlights our approach to delivering sustainable outcomes across our activities. All data in this report covers the period from 1 July 2020 to 30 June 2022, unless otherwise stated.

Through the use of data, commentary and case studies, this report:

- presents the design and construction performance of the Sydney Metro City & Southwest project
- highlights early achievements for Sydney Metro West and Sydney Metro – Western Sydney Airport projects
- reports operational outcomes of the Metro North West Line.

For the purpose of clarity and efficiency, this report focusses on the reporting period and seeks to avoid repetition of information that has been presented in other publications. Please refer to our **Sydney Metro sustainability web page** for related information and links.

Sydney Metro measures success through tracking and reporting on performance against sustainability objectives and targets identified at the outset of a project and verifying performance against industry benchmarks. Key achievements to date are outlined in Section 5.



Peter Regan PSM, Chief Executive, Sydney Metro, pictured inside the station box at the Sydney Olympic Park Sydney metro station.

1 Foreword from the Chief Executive

‘Sustainability forms an integral part of Sydney Metro’s values, and our vision to transform Sydney with a world class metro. Since 2011, driving environmental and socio-economic outcomes has been a key part of the success of Sydney Metro.’

On behalf of Sydney Metro, I am pleased to present the Sustainability Report 2022.

In 2021 we published the Sydney Metro Sustainability Statement of Commitment. This aligns with the cluster-wide Transport for New South Wales (TfNSW) Environment and Sustainability Policy and sets out our intent to move beyond compliance and be a genuine leader in both environmental management and sustainability.

The Sydney Metro Sustainability Framework describes how our organisation will deliver on this commitment. The framework establishes six guiding principles which set the direction for how we approach sustainability, both within our organisation and on our projects. It also identifies key initiatives that we will undertake to support the successful achievement of sustainable outcomes.

Whilst COVID-19 has disrupted some planned community engagement and outreach initiatives, we were pleased to support the ‘Vinnies CEO Sleepout’ event for three years running, raising more than \$50,000 for this important cause in the last two years alone. Our delivery partners have also undertaken numerous volunteering and fundraising activities to support the community at this challenging time.

Sustainability achievements in 2020–22 include:

- Continuing to use zero-emission electricity for all operational electricity needs of the Metro North West Line (now in its third year of operations), supporting the NSW Government target of net-zero emissions.
- All new Sydney Metro City & Southwest underground stations have now achieved a 6 Star ‘World Leadership’ Green Star – Custom (Sydney Metro) Design Review, under the Green Building Council of Australia, with the last five being awarded this rating in the last two years.
- Achieving ‘Leading’ Infrastructure Sustainability rating submissions for Sydenham Station (Design) and the City & Southwest Tunnels & Stations Excavation works (As Built) which achieved the highest score awarded at the time.
- Achieving a Platinum design rating for Bankstown Station Early Works under the TfNSW Sustainable Design Guidelines.
- Publishing the Sydney Metro – Western Sydney Airport Sustainability Plan.
- Refining our climate change governance processes to reflect emerging good practice.
- Continuing to achieve resource efficiency in construction through responsible material use and efficient water management.
- Supporting our delivery partners in sustainable supply chain management.
- Launching the ‘Connecting with Country’ pilot.
- Continuing to support, develop and engage with our extended workforce, including 1210 small to medium businesses and 159 Aboriginal businesses.
- Achieving certification of our environmental management system to the International Standard for Environmental Management Systems ISO 14001:2015.

Looking forward, we are committed to further supporting NSW Government policy and UN Sustainable Development Goals by working with our stakeholders to achieve environmental, social and economic benefits to the local and broader community.

Peter Regan PSM
Chief Executive, Sydney Metro



A team of workers about 31 metres underground at the Sydney Metro City & Southwest Victoria Cross Station, in the heart of the North Sydney business district.

2 Delivery partners

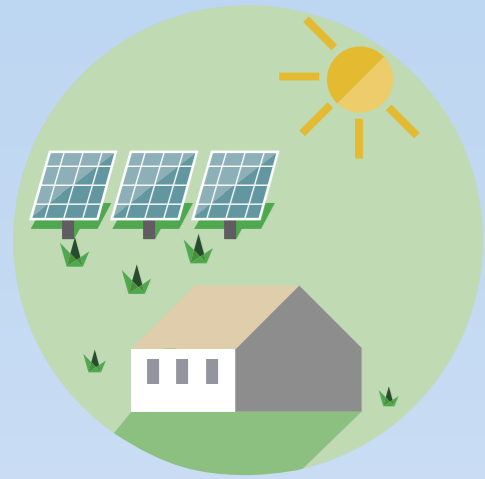
Sydney Metro acknowledges the key role that our delivery partners play in supporting and implementing our sustainability objectives. We look forward to continuing our collaboration with industry to drive sustainable outcomes across our projects.

Abergeldie Complex Infrastructure Pty Ltd
 Acciona Ferrovial Joint Venture
 AW Edwards
 Bechtel
 Besix Watpac
 CPB
 CPB Contractors Pty Ltd and Ghella Joint Venture
 CPB Contractors Pty Ltd and United Infrastructure Joint Venture
 Delta Pty Ltd
 Downer
 Gamuda Australia and Laing O'Rourke Consortium
 Georgiou Group Pty Ltd

HSEJV
 John Holland
 John Holland Laing O'Rourke JV
 JHCPB Ghella
 Laing O'Rourke
 Lendlease
 MTS
 MTR
 Quickway Constructions Pty Ltd
 Systems Connect
 Transport for Tomorrow, a joint entity by Laing O'Rourke & KBR
 UGL

Note: This list refers to our contract partners active in the reporting period. It is not exhaustive, and we acknowledge that a large number of other organisations have supported the program to date.

3 Sustainability highlights



Zero emission electricity used for 100% of Metro North West Line operations, saving over **133,000 tonnes** of carbon dioxide emissions across the 2020–21 and 2021–22 financial years



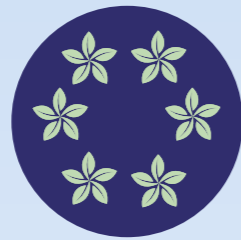
100% of clean spoil beneficially reused
985,670 tonnes



97% construction and demolition waste recycled (diverting almost **172,000 tonnes** from landfill)



43% Portland cement replaced using supplementary cementitious materials



5 Green Star design ratings awarded by the Green Building Council of Australia achieving **6-Star** (World Leadership) status



3 key documents published:

- Sydney Metro Sustainability Statement of Commitment
- Sydney Metro Sustainability Framework
- Sydney Metro – Western Sydney Airport Sustainability Plan



46 community benefit initiatives implemented (23 new and 13 ongoing initiatives)



1210 small to medium enterprises have been engaged on Sydney Metro projects, including: **159** Aboriginal businesses

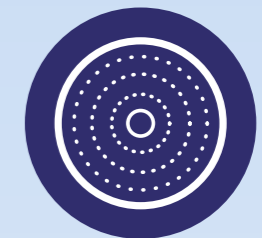


35,526 people have worked across the Sydney Metro projects over the 2020–21 and 2021–22 financial years, including:

- 943** apprentices
- 175** trainees
- 1027** Aboriginal people
- 1484** long-term unemployed



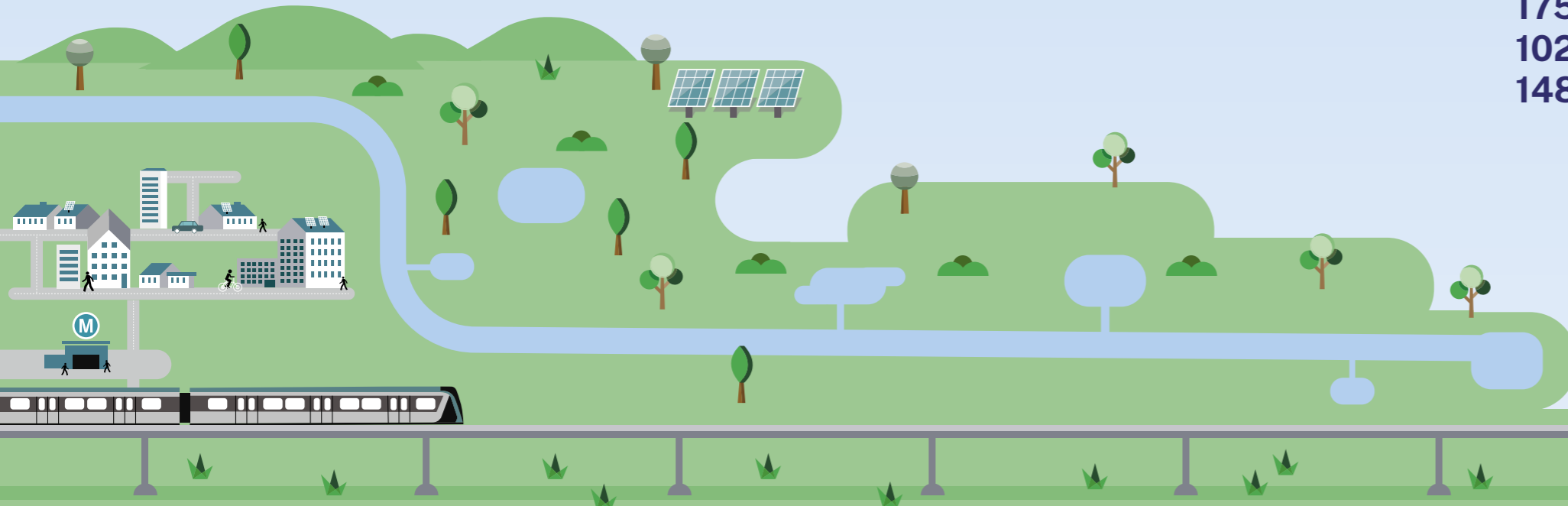
Over **90%** of sustainability targets achieved or exceeded



Over **\$105 million** spent on **Aboriginal business engagement, workforce training and employment**



6 Sydney Metro contractor sustainability forums hosted



4 About Sydney Metro

Metro North West Line

Opened 26 May 2019



13 stations



4000 commuter car parks



36 kilometres

City & Southwest

Opening 2024



18 stations



New CBD connections



30 kilometres, including under Sydney Harbour

West

Construction started 2020



Nine stations



Connecting Greater Parramatta and the Sydney CBD



Western Sydney population, 2036

Sydney Metro – Western Sydney Airport

Construction started 2020



Six stations

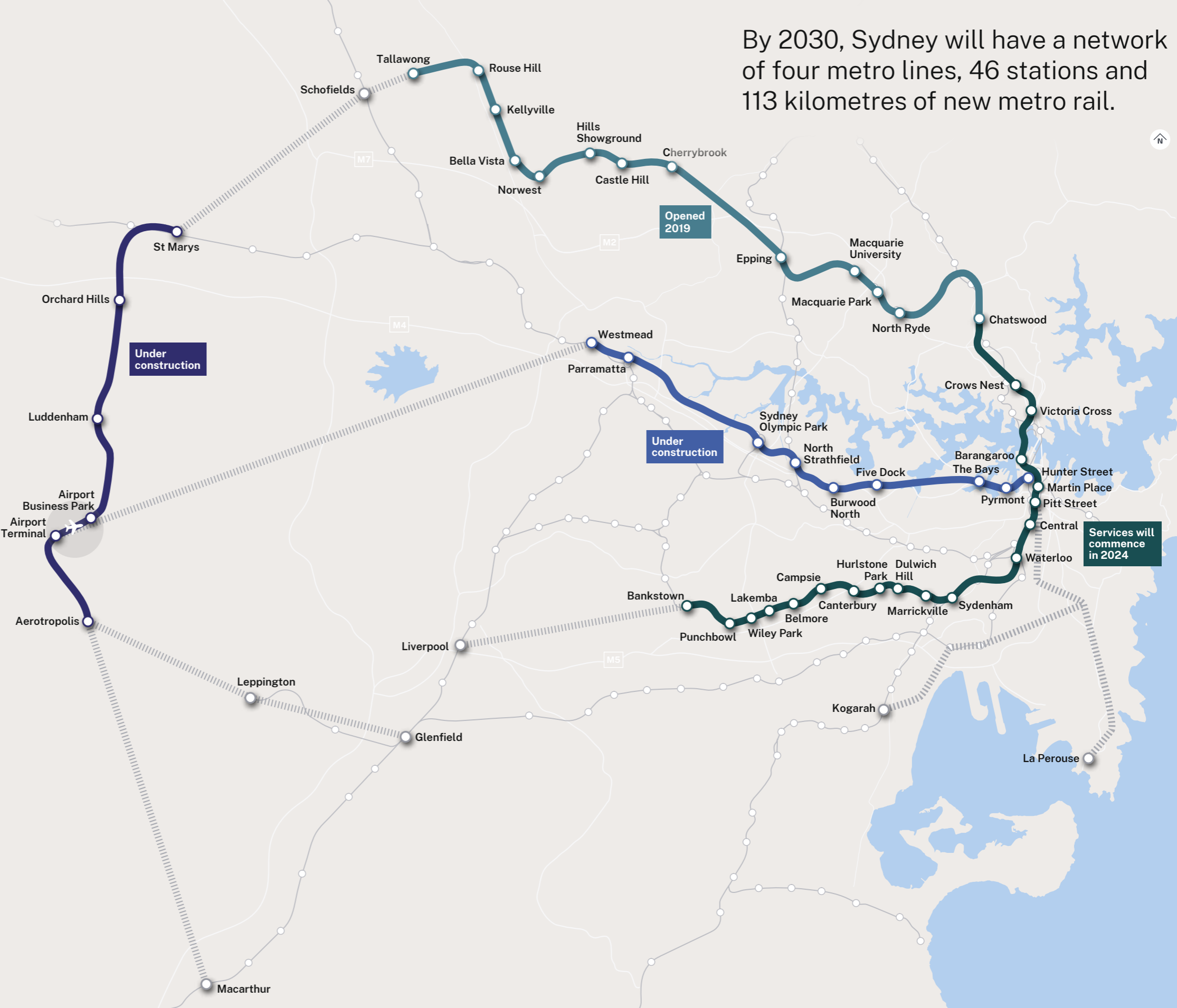


Connecting Western Sydney International Airport to the rest of Greater Western Sydney



Servicing Greater Western Sydney

Sydney Trains suburban network
Future metro (subject to further investigation)



By 2030, Sydney will have a network of four metro lines, 46 stations and 113 kilometres of new metro rail.

4.1 Our approach to sustainability

For Sydney Metro, 'sustainability' means planning, building and operating metro services, places and transport infrastructure for current and future generations that optimises environmental, social and economic outcomes.

Sydney Metro's approach to sustainability is governed by the **Sydney Metro Environment and Sustainability Statement of Commitment**. This sets out our intent to:

- Minimise our impacts and leave a positive environmental and social legacy.
- Deliver a resilient asset and service for our customers.
- Collaborate with stakeholders to innovate and drive sustainable outcomes.
- Embed sustainability into our activities.

The approach is aligned to the **Transport for NSW Environment and Sustainability Policy** which provides a commitment to delivering transport that contributes to economic prosperity and social inclusion in an environmentally responsible and sustainable manner, consistent with the **Future Transport Strategy**.

The Sydney Metro Sustainability Framework establishes six guiding principles for how sustainability is approached at an organisational and project level. These principles are the cornerstone of how we embed and deliver on our sustainability commitments to the community, our customers and our key partners (government and industry).

Figure 1: Sydney Metro Sustainability Principles



Environment & Sustainability Statement of Commitment

Sydney Metro will deliver great services, places and transport infrastructure for our customers while protecting the environment, contributing to economic prosperity and delivering social benefits for the communities we serve. We have a duty to undertake our activities in the interest of the greater good, to move beyond compliance and be a genuine leader in both environmental management and sustainability.

Sydney Metro is committed to:

- Minimising our impacts and leaving a positive environmental and social legacy;
- Delivering a resilient asset and service for our customers;
- Collaborating with stakeholders to innovate and drive sustainable outcomes; and
- Embedding sustainability into our activities;

To deliver on these commitments Sydney Metro will:

Leave an environmental and social legacy

- Protect the environment, prevent pollution and comply with legal and other requirements.
- Manage resources and waste efficiently, exploring opportunities to minimise waste, use recycled and low impact materials and reduce our environmental footprint.
- Promote a diverse and inclusive workforce and supply chain, build capability and capacity within industry, and increase Aboriginal participation.
- Responsibly minimise environmental and social risks in our supply chain.
- Create liveable places that are well integrated and promote active and sustainable transport.
- Conserve and enhance the natural environment and our built and cultural heritage.
- Work collaboratively with delivery partners to provide social benefits to the communities in which we work.

Drive resilience

- Tackle climate change and contribute to the NSW Government target of net zero emissions.
- Deliver Sydney Metro assets and operations that are resilient to a changing climate, and work with stakeholders to proactively respond to emerging challenges and opportunities.
- Promote the greening of our cities to help combat the 'urban heat island' effect.

Collaborate to deliver sustainable outcomes

- Align with and respond to Transport for NSW policy and other NSW Government priorities.
- Establish and maintain positive relationships with communities and stakeholders to harness local knowledge and maximise opportunities to add value across the project lifecycle.
- Collaborate and consult with Aboriginal stakeholders to understand how we can best respect and celebrate Aboriginal cultural values including Designing with Country.
- Provide industry leadership by setting benchmarks, encouraging innovation and driving continual improvement with our delivery partners.
- Increase environmental awareness amongst staff and customers to drive more sustainable behaviours.

Embed sustainability

- Establish robust objectives and targets that are measurable and take into account whole-of-life considerations.
- Maintain an environmental management system that is integrated into our projects and continually improved to enhance environmental performance.
- Apply effective assurance processes to monitor environment and sustainability performance including ensuring accountability, incentivising beyond compliance behaviours and implementing corrective actions as required.
- Embed sustainability considerations into key project decisions across the project lifecycle.
- Provide appropriate training and resources to meet our obligations and commitments.
- Publicly report on sustainability performance.

Peter Regan
Chief Executive, Sydney Metro

This Statement of Commitment supersedes previous versions of the Sydney Metro Environment & Sustainability Policy and aligns with the cluster wide TfNSW Environment and Sustainability Policy which has been adopted by Sydney Metro. It applies to all people working for Sydney Metro.

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5 Demonstrate leadership

Aim: Deliver a world-class metro that is environmentally and socially conscious; share knowledge and demonstrate innovation in sustainability.



5.1 Sustainability targets

Our project sustainability plans clearly communicate our ambitions. The plans include targets against which we can track our progress as summarised in Figure 2 and provided in detail in Appendix B. Across the three projects currently in construction, all are on track to achieve more than 90 per cent of the quantitative and qualitative targets and objectives presented in the projects' sustainability strategies, plans and business cases.

Together with our contractors on the Sydney Metro City & Southwest project, we are currently exceeding the performance targets relating to achievement of third-party sustainability ratings, construction electricity offsets, construction waste recycling and Portland cement reduction. In addition, the Sydney Metro West and Sydney Metro–Western Sydney Airport projects are on track to exceed their targets to offset at least 25 per cent of greenhouse gas emissions associated with Scope 1 and 2 during construction, as some of our contractors have already committed to offset more than this.

At risk targets are of a minor nature and/or will be resolved in the next reporting period. On the Sydney Metro City & Southwest project they include achieving on-site renewable energy targets and the setting of updated vehicle emission standards. These are mitigated through the 100 per cent operational offset commitment and through requiring well maintained machinery which is switched off when idle.

On the Sydney Metro–Western Sydney Airport project, the construction and demolition waste recycling rate of 95 per cent was not met during this reporting period. This is expected to improve, and will be closely managed, as more significant construction commences.

The Sydney Metro–Western Sydney Airport Sustainability Plan was published in January 2022. The Plan demonstrates how sustainability objectives for Sydney Metro–Western Sydney Airport support the vision for the new Western Parkland City and Western Sydney International Airport and respond to the Conditions of Planning Approval. The initiatives and targets in this document are benchmarked against past Sydney Metro projects, and international best practice on similar infrastructure projects. These are embedded into contract documents to drive sustainability outcomes, with performance to be reported publicly. The plan also includes highlights from the Infrastructure Sustainability Council base case framework, which demonstrates a level of transparency above and beyond the industry standard.

The Sydney Metro West Sustainability Plan will be published next financial year in line with the delivery phase for the project. It will provide a roadmap to help achieve the targets included in Appendix B.



An artist's impression of the Western Sydney Airport Terminal Station.



Adaptive reuse of bricks salvaged during demolition works at Belmore Station.



Sydenham Station, which achieved a 'Leading' design rating from the Infrastructure Sustainability Council.

5.2 Sustainability ratings

Third-party rating tools such as Green Star issued by the Green Building Council of Australia (GBCA) and Infrastructure Sustainability (IS) ratings issued by the Infrastructure Sustainability Council (ISC) enable us to verify the sustainability performance of our projects against recognised industry benchmarks.

This period marked some significant ratings milestones, with five more stations achieving Green Star Design verification. All seven of our new city stations in the Sydney Metro City & Southwest project have now achieved a 6 Star Green Star (Design and As Built Sydney Metro v1.1) design rating, representing World Leadership in sustainable performance.

Projects have also been achieving very high IS ratings. Sydenham Station achieved a 'Leading' design rating at 91 points and the Tunnels & Stations Excavation achieved the highest IS As Built submission awarded at the time with 96 points. Smaller projects, such as station upgrade packages along the Sydenham to Bankstown alignment, have been assessed under the TfNSW Sustainable Design Guidelines, and some of these have achieved 'Platinum' design ratings.

The Sydney Metro West and Sydney Metro-Western Sydney Airport projects are also targeting a high level of performance against industry rating tools, including raising the bar to target a 'Leading' IS rating for most packages.

Figure 2: Sustainability target tracking

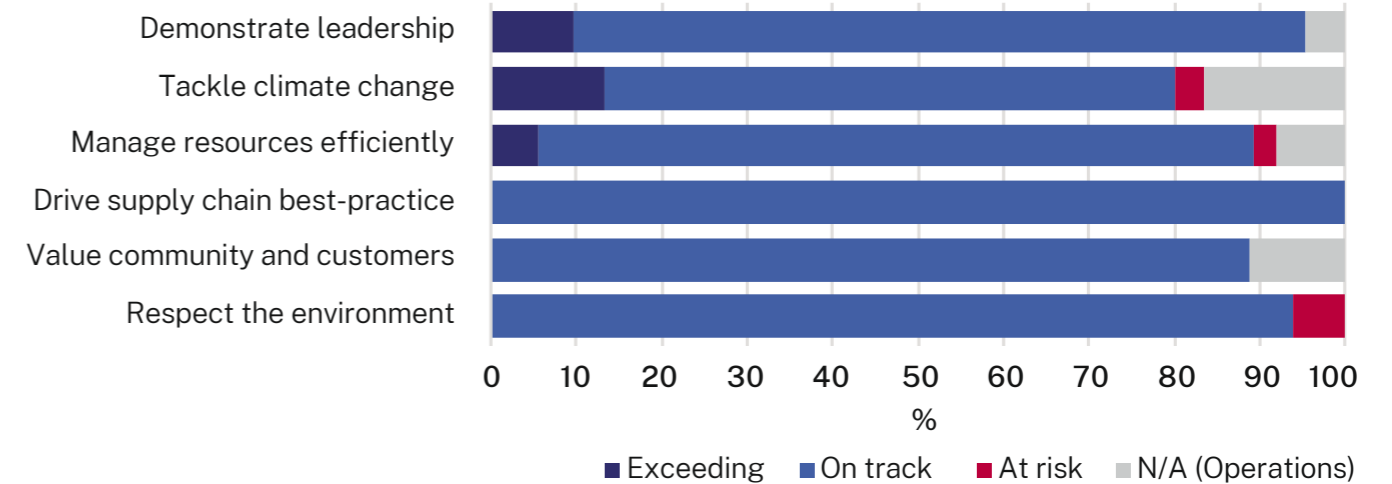
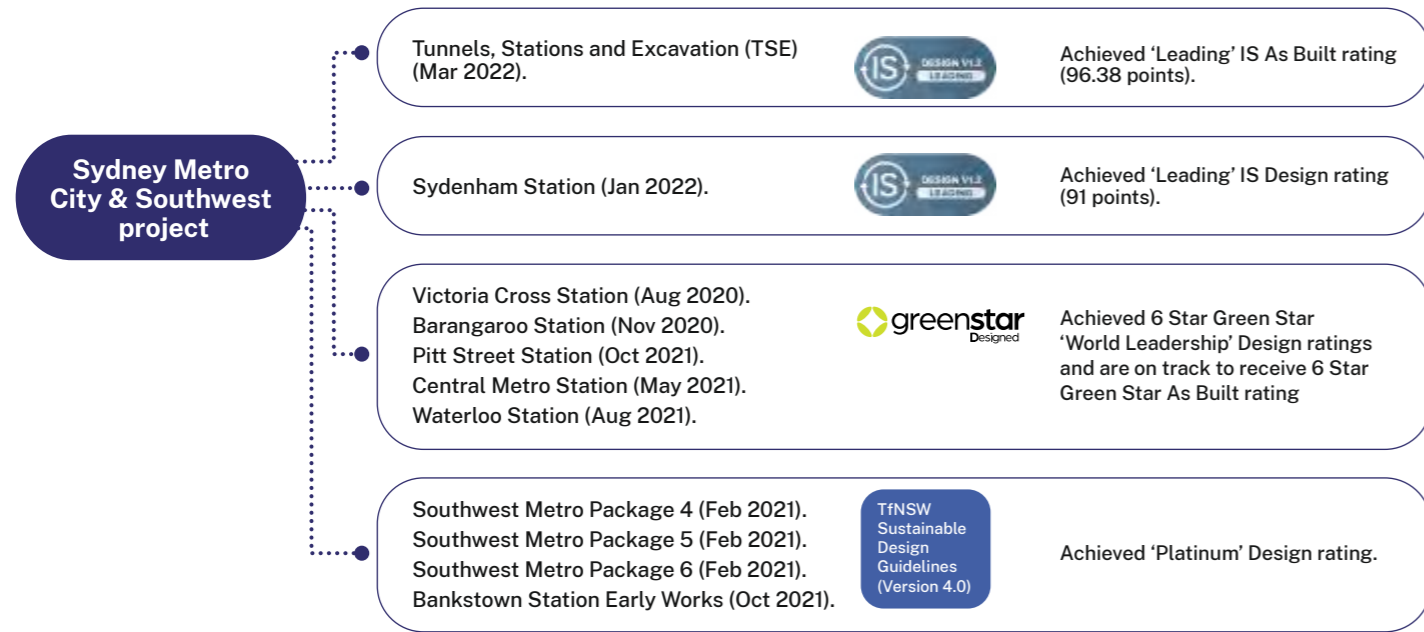


Figure 3: Industry ratings awarded to Sydney Metro, 1 July 2020 to 30 June 2022



Northern Concourse at Central Station.

Case study

Sydney Metro awarded highest Infrastructure Sustainability As Built rating



Heritage excavation at Blues Point Reserve.

Sydney Metro is particularly proud that its City & Southwest Tunnel and Station Excavation (TSE) Works won the 2022 Australian Construction Achievement Award (ACAA). The TSE Works, delivered by John Holland CPB Contractors and Ghella were technically complex with challenging logistical and geotechnical conditions. The project implemented many sustainable solutions including:

- the first rail tunnels under Sydney Harbour
- the largest spanning rail cavern
- the operation of five tunnel boring machines (TBMs) simultaneously
- multiple high-rise demolitions and four central business district (CBD) mined tunnelling sites
- heritage excavations that recovered the oldest European-style boat built in Australia.

The project received the highest ever ISC Infrastructure Sustainability rating at the time by adopting sustainable initiatives such as:

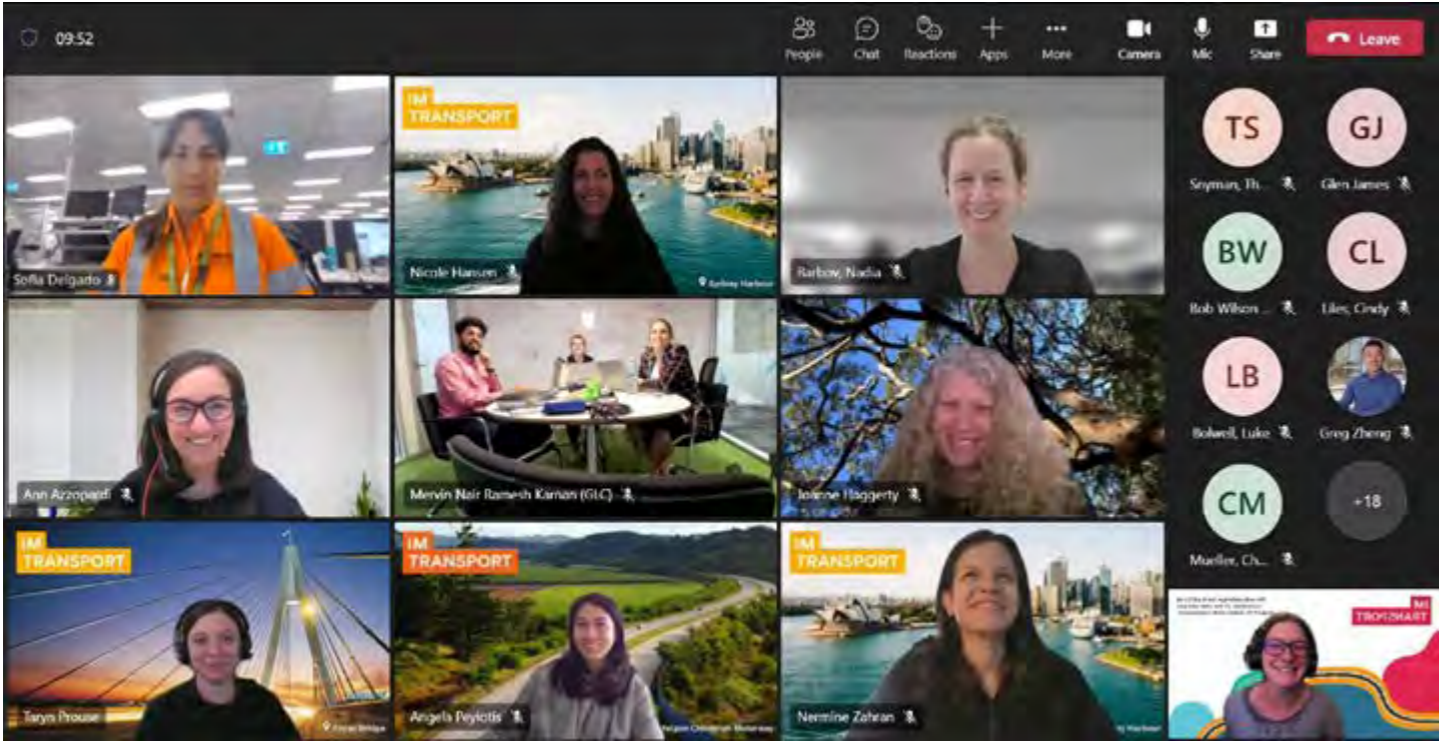
- recycling more than 95 per cent of construction waste
- reducing water use by more than 26 per cent as well as the reuse of water where possible (for example, tunnelling support activities and dust suppression)
- reducing its carbon footprint compared to a business-as-usual approach by 209,650 tonnes of carbon dioxide equivalent (tCO2-e)
- reusing 4.0-million tonnes of spoil across Sydney on more than 100 approved roads, housing and airport projects.

5.3 Collaborating with industry and other jurisdictions

Sydney Metro highly values collaboration and knowledge sharing to drive efficiencies, encourage innovative thinking and address common sustainability challenges and opportunities. Sydney Metro is an active member of the Infrastructure Sustainability Council (ISC) and Green Building Council of Australia (GBCA). We welcome the opportunity to collaborate with these peak bodies and provide feedback to rating tool development.

We also recognise our role in sharing knowledge and lessons learned by participating and presenting at industry and government sector webinars and conferences. To facilitate open collaboration, keep abreast of best practice, and share lessons learned across Sydney Metro's own delivery activities we hosted six Sydney Metro Contractor Sustainability Forums in 2020-22.

In addition, Sydney Metro collaborates closely with a range of partners to test, trial and pilot new approaches, and innovations in our industry. This reporting period this has included participation in the Transport for NSW 'Sustainable Procurement in Infrastructure' program, which is engaging with industry to help increase use of recycled and low carbon materials and design, the Low Emissions Building Materials Program (facilitated by the Climate Change & Sustainability Division at the Department of Planning and Environment), and the Materials Embodied Carbon Leadership Alliance (MECLA) alongside more than 100 other organisations from the building industry and all levels of government.



The Sydney Metro Contractor Sustainability Forum.

Case study

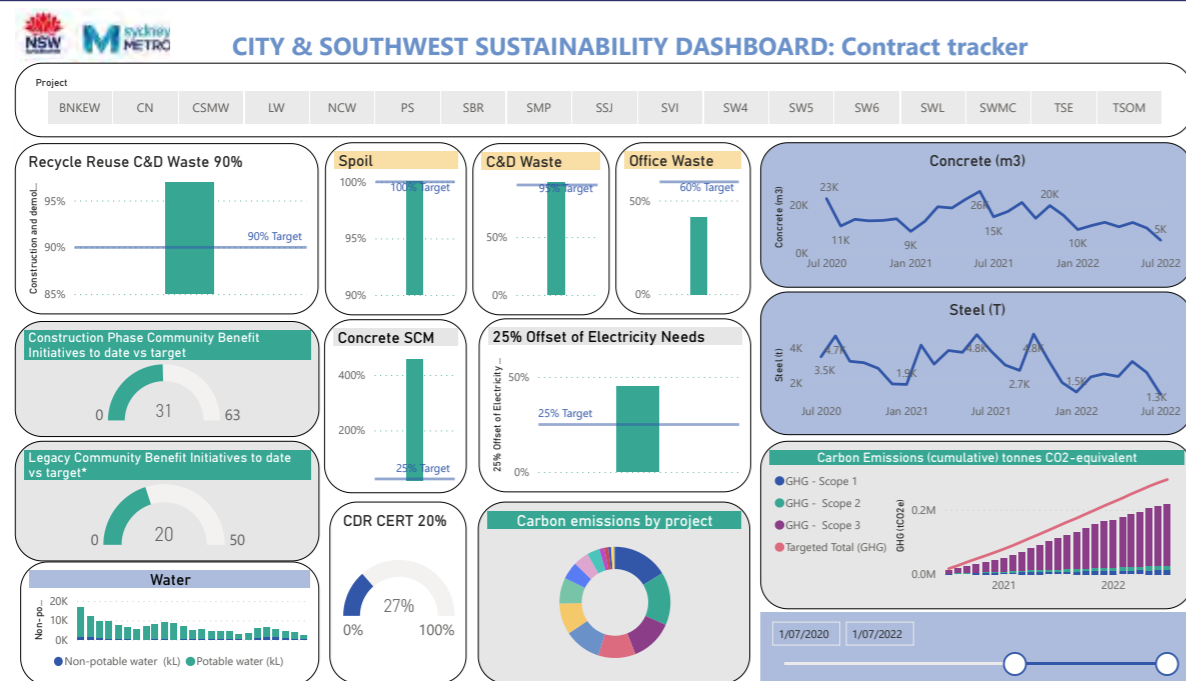
Sydney Metro Carbon Tool

Example of the Sydney Metro Carbon Tool Results Dashboard.

To help improve our efficiency, accuracy and transparency in tracking and reporting the carbon footprint of our projects, Sydney Metro developed a new Sydney Metro Carbon Tool using in-house expertise in collaboration with Jacobs Australia Pty Ltd. This tool provides a user-friendly visual snapshot of emission sources and mitigation activities throughout the construction stages. It represents a major step forward in the industry and is currently being adapted for potential use across all of Transport for NSW.

Case study

Sydney Metro data management improvements

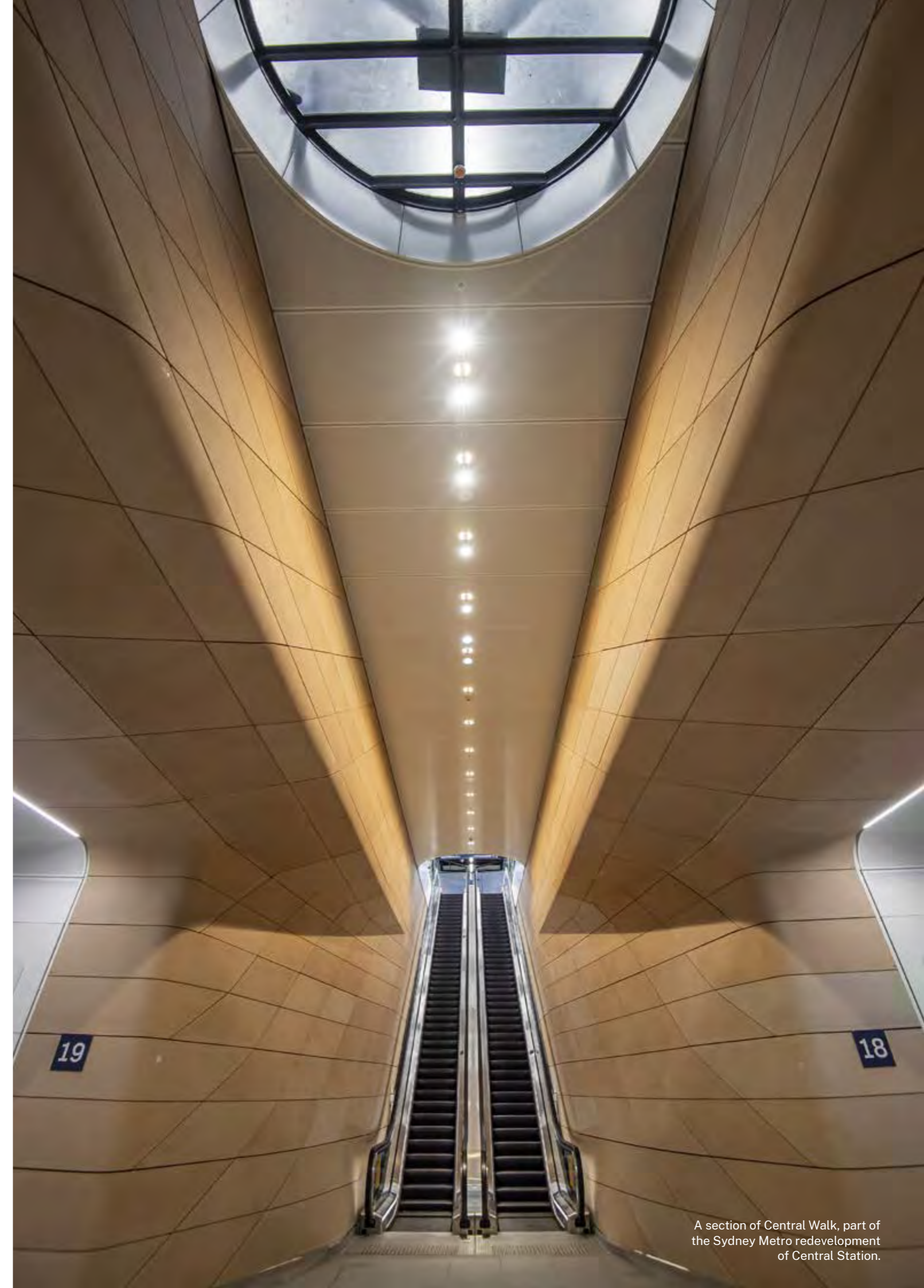


Example of the Sydney Metro Sustainability data management systems.

Recognising that accurate and well-organised data is a key tool used to measure our performance and drive improvement outcomes, we have overhauled our data management to use a PowerBI based system. As part of this update we have prepared a guidance document to improve clarity and consistency of reporting inclusions and assumptions.

The update has enabled us to:

- add and analyse data from a number of project packages spanning different timeframes and scales
- clearly present performance against quantitative targets
- deep dive into performance for specific contracts or timeframes
- facilitate identification of errors or omissions
- focus on data outcomes by streamlining the collation process
- create a range of dashboards and graphics tailored to audience
- inform future sustainability strategies and targets.



A section of Central Walk, part of the Sydney Metro redevelopment of Central Station.

6 Tackle climate change

Aim: Integrate a comprehensive climate change response, and drive excellence in low carbon solutions.



6.1 Embedding climate change resilience

Sydney Metro is aligned with the **NSW Government's commitment** to taking effective action on climate change and to making NSW more resilient to a changing climate.

Climate change risk assessments are carried out for all Sydney Metro projects, and findings integrated into design and construction of all new assets. These assessments include:

- requirements to adopt, develop and address risks in pre-developed climate change risk registers
- integration of future climate tolerances into design specifications
- requirements to mitigate our contribution to climate change through efficient design, construction and operation.

Climate-related risks are proactively managed during operations through ongoing risk assessment reviews and the implementation of a severe weather response plan, which sets out clear procedures for before, during and after a severe weather event.



A quandong tree planted in Chatswood as part of the Sydney Metro Tree Replacement Program.

Figure 4: Sydney Metro's approach to addressing climate change

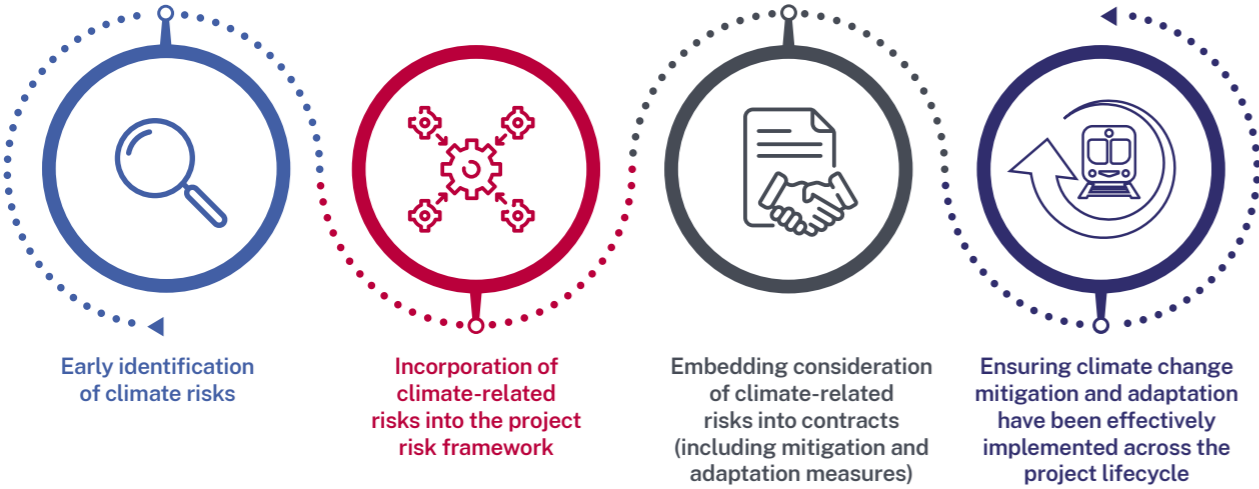


Figure 5: Sydney Metro's approach to addressing climate change

Hazard	Risk	Example controls and adaptations
Storms, rainfall and flooding 	<ul style="list-style-type: none"> • Extreme rainfall events leading to flooding of track and stations and water ingress affecting equipment • Sea level rise impacts to coastal assets • Increased winds, hail, and lightning strikes damaging cables and equipment and affecting staff and customer safety • Increased maintenance 	<ul style="list-style-type: none"> • Station entries and tunnel portals are designed above the projected 100-year flood level and take account of sea level rise as appropriate • Drainage systems and stormwater outlets include additional capacity • Cables are enclosed where practicable; insulated; and fitted with extensive protection circuitry to address safety risks • Non-slip floor finishes, and rain protection provided to customers • Operational flood modelling study being undertaken for the Sydney Metro City & Southwest project
High temperatures and heatwaves 	<ul style="list-style-type: none"> • Disruption to power supply, stress on equipment and trackwork, speed restrictions, customer and staff exposure to high temperatures • Increased maintenance 	<ul style="list-style-type: none"> • Shading, vegetation and passive solar design to reduce exposure and urban heat island • Increased cooling capacity designed into air conditioning systems • Equipment and cables are located underground where practical and selected to operate at higher temperature • Power systems include redundancy and backup supplies • Track designed to be less vulnerable to heat related movement
Drought 	<ul style="list-style-type: none"> • Impacts on equipment and physical assets through impacted soils • Water not available for operations 	<ul style="list-style-type: none"> • Drought tolerant vegetation species in landscaping plans • Water efficient design and incorporation of rainwater harvesting tanks as appropriate • Fire control systems to capture 80 per cent testing water • Specification of robust and durable construction materials
Bushfires 	<ul style="list-style-type: none"> • Risks of fire and smoke to assets and people 	<ul style="list-style-type: none"> • Fire-resistant design and materials • Filters in air intakes to promote air quality • Passenger information and public address systems with interface to the Transport Management Centre (TMC) to communicate alerts

As part of our drive towards continual improvement and transparency in reporting, we have reviewed our climate change risk practices with reference to:

- Sydney Metro Risk Management Standard
- Transport for NSW Climate Risk Assessment Guidance
- Climate Risk Ready NSW Guide (NSW Government, 2020)
- Task Force on Climate-Related Financial Disclosures (TCFD)
- The NSW Climate Change Adaptation Strategy (NSW Government, 2022).

Building on our experience in managing climate risks across projects, this reporting period we have:

- Prepared an overarching set of climate change projections and developed risk assessment templates for Sydney Metro West and Sydney Metro – Western Sydney Airport projects. This will support a more consistent assessment and tracking of risks across multiple project packages.
- Reviewed the operational performance of the Metro North West Line during climate ‘shock’ events of 2019–20 (such as heat waves, extensive bushfires and high rainfall) to enable a feedback loop to existing processes.
- Developed a draft Climate Change Risk Procedure to better integrate our process into the Sydney Metro risk governance process.
- Prepared a TCFD-aligned disclosure statement (refer to this section and Appendix C).

To deliver assets that are resilient to the increased shocks and stresses associated with climate change, we have adopted a high carbon trajectory (RCP 8.5) for climate change model projections. This means that the design will consider the impacts of climate change in a high emissions scenario, helping to future proof these assets.

Transition risks and opportunities

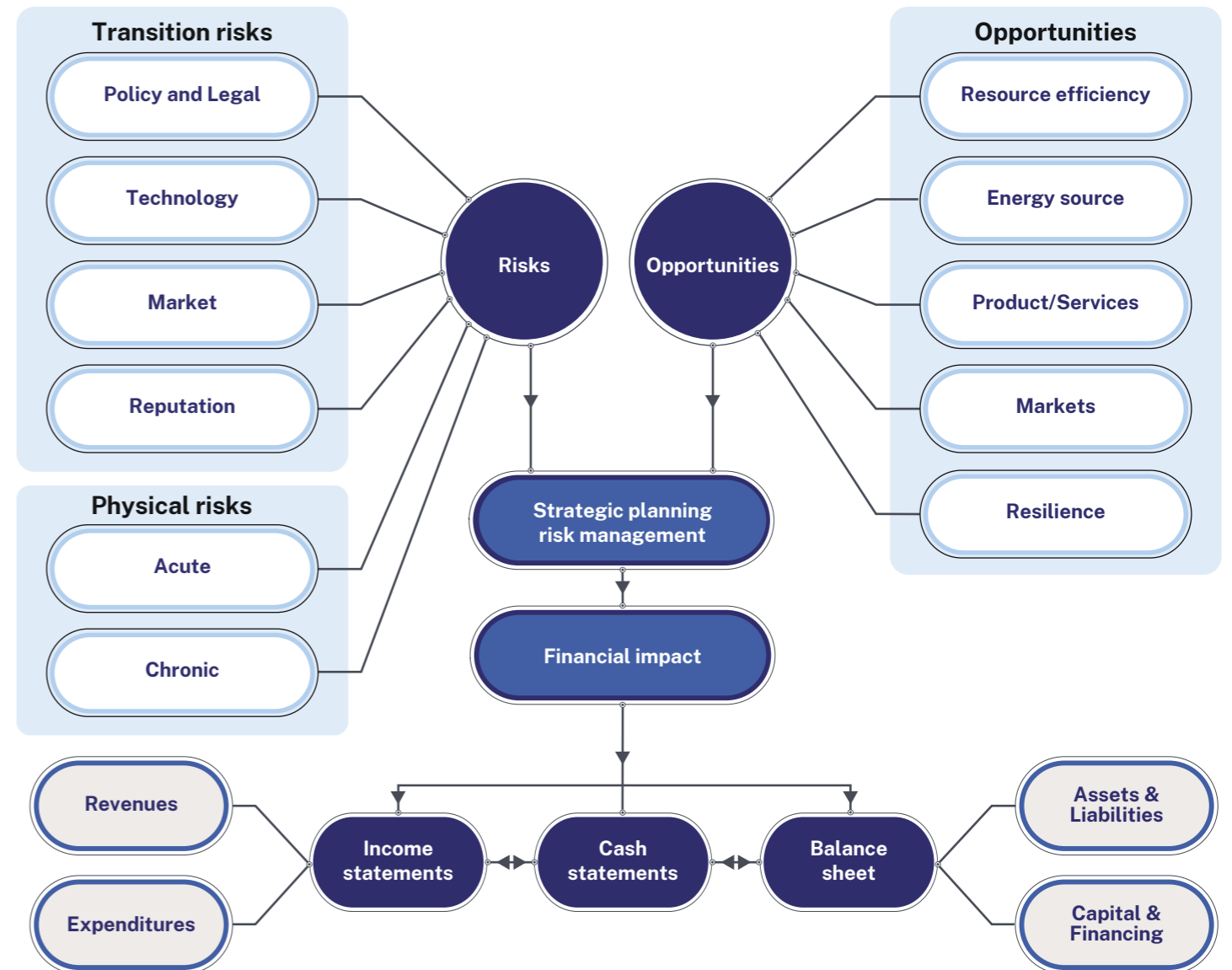
In line with best practice, including the Task Force on Climate-Related Financial Disclosures (TCFD) outlined in Figure 6, we have also identified risks and opportunities associated with the transition to a low carbon trajectory towards a net-zero future. A PESTLE workshop was held by the Sydney Metro sustainability team to explore the key external factors (Political, Economic, Social, Technological, Legal and Environmental) that may influence Sydney Metro's operations and climate change strategy in the context of transition to a low carbon economy. Two climate change scenarios were considered: a rapid and orderly transition to decarbonisation, leading to a 2°C or lower temperature increase; and a delayed and disorderly transition with little early investment or collaboration between sectors.

Risks, opportunities and associated actions have been identified, incorporated into the Enterprise Risk Management register, and communicated to the leadership team as part of our consultation process. Considerations include increasing climate change policy and regulations, stakeholder interests and collaboration, technological advancements, and low carbon market transformation. As with all our climate change risk assessments, these will be revisited and refined as needed.



Beryl Solar Farm.

Figure 6: Climate-related risks, opportunities and financial impact (adapted from Task Force on Climate-Related Financial Disclosures)



6.2 Reducing carbon emissions

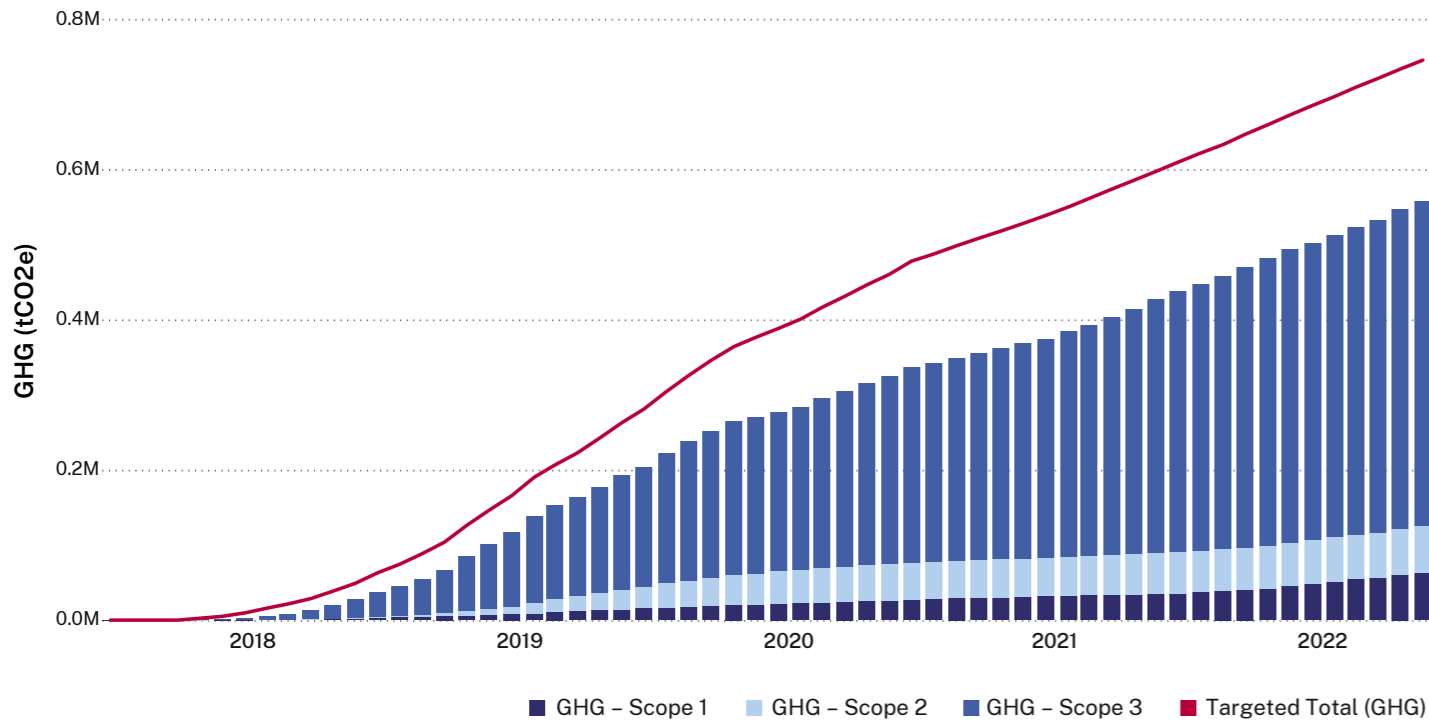
Sydney Metro continues to take proactive steps to reduce its energy consumption and overall carbon footprint through implementing energy-efficient design, minimising energy use and embodied carbon associated with materials, achieving onsite renewable energy generation, and using zero emission electricity.

To effectively monitor and reduce our embodied and construction carbon, emissions are tracked against carbon targets, and recorded on a monthly basis during project delivery. These include:

- Scope 1 (direct) emissions – for example fuel use on site
- Scope 2 (indirect) emissions from the generation of purchased electricity
- Scope 3 (indirect) emissions including embodied carbon in the extraction, manufacture and transport of materials, and the transport and disposal of waste.

Sydney Metro has committed to developing a metro-wide net-zero carbon pathway. As the pilot project, Sydney Metro – Western Sydney Airport has commenced working towards achieving carbon neutral certification inclusive of scopes 1, 2 and 3, and has become the first rail infrastructure project in Australia to commit to being certified carbon neutral from the start of construction, all the way through to operations.

Figure 7: Sydney Metro City & Southwest project cumulative construction Greenhouse Gas (GHG) emissions



Case study

Reducing emissions during construction



After removal of street lights, five temporary relocatable solar-powered lights were installed adjacent to the Victoria Cross site. These lights have saved more than 1000 kilograms of carbon dioxide emissions (kgCO₂-e) to date.

We continue to tackle our construction greenhouse gas emissions and are tracking at 27 per cent below business as usual on the City & Southwest project through initiatives including design, alternative fuels, renewable electricity, recycled materials and effective waste management.

Cranes used at Martin Place are now using B20 biodiesel containing at least 20 per cent waste products, such as used cooking oil and animal fats (tallow). By using this biodiesel mix, the project will reduce its fuel-related emissions and exceed the base project requirements by 15 per cent. Biodiesel fuel was also used at Westmead demolition works site as part of early works associated with the Sydney Metro West project.

All Sydney Metro projects have set renewable electricity targets to reduce emissions during construction. On the Sydney Metro City & Southwest project, all delivery partners are required to use at least 25 per cent renewable electricity. Several delivery partners have taken the initiative to exceed this target to achieve 100 per cent through a mixture of on-site solar, Large-Scale Generation Certificates, and GreenPower. Sydney Metro West has embedded a 25 per cent renewable energy requirement into our construction packages with further opportunities being explored for the project. The Sydney Metro – Western Sydney Airport project committed to a 100 per cent offset requirement as part of its Station Boxes and Tunnelling contract.

Case study

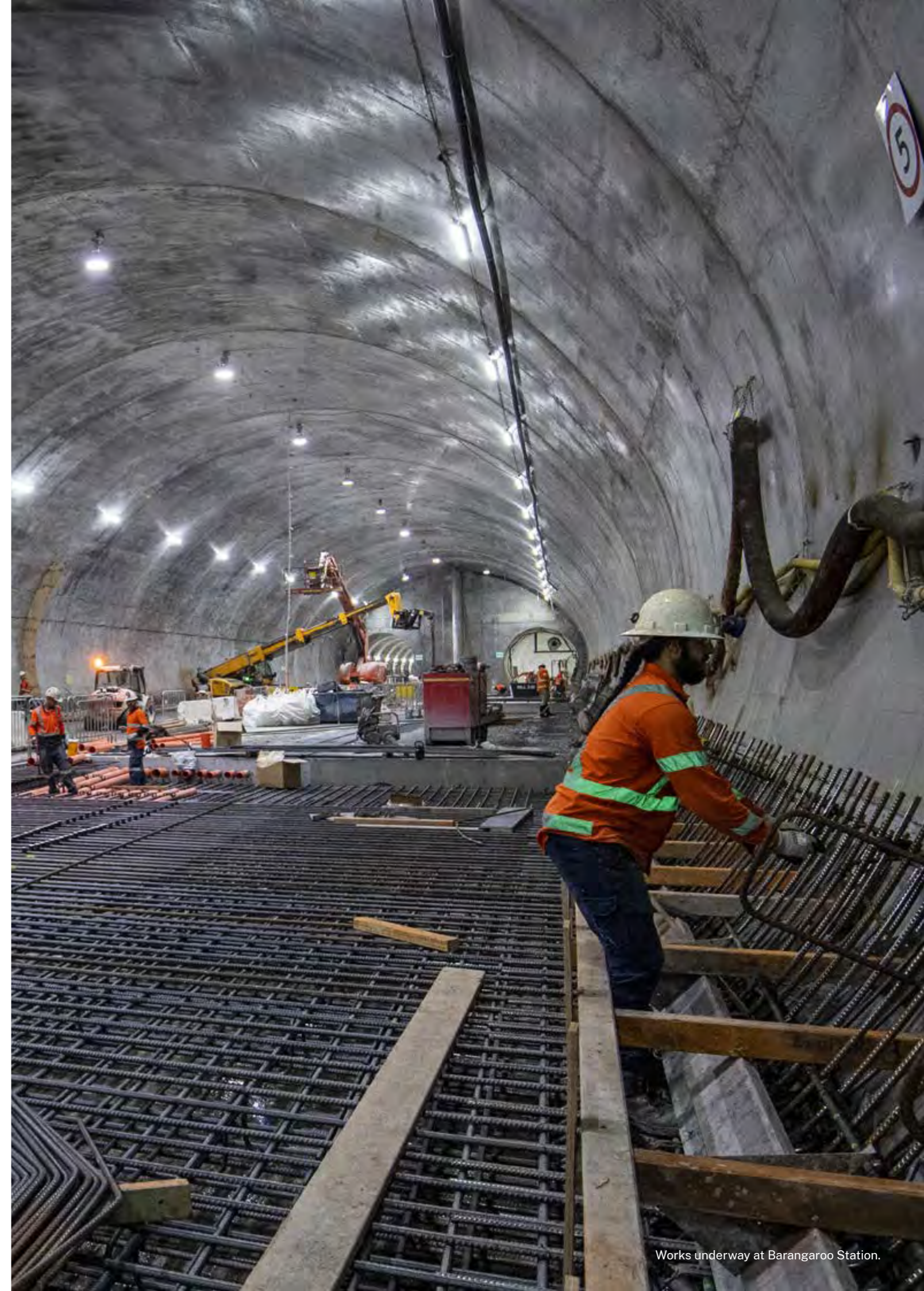
Incorporating renewable energy in our operations



Solar panels being installed at Central Station. A total of 664 solar panels will generate 366.3 megawatt-hours (MW/h) per year, to power lights around the station.

Adding to the 1100 kilowatts peak (kWp) of solar photovoltaics installed for the Metro North West Line, the newly completed Sydney International Speedway in Western Sydney Parklands (as part of Sydney Metro West project enabling works) includes 100 kilowatts peak of on-site solar panels. The City & Southwest project design includes over 800 kilowatts peak (covering approximately 6400 square metres) of solar photovoltaic panels across 13 sites. On average, the solar panels on the City & Southwest project will supply around 3 per cent of the total electricity required for the above ground stations and maintenance facilities, which falls slightly short of the 5–20 per cent target. Further opportunities for solar photovoltaics are being investigated on Sydney Metro West and Sydney Metro–Western Sydney Airport projects and will be outlined in future reports.

To supplement our on-site renewables, Sydney Metro has committed to purchasing zero emission electricity for all Sydney Metro operations. The Metro North West Line used 85 gigawatt-hours (GWh) of electricity in the 2020–21 financial year and 76 gigawatt-hours in the 2021–22 financial year. Sydney Metro used zero emission electricity for its operational consumption through the purchase and retirement of large-scale generation certificates (LGCs) from the Beryl Solar Farm in regional NSW. Without the renewable electricity, over 142,000 tonnes of carbon dioxide emissions would have been generated in the reporting year, equivalent to the annual carbon dioxide emissions of 300,000 return car trips between Sydney and Melbourne.



Works underway at Barangaroo Station.

7 Manage resources efficiently

Aim: Achieve whole-of-life value through efficient use and management of resources.



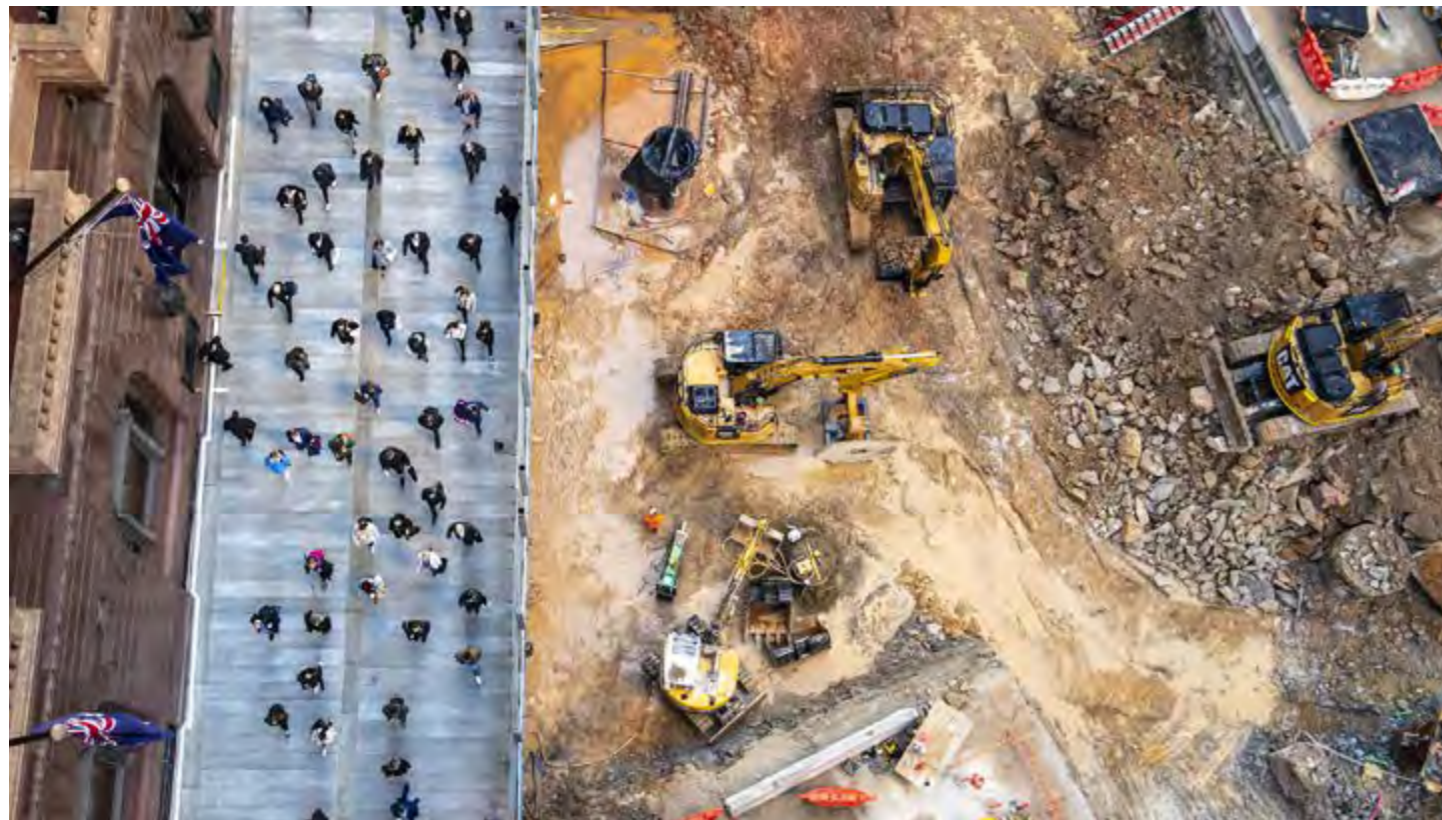
7.1 Conserving water

All Sydney Metro projects include targets to reduce potable and total water use, and increase the percentage of water that comes from recycled sources. The Sydney Metro – Sydney Western Airport project has also committed to developing a net-zero water pathway inclusive of water discharges into the environment.

Water use and efficiency during construction

The completion of tunnelling works on the Sydney Metro City & Southwest project in the 2020–21 financial year has resulted in a significant reduction in both the volume of construction water used and in the proportion of water from non-potable or recycled sources. Potable water use continues to be reduced where possible by using good

construction practices, installing rainwater harvesting, circulating ‘wheel wash’ water and using efficient dust suppression systems. Challenges for on-site water capture and reuse include the salinity of groundwater from excavation sites and the limited roof areas available for rainwater capture. However, rainwater harvesting tanks with a combined capacity of over 55,000 litres are in use across the project. On the other projects, Sydney Metro West captured and reused an estimated 384,000 litres of site water through temporary tank collection systems throughout the construction of the Speedway package. While still early in the construction phase, the Sydney Metro – Western Sydney Airport project has already installed 13,000 litres of rainwater harvesting capacity.



Highly water efficient dust suppression fog cannons in use at Martin Place.

Water



17.7 megalitres

construction water sourced from non-potable sources in 2020–22



Total to date: **740 megalitres**
More than for all projects



90% predicted reduction in operational water use at Barangaroo Station through the use of seawater cooling and efficient fittings



35% predicted reduction in operational potable water use across Sydney Metro City & Southwest new underground stations

Materials

43% Portland cement replacement rate in concrete in 2020–22



Total to date: **38%** for all projects

Over **1000 tonnes**



recycled crushed glass used for bedding and drainage overlay in 2020–22

Over **90% of steel**



used to construct the Sydney Metro City & Southwest project has been sourced from Australian manufacturers to date

Waste

100% of reusable spoil beneficially reused in 2020–22 (985,670 tonnes)



Total to date: **100%** (more than 12 million tonnes to date) for all projects

523,380 tonnes

of spoil reused on site in 2020–22 (avoiding approximately 32,000 truck movements this reporting period, most as part of the Sydney Metro West project works' construction of the Sydney International Speedway).

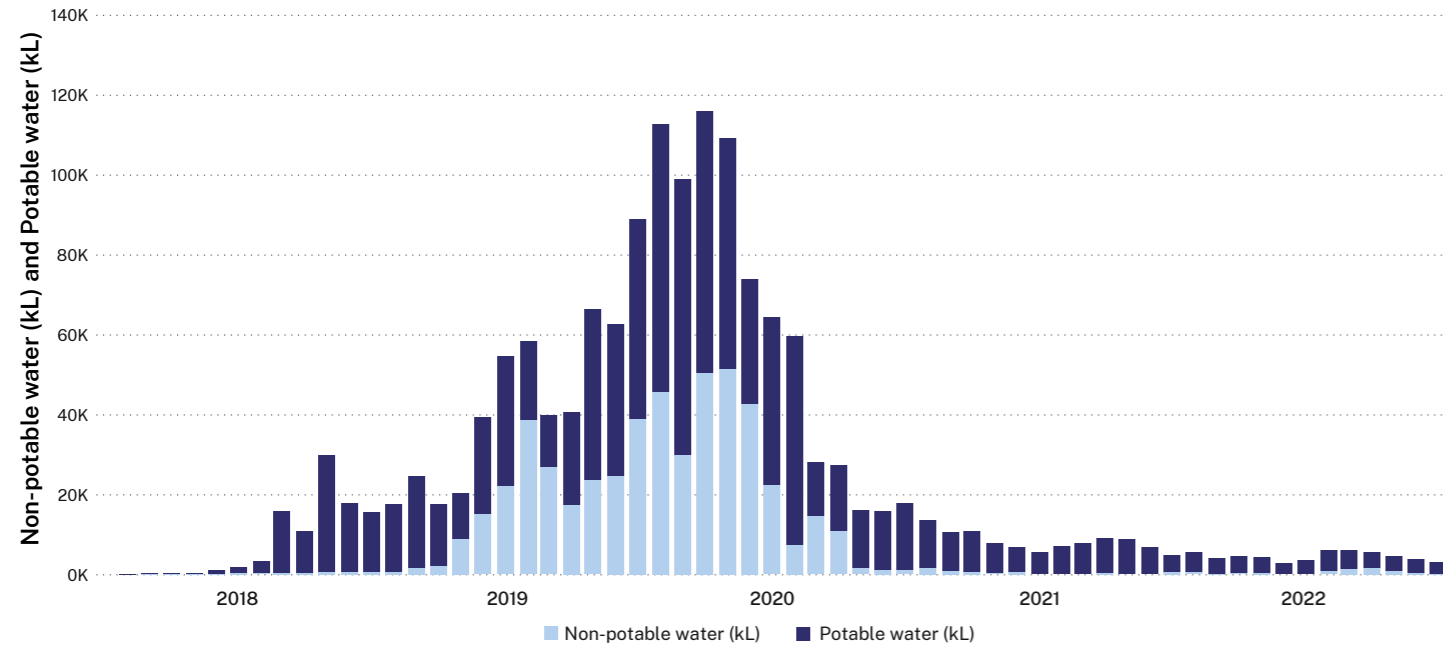


97% (171,865 tonnes) construction and demolition waste recycled in 2020–22



Total to date: **96%** (405,358 tonnes)

Figure 8: Construction water use on the Sydney Metro City & Southwest project



Operational water consumption

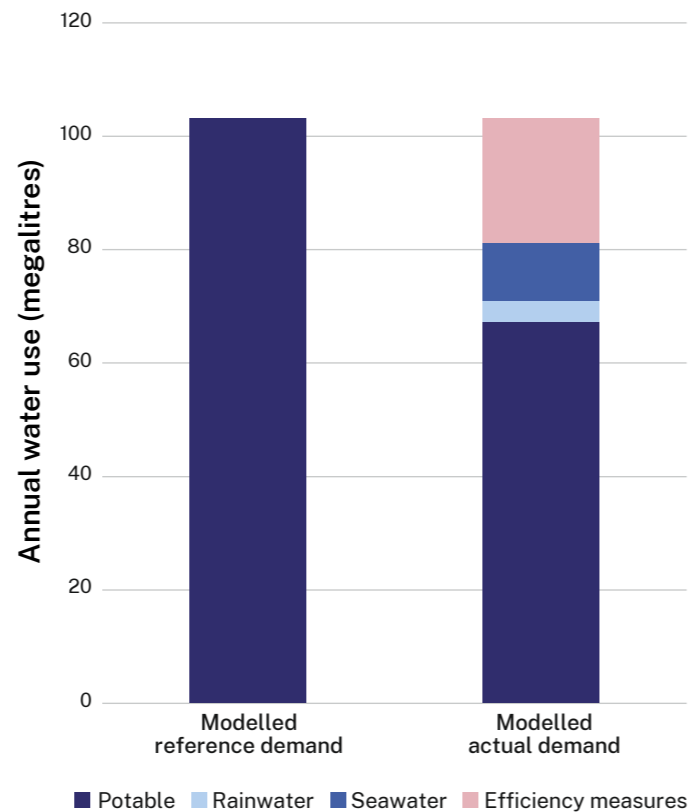
Operational water consumption has been reduced on the Sydney Metro City & Southwest project through:

- specifying Water Efficiency Labelling and Standards (WELS) water fittings including WELS 6 star urinals and taps and WELS 4 star dual flush toilets
- designing water-efficient cooling systems including seawater cooling at Barangaroo Station, adiabatic chillers at Central Station and rainwater top-up for cooling towers at Victoria Cross Station
- capturing and reusing at least 80 per cent of fire test water across all stations
- designing the roof of the new Northern Concourse at Central Station to enable capture of additional rainwater into an existing rainwater harvesting tank for a total capacity of 190,000 litres at Central Station.

As a result, the Sydney Metro City & Southwest project city stations have predicted a 35 per cent reduction in potable water demand, of which around 14 per cent is through the use of non-potable water. Non-potable water use in the stations has been limited by lack of access to grey water systems and low availability of roof space. However, the over station developments for Martin Place and Waterloo are planned to leverage available roof space created to capture and reuse rainwater to reduce the potable water consumption of the cooling towers.

As part of the Sydney Metro West project, a 1.1 million litre onsite stormwater detention tank was installed as part of the Speedway package, with 550,000 litres of tank water available for operational dust suppression and other uses on the site.

Figure 9: Modelled reductions in operational water demand in Sydney Metro City & Southwest project stations



Construction of the new aqueduct over the existing heritage-listed Sydenham Pit, while retaining the existing heritage listed pump station.

7.2 Efficient use and selection of materials

We work continually with our delivery partners to identify opportunities to reduce material quantities through lean design, and to specify environmental performance of products.

Sydney Metro has used over 72,000 tonnes of structural and reinforcing steel in the reporting period. By far the largest proportion has been used on the City & Southwest project, which requires that all steel is sourced from suppliers that are certified under the Australian Certification Authority for Reinforcing and Structural Steels or a demonstrated equivalent and that at least 60 per cent of structural steel has been manufactured using energy-reducing processes. Steel has been sourced locally where practicable, with more than 90 per cent of steel used to date to construct the Sydney Metro City & Southwest project sourced from Australian manufacturers*.

Recognising that concrete is a significant contributor to our construction carbon emissions, we have set limits on the carbon-intensive binding agent (Portland cement) and stipulated replacement targets using low carbon supplementary cementitious materials (typically fly ash or ground granulated blast furnace slag). This works to also drive down the embodied carbon of the concrete and turns an industrial waste product into a resource. In 2020 we created a quick-reference concrete compliance tool to support our contractors to achieve and measure against these targets.

* Note that this represents data for 95 per cent steel used in total, pending origin data for remaining 5 per cent.

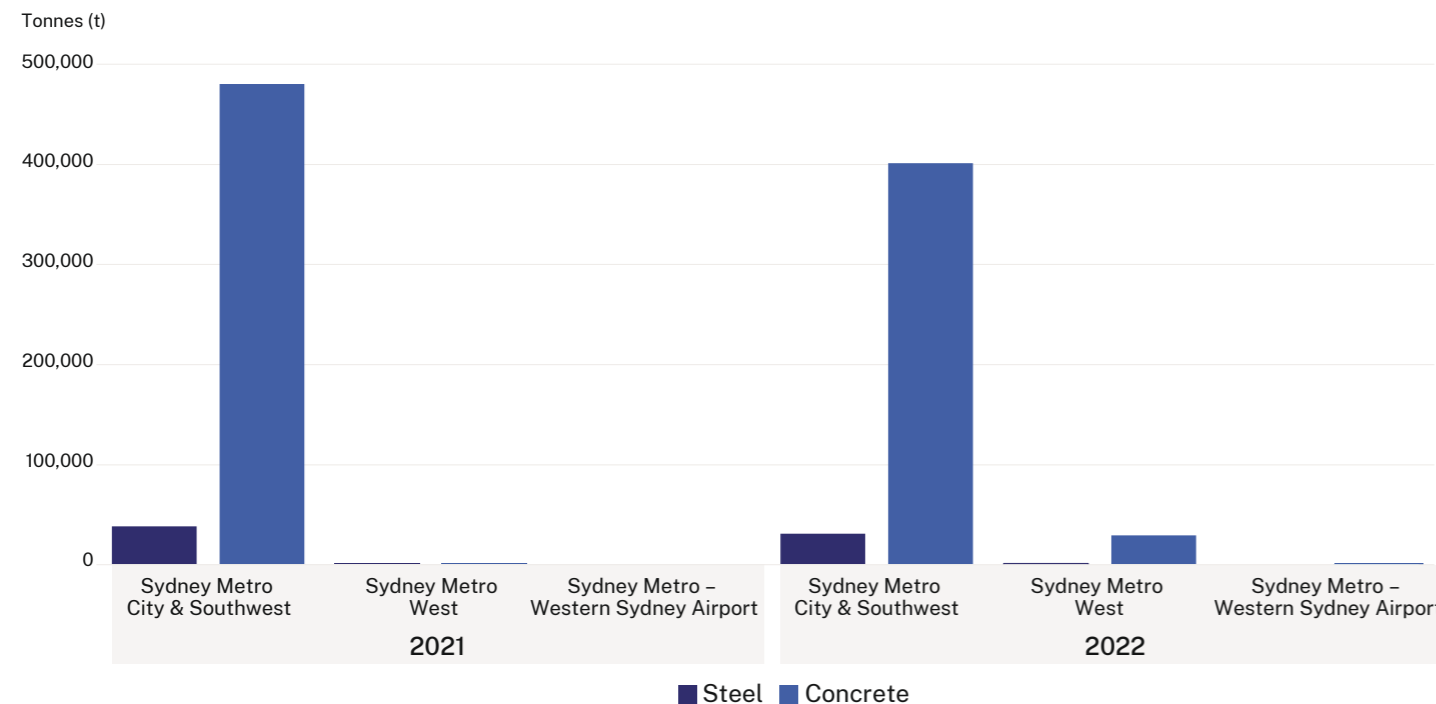
Figure 10: Average percentage of Portland cement replaced with supplementary cementitious materials (SCM), 2020–21 and 2021–22 financial years

Project	Target	Portland cement replacement	
		2020–21 financial year	2021–22 financial year
City & Southwest project	25%	41%	45%
Sydney Metro West project	35%	17%	50%
Sydney Metro – Western Sydney Airport project	35%	0%	0%

This reporting period has seen significant use of innovative, reused and recycled materials, including the following:

- 50 geopolymer concrete sleepers, which have a 60 per cent smaller carbon footprint than regular concrete sleepers, were installed in June 2022.
- A 100 per cent recycled and recyclable plastic product (TufDuct) was used instead of standard concrete, to house services that run along the Sydney Metro City & Southwest project corridor and at Sydenham Station.
- 1000 tonnes of recycled crushed glass were used at the expanded Sydney Metro Trains Facility at Tallawong, for bedding and overlay material in the installation of new drainage and intertrack drainage instead of imported sand.
- Salvaged heritage bricks were reused at City & Southwest project station platforms. This avoided sending waste to recycling or landfill and avoided purchase of new materials.
- Reuse of shipping containers and steel salvaged from the Tunnels and Station Excavation Works acoustic shed to construct a walkway to allow greater accessibility to the Crows Nest Station site for their workers.
- Structural steel beams and timber were salvaged for reuse in future projects during the demolition process at the Parramatta metro station site.
- Sandstone blocks recovered from the Sydenham Metro upgrade works were donated to Inner West Council. These blocks have been put to good use for community projects, including being incorporated into playgrounds, landscaping, and stabilisation for a stormwater upgrade project at Marrickville Golf course.
- Almost 170,000 tonnes of excess spoil generated at the Sydney International Speedway was used to construct a nearby tunnelling precast yard located less than one kilometre away.

Figure 11: Steel and concrete usage, 2020–21 and 2021–22 financial years



Case study

GECA certified construction waste collection



Grasshopper Environment at Central Station.

The Central Station metro project, part of the Sydney Metro City & Southwest project, became the first construction project in Australia to specify Good Environmental Choice Australia's (GECA's) Waste Collection Services ecolabel certification. Its waste contractor, Grasshopper Environmental, became the first waste provider in Australia to achieve the certification with the inclusion of construction and demolition waste streams. This was achieved through strong collaboration and commitment between our delivery partners, Laing O'Rourke, and Grasshopper Environmental.

To achieve this industry-leading accreditation, Grasshopper Environmental has demonstrated its ongoing commitment to innovation, improving sustainability outcomes and lowering environmental, health and social impacts.

Certification from the GECA is an independent 'tick' that shows that a product or service is better for both people and the planet. Certifying under the GECA standard drives transparency, data accuracy, credibility for reporting, and social sustainability across the entire supply chain, resulting in better sustainability performance and supporting service providers' efforts to minimise their impacts.



Top left: Geopolymer low-carbon concrete sleepers.

Top middle: Reuse of salvage demolition bricks at Belmore Station.

Top right: Approximately 215 salvaged sandstone blocks integrated into Simpson Park Playground, St Peters.

Bottom left: Repurposed shipping containers reimagined as a workers walkway at Crows Nest Station.

Bottom middle: Structural steel beams salvaged in Parramatta for reuse.

Bottom right: Construction of the Sydney International Speedway has balanced cut-and-fill where possible, and reused excess spoil nearby.

8 Drive supply chain best practice

Aim: Collaborate with key stakeholders to drive a lasting legacy in workforce development, industry participation and sustainable procurement.



8.1 Ensuring ethical procurement

On 1 January 2022, the *Modern Slavery Act 2018* (NSW) came into force, requiring NSW Government agencies including Sydney Metro to take reasonable steps to ensure that the goods and services they procure are not the product of modern slavery and, from the 2022-23 financial year, include a statement of steps taken in their annual reports. In response, Sydney Metro has developed expanded modern slavery clauses for new contracts and commenced a modern slavery-focused enterprise risk assessment to help better identify, manage and reduce these risks.

Sydney Metro's contractors are required to put processes in place to ensure that procurement is undertaken in an environmentally and socially responsible manner that supports basic human rights, avoids modern slavery and complies with local labour and environmental laws. Further details of our requirements are provided in our previous Sydney Metro annual reports. No instances of unethical procurement have been identified in the reporting period.

This reporting period we have supported our contractors to manage their supply chain risks by preparing and distributing a sustainable procurement checklist. This is a practical reference document which outlines key activities, links and resources to help integrate responsible procurement into supply chain management. In addition to this work, we have collaborated with the Responsible Construction Leadership Group on environmental and social hot spot analyses for construction materials. These hot spot analyses considered a range of social and environmental risks relating to the extraction, manufacture, transport, installation, use and disposal of key construction materials including steel and asphalt. Sydney Metro reviewed and updated the analyses, and released these to contractors as reference material.



Materials storage at Bligh Street in Sydney's central business district.

Case study

Supplier sustainability training

Sydney Metro delivery partners are required to exercise a risk-based screening of suppliers and provide supplier training as appropriate. For example, the contractors who are delivering the Station Box and Tunnelling works for Sydney Metro – Western Sydney Airport, have undertaken sustainability training with nine suppliers and subcontractors.

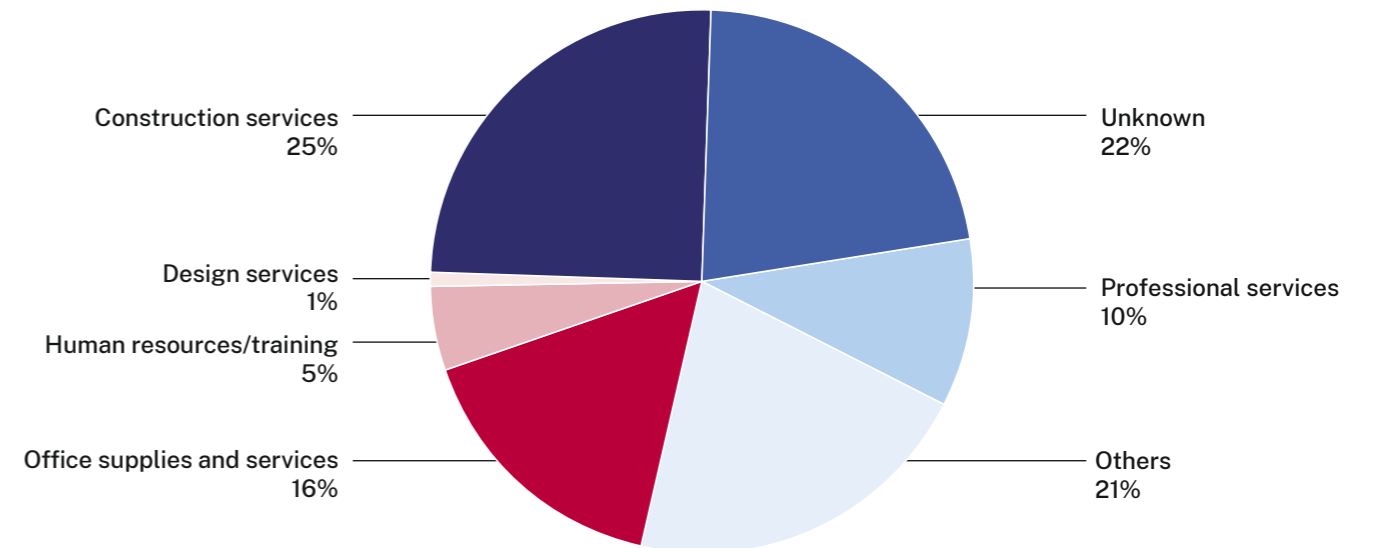
Similarly, as part of the construction of Pitt Street Station, delivery partner CPB has developed a High Impact Supplier Training (HIST) program based on the Australian Supply Chain Sustainability School's resources and learning modules. Companies were selected for training based on the types of materials used, contract value and/or overseas sourcing. The training integrated project sustainability performance objectives including resource efficiency, climate change and human rights. The face-to-face delivery of the training allowed for individuals to share personal experience and helped to share knowledge in supply chain best practices in workforce development, industry engagement and sustainable procurement.

8.2 Aboriginal business representation

Sydney Metro is committed to broadening opportunities for Aboriginal peoples on Sydney Metro projects and acknowledges the significant opportunities present to positively impact Aboriginal and Torres Strait Islander peoples, businesses, and communities.

For more information and highlights of some of the successful Aboriginal participation initiatives and outcomes being achieved by Sydney Metro, go to our [case study](#).

Through a number of initiatives, including implementing minimum requirement, bid-back mechanisms, collaborative forums and client-led programs, Sydney Metro has achieved up to 25 per cent representation of Aboriginal businesses in the supply chain.



Representation of Aboriginal businesses in the Sydney Metro supply chain as of May 2022.

8.3 Leaving a workforce legacy

Sydney Metro provides a significant opportunity to support jobs and skills for a more diverse and inclusive workforce and supply chain. Our Workforce Development and Industry Participation and Aboriginal Participation Plan sets out how these priorities will be delivered by addressing key Australian and NSW government policies and skills challenges.

Sydney Metro's priorities include:

- Industry participation
- Workforce skills development
- Diversity and inclusion
- Inspiring future talent
- Collaboration.

Initiative outcomes

The following data details the outcomes of some of these initiatives to date across the Sydney Metro projects. The [Sydney Metro Annual Report](#) provides details of our direct workforce diversity and inclusion achievements.

Industry Jobs and Skills Team

Sydney Metro has an embedded Industry Jobs and Skills Team which supports delivery partners and the wider supply chain in accessing information and support to achieve workforce development and industry participation requirements and initiatives. The team has strong links to the Department of Employment and the Department of Education, Skills and Employment, which both support Sydney Metro in achieving workforce outcomes.

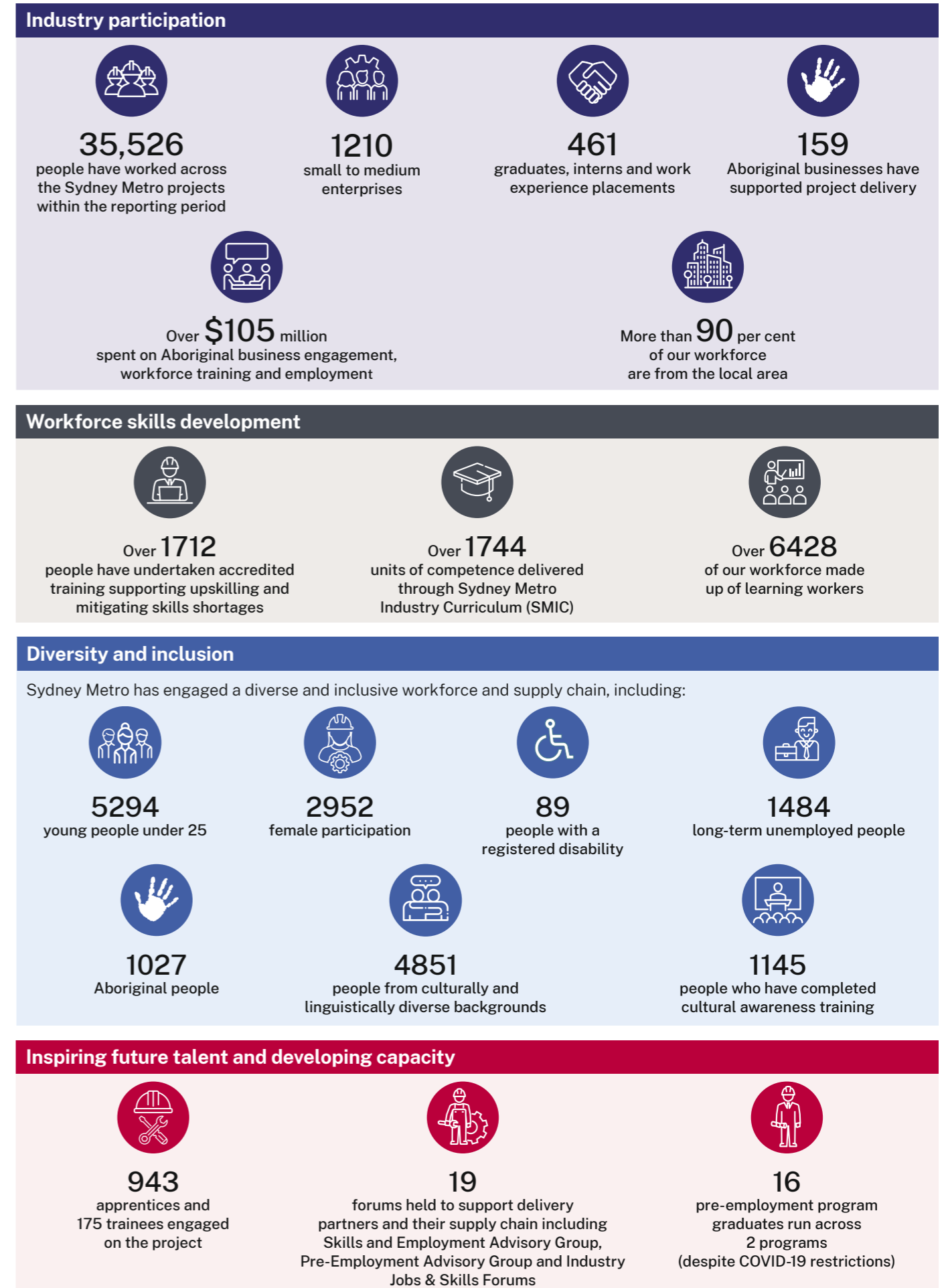
Industry participation

Sydney Metro has built into its contracts a requirement for delivery partners to engage with Australian and New Zealand (ANZ) Small and Medium Enterprises (SME) and Aboriginal businesses to increase supply chain diversity and support local businesses throughout delivery.



Participant at the Health & Safety Advisory Service as part of the Sydney Metro Pre-Employment Program, March 2021.

Figure 12: Outcomes of workforce initiatives for July 2020 – June 2022 for all Sydney Metro projects and operations (Metro North West Line, Sydney Metro City & Southwest, and Sydney Metro West and Sydney Metro – Western Sydney Airport)



Supporting workforce diversity: pre-employment program

Sydney Metro's pre-employment programs provide employment pathways for long-term unemployed or under-employed individuals. The programs provide the skills, knowledge and tools to enable participants to transition to a role within the Sydney Metro supply chain.

During this reporting period, in the context of the challenges of COVID-19 restrictions, two programs were delivered, with 16 participants graduating from the program.

To date, the pre-employment program has achieved the following outcomes:

- **95 per cent** successful course completions
- **90 per cent** employment outcomes
- **42 per cent** Aboriginal peoples
- **20 per cent** female participation in non-traditional trades and occupations
- **58 per cent** young people 25 years and younger.

The program supports ongoing learning and career development through apprenticeship and traineeship pathways.



Participants at Indigenous Training.

Inspiring Future Talent

The Sydney Metro Inspiring Future Talent program focuses on engaging primary, secondary and tertiary education establishments to increase the awareness and engagement of young people and diversity groups into careers within the industry.

Sydney Metro works closely with delivery partners to support programs and initiatives including work experience, graduate placements, apprentice and traineeships pathways and other transition to work programs.

Collaboration

Sydney Metro has established a number of forums to increase collaboration and sharing of lessons learnt across industry with the aim to drive increased employment, skills and diversity outcomes:

- Established in 2014, the Skills and Employment Advisory Group members include Sydney Metro delivery partners, along with Australian and NSW government agencies.
- The Pre-Employment Advisory Group focuses on the collaborative delivery of the Sydney Metro pre-employment program across all packages of work in delivery.
- An Industry Jobs and Skills forum was delivered in partnership with Australian and NSW government agencies to increase supply chain awareness and engagement in the delivering of local employment opportunities, workforce diversity and skills development.
- The Aboriginal Business forum provides opportunities for Aboriginal businesses to engage with Sydney Metro delivery partners and their supply chain to hear about up-and-coming procurement opportunities.



Participants at the Health & Safety Advisory Service as part of the Sydney Metro Pre-Employment Program in March 2021.

8.4 FastTracking the Future education program

Sydney Metro engages with school communities, teachers and students via its award-winning education program FastTracking the Future. Since 2014, Sydney Metro's Public Communications team has continued to evolve the program and focus on curriculum-aligned activities for Kindergarten to Year 10 students.

Metro Minds

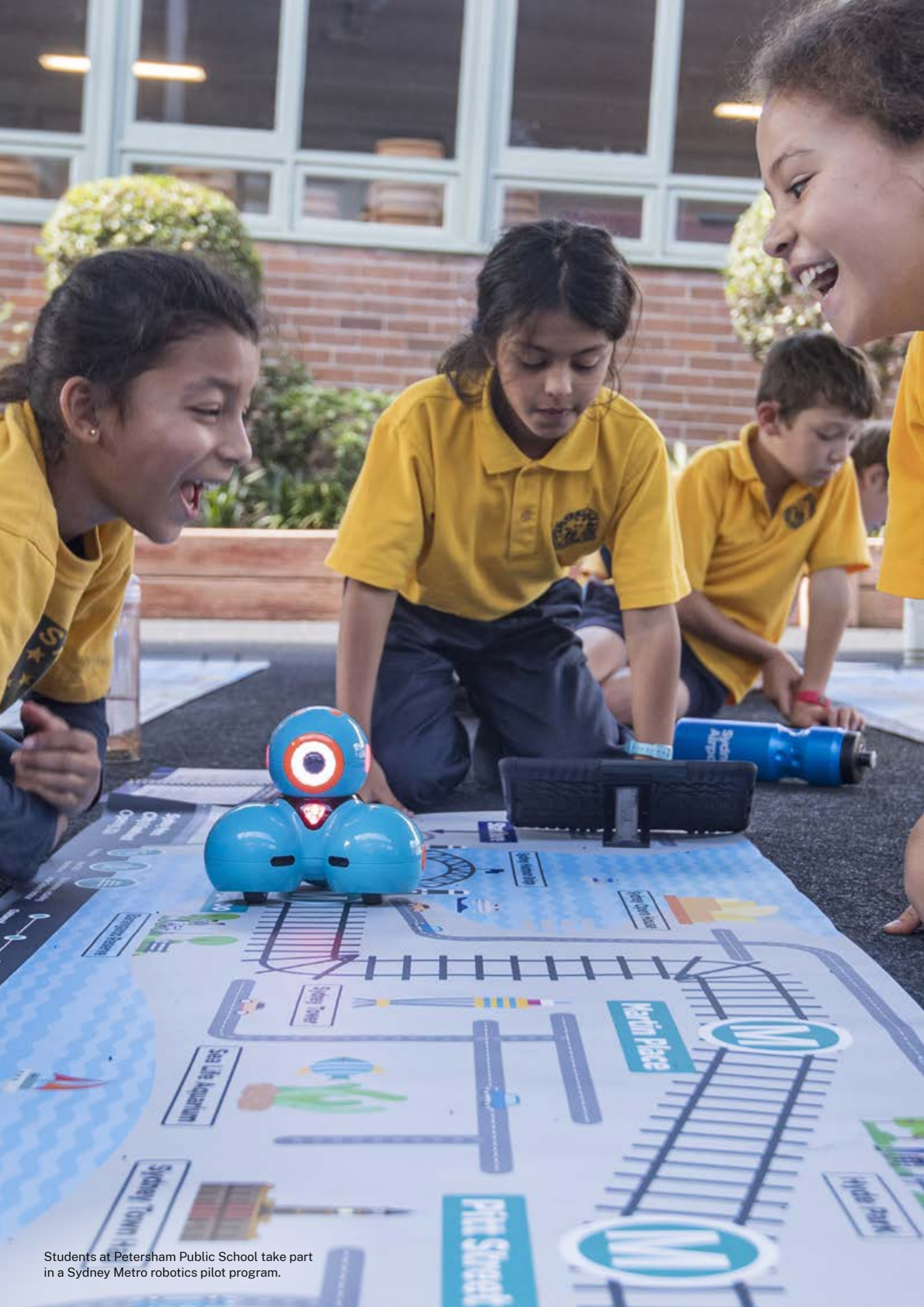
Metro Minds STEAM Challenge is part of the education program that immerses Year 7 to 10 students in real-world challenges using design thinking. Students work in teams to create and design an innovative solution to a Sydney Metro opportunity or challenge of their choice. This competition brings students face to face with real Metro minds working on Sydney Metro projects. In 2021, 17 Sydney Metro representatives visited 12 schools and in 2022, 21 experts visited 13 schools participating in the Challenge. Take a look at our visit to [Catherine McAuley Westmead in 2021](#) and our [2022 STEAM Challenge Finals](#).



Metro Minds Ambassador Amelia Loder (Manager Sustainability Sydney Metro – Western Sydney Airport) working with Catherine McAuley students in 2021.



Attendees at the finals of the Metro Minds STEAM Challenge 2022.



Students at Petersham Public School take part in a Sydney Metro robotics pilot program.

Inquiry based learning

Sydney Metro's city-shaping project presents a learning opportunity for schools near the alignment to use Sydney Metro as an authentic teaching tool to assist students to explore the goals of the infrastructure project and its legacy for the people and communities it serves. In partnership with Western Sydney University, Sydney Metro created a professional development program in inquiry-based learning for teachers to deliver a curriculum-aligned education program for Year K-10 students.

Through inquiry-based units of work, students were able to work with teachers to decide what issues were important to them and worthy of inquiry and exploration. This student-led approach used a real-life project as a context to drive awareness of the value and input of the planning process in large infrastructure programs such as Sydney Metro. The program allows schools to invite experts from all parts of the Sydney Metro project to increase their awareness and curiosity around the works underway in their neighbourhood.

Take a look at how we are [working with teachers and students](#).

Robotics incursion program

Sydney Metro's Public Communications team created a robotics incursion program and resource pack aimed at providing a fun introduction to coding. More than 200 students from Year 3-4 from Petersham Public and Tempe Public Schools participated in a pilot program in 2021.

The resource pack included, lesson plans, 13 educational robots called Dash, and tablets with an easy drag-and-drop visual coding tool called Blockly. Students completed a series of challenge cards using a challenge map based on Sydney Metro. The incursion program will be extended to schools along Sydney Metro's West and Sydney Metro - Western Sydney Airport project alignments in 2022.



Our Lady of Mercy Parramatta, Metro Minds winners, 2022.

9 Value community and customers

Aim: Respond to community and customer needs; promote heritage, liveable places and wellbeing for current and future generations.



9.1 Enhancing Aboriginal participation

At Sydney Metro we acknowledge the importance of understanding cultural perspective, and collaborating with and providing opportunities for Aboriginal peoples as part of our project development, delivery and operations.

We align with the foundational pillars contained within the TfNSW Reconciliation Action Plan (RAP) and we continue to implement activities that focus on building and strengthening relationships, respect and celebrate culture, and provide employment and career development opportunities.

We aim to have an overall representation target of 3 per cent Aboriginal employees in non-executive salary classes by 2025 and an increase in Aboriginal senior leaders. Sydney Metro has demonstrated a positive trajectory in alignment with this approach and wider government policies.

In addition to a focus on increasing employment, we recognise significant dates, ensure accessible tools and resources for all staff, provide dedicated training programs that provide knowledge uplift and undertake initiatives that celebrate Aboriginal culture.

Going forward, we will continue to focus on activities such as those mentioned here in accordance with our commitment towards Aboriginal participation and representation.

Connecting with Country

Sydney Metro has trialled the Government Architect's Connecting with Country Framework this reporting period, and there have been valuable lessons for sustainability. A key objective of this trial was to enable Country, community and culture to be respectfully and appropriately incorporated into the projects through listening to Country and to those who can speak for Country and culture. One of the key lessons of the trial has been about the importance of reusing materials taken from Country and returning materials to the Country where they were taken from, including soils, stones, trees and other elements.



Preschoolers take a look at the work at Crows Nest Station, part of the Sydney Metro City & Southwest project.



Archeologist's have discovered what they believe to be the first wooden boat built in Australia at the Barangaroo Metro construction site.

Case study

Designing with Country – Bankstown cross-corridor plaza

Bankstown Station is 16 kilometres southwest of the Sydney central business district (CBD) and will be the final station on the Sydney Metro City & Southwest project alignment. The Dharug people are the traditional owners of the land.

The landscaping and public domain design of the cross-corridor plaza at Bankstown Station was developed by integrating First Nation's cultural values and design principles.

Facilitated by Canterbury-Bankstown Council, the design team engaged with the local Elders group and was given the opportunity to present the project's aspirations – to create a pedestrianised welcoming public space connecting the north and south of Bankstown CBD, a green spine with places of cool respite, and opportunities to improve stormwater quality through water-sensitive urban design. Engaging with and listening to the Elders enabled the project design team to better understand how their stories could be embedded in the project outcomes.

The Elders shared stories about the importance of local landforms and waterways – ridgelines afforded views and vistas, and acted as vantage points to see who was coming and going; walking tracks had a directional relationship to the ridgeline as well as leading to food and water sources. People moved up and down Salt Pan Creek and the Georges River and thus water is seen as a connector of communities and people. In the past, when the gully flooded in the northern part of the station precinct, it was a signal for people to move on. Throughout the discussions with Elders, the flow of water, habitat and people became a metaphor for migration and movement.

The Elders also spoke about the importance of the Salt Pan Creek Camp, a new Indigenous community formed in the early decades of the 20th century. It was a place where Aboriginal folk congregated, shared food and stories, and felt safe and protected. It was very significant to the Elders as it was freehold and a place outside of the controls of the Protection Board in the 1930s. It was a place where First Nations people could practice their language and culture, and be themselves.

From these oral histories and important discussions with the Elders, they agreed that connection to Country would be best reflected in the northern part of the plaza, and early design themes emerged as follows:

- a yarning circle
- indigenous flora (soft landscaping)
- wetland treatments that feed and rehabilitate the concrete drainage channel
- Salt Pan Creek basin defined by semicircular ridgelines
- paving inlay referencing key stories about Salt Pan Creek.

The resulting concept design incorporates a circular terraced seating area in the northern part of the cross-corridor plaza, reflecting the importance of the ridgelines as a place of vantage, as well as being a place for gathering and refuge.

Landscape species reflect those found on the banks of the local waterways and trees have been positioned in a clumped manner rather than ordered in straight lines, to reflect trees as they are seen and experienced on Country.

Watching people move through the plaza from this terraced seating area is symbolic of the metaphor for migration and movement which the Elders shared through their stories. The plaza as a gathering space is also an important reminder of the historical significance to First Nations peoples of the Salt Pan Creek Camp – a place where people could be themselves and enjoy each other's company.



An artist's impression of Bankstown cross-corridor plaza.

9.2 Managing archaeology

A number of significant Aboriginal and non-Aboriginal heritage finds have been uncovered through the Sydney Metro City & Southwest archaeological program. These are outlined in the previous [Sydney Metro Sustainability Report 2020](#), and key updates are provided below.

Burial grounds at Central Station

Central Station was originally built one of Sydney's oldest colonial burial grounds, Devonshire Street Cemetery. The remains of Joseph Thompson were discovered during archaeological excavations in January 2019. Consultation with his descendants was undertaken throughout 2020 and he was reburied in Pioneer Park in the Eastern Suburbs Memorial Park in November 2021 following a commemorative service at the Pitt Street Uniting Church where he was a deacon. Name plates were also identified from the Perry and Ham families, who shared a vault in the Congregational Church section of the Devonshire Street cemetery. Sydney Metro is consulting with descendants about reburial of these remains later this year.

Archaeological works are also underway on the Sydney Metro West project with key excavations ongoing at The Bays, where the remains of a turn table have been uncovered, and at Parramatta, where excavations will be ongoing for the next two years.



Excavation at Central Station.

Adaptive reuse

Options for effective adaptive reuse are being explored for heritage listed buildings located in station precincts across the Sydney Metro network. These include a Georgian revival villa and early row of shops in Parramatta, and a state heritage listed hotel near the Hunter Street Station site. Adaptive reuse brings new life to existing buildings by providing contemporary use and ongoing viability, while reducing our carbon footprint.

Finding new uses for salvaged items

During Sydney Metro's heritage works we often uncover materials that can be reused elsewhere. For example, the sandstone archaeological footings from early houses at Blues Point are being replaced at the site as part of the interpretation; blue stone cobbles from one of our construction sites are being reused in landscaping at Marrickville; and timber posts from Central Station are being reused in the landscape at Bankstown. Where we cannot find a new use in heritage interpretation or in our landscaping works, useful materials are offered to local councils to use in community works such as landscaping and playgrounds.

Case study

Integrating Public Art



Sydney Metro's first artwork, 'Light Line Social Square' along the Metro North West Line, has been recognised with the NSW Institute of Architects Lloyd Rees Award for Urban Design 2020. Artists Turpin Crawford Studio and McGregor Westlake Architecture, with station architects Hassell, wove together infrastructure, art, landscape, and architecture to create the line-wide artwork.

The Sydney Metro Art Program vision is to 'Elevate the customer's journey with art and engagement'. Public Art is a key part of Sydney Metro's placemaking approach and promotes inviting, welcoming stations that are connected to communities.

Along the Metro North West Line stations featuring the Light Line Social Square artwork, art attribution plaques have been installed. Attribution plaques recognise artists' moral rights to be attributed. They also promote engagement and cultural awareness by helping customers to identify artworks, both at the stations and through included URL links to the [Transport Arts](#) website, where more detailed information is available.

For the Sydney Metro City & Southwest project, the theme 'Storylines' was selected to inspire artwork relating to localities, including cultural, urban, and the natural elements. Bespoke artwork has been commissioned at each of the 18 stations through a competitive process that encourages applications from artists from diverse backgrounds. Commissions were open to local and emerging public artists. Several heritage interpretation artwork commissions were open specifically to Aboriginal artists, who are now working with local Aboriginal communities. Other artworks along the line will showcase flora and fauna, remnant Sydney bushland, the Cooks River and journeys.

The first station of the line to open, Sydenham, features Sydney-based artist Agatha Gothe-Snape's artwork 'Notes on Sydenham'. This was inspired by conversations with the local community. Other Sydney Metro City & Southwest project artworks will be opened when the new stations open.

For the Sydney Metro – Western Sydney Airport project, the selected curatorial themes reflect the project's Connecting with Country consultation. The line-wide theme is Journeys and Pathways. Nine public art commissions are planned, including a line-wide work which will be undertaken by an artist team, and have an individual expression at each of the six new stations. Other commissions will be stand-alone artworks at each of the six stations and artworks in the public places associated with the planned new active transport link. Two-dimensional works, relief and freestanding sculptures are planned, and three of the nine commissions specifically require Aboriginal artists to apply individually or as part of a team.

9.3 Promoting active transport

More people travelling by 'active transport' can reduce road congestion and deliver positive health, wellbeing and environmental outcomes. Sydney Metro is committed to enabling and encouraging people to walk or cycle as part of their everyday travel, whilst supporting customers with limited mobility. Interchange access plans are

prepared for stations to inform the interchange design of transport and access facilities, including footpaths, cycle paths and bike parking, bus stops (temporary transport requirements considered), and car parking, as well as amenities and shelters, to ensure easy, accessible, safe and efficient customer transfer.

Case study

Improving pedestrian access to Bella Vista Station



The new Glenwood Pedestrian Link.

Sydney Metro has continued to make it easier for Glenwood residents to use the Metro North West Line with the construction of a new pedestrian link to improve access between Glenwood and Bella Vista Station. Pedestrian access between the Glenwood residential area and the pedestrian bridge was previously blocked by one kilometre of continuous property fences and noise barriers along Old Windsor Road, restricting the number of residents able to walk to and from Bella Vista Station.

The Glenwood Pedestrian Link provides improved access and reduced walking times for local residents within proximity to the Bella Vista Station, allowing an estimated 700 Glenwood households – and two local schools – to now be within a 15-minute walk of the station. This will provide even more travel options when the Sydney Metro City & Southwest opens in 2024.

Construction of the Glenwood Pedestrian Link is now complete, along with new footpaths along Sharrock Avenue and Cramer Place which provide a connection into the existing pedestrian network. Ownership of the link has been transferred to Blacktown City Council.



An artist's impression of the new public plaza at Bankstown Station.

The **station design and precinct plan for Bankstown Station** was approved this reporting period. This will see the new metro entrance located in the middle of Bankstown, which will help link the north and south of the CBD. These are currently separated by the rail corridor, inhibiting movement throughout the precinct. Sydney Metro will provide a new cross-corridor connection that aligns with Restwell Street and the Appian Way.

The plaza space that forms the connector will act as a catalyst to begin transformation of a green 'spine' that provides a pedestrian friendly network throughout the precinct. The landscaped pedestrian plaza will integrate with adjacent streets that are proposed to be upgraded by City of Canterbury Bankstown Council. This will also complete a key part of Council's anticipated 'cultural trail', a walking loop throughout the CBD that visits key heritage and cultural sites.

9.4 Engaging with the community and customer

Sydney Metro works closely and cooperatively with the community and our partners to deliver a sustainable, city-shaping public transport system.

We have been working with stakeholders and communities, adapting to community needs and refining our approach to achieve better outcomes. For projects in the pre-delivery and delivery phases, Sydney Metro has dedicated place managers. These community relations specialists provide a vital link between the project and the community, and are available to answer questions and receive feedback and/or complaints during delivery of the project.

Digital solutions to COVID-19 restrictions, 2020–21

While traditional face-to-face consultation will always be a key pillar of the Sydney Metro approach, the challenges faced through the COVID-19 pandemic have shaped how

the team will plan and undertake consultation moving forward, to ensure planning information is as easy to access as possible. An enhanced digital approach, using interactive portals and virtual information rooms, was launched by Sydney Metro West in early 2020 to support consultation under restrictions posed by the pandemic. This approach has been progressed during 2020–21 to support planning activities.

In June 2021, Sydney Metro West launched Sydney Metro Connect – a mobile phone app to help keep our communities informed of construction work. Sydney Metro Connect can be downloaded onto smart devices and helps community members to stay informed about current work and project milestones on Sydney Metro West. The app provides notifications for upcoming work by area, access to information in more than 100 languages and news and personalised updates all in one place, which supports the community to easily engage with the project.

The Sydney Metro–Western Sydney Airport Environmental Impact Statement was on display from 21 October 2020–2 December 2020. The community was given the opportunity to provide feedback and submissions on the project, using the Sydney Metro–Western Sydney Airport interactive portal. More than 29,000 community members logged into the interactive portal to learn more about the project.

Similarly, the new Sydney International Speedway Environmental Impact Statement public exhibition included a dedicated virtual information room which featured a project map, 360-degree views of the proposed speedway, entrance, carparks and pit areas as well as the site layout, a video from a project expert and the Environmental Impact Statement documents.

Webinars and virtual community information sessions were undertaken to enable COVID-19-safe community engagement on the Sydney Metro City & Southwest Blues Point tunnel access modification, and the Bankstown Station modification.

Hybrid consultation with the community, 2021–2022

The Sydney Metro City & Southwest project team facilitated several virtual and in-person consultation activities and community events over the past 12 months.

A virtual consultation was held in October 2021 to present the Blues Point community with the design proposal for the restored Henry Lawson Reserve.

A community Open Day was held at Crows Nest Station in March 2022 and business forums were held on site at Victoria Cross Station (December 2021) and Martin Place Station (March 2022).

The Sydney Metro City & Southwest project team and its delivery partners also provided in-person drop-in sessions to the community for the public exhibition of the State Significant Development Application of the site C over station development at Crows Nest.



Sydney Metro West interactive portal.

9.5 Promoting social outcomes and community benefits

Sydney Metro seeks to benefit the local community both during and beyond the construction phase of our projects, via internal initiatives and through our delivery partners.

In June 2021 and 2022, Sydney Metro City & Southwest, Sydney Metro West and Sydney Metro–Western Sydney Airport Project Directors participated in ‘Vinnies CEO Sleepout’ at White Bay terminal. This entails sleeping out on one of the longest and coldest nights of the year to support the many Australians who are experiencing homelessness and people at risk of homelessness. The sleepout was preceded by a series of awareness and fundraising activities across Sydney Metro, raising over \$20,000 in 2021 and \$33,000 in 2022 for this important cause.

All three Sydney Metro Project Directors, raising money for the ‘Vinnies CEO Sleepout’ in 2022.

Left-to-right: (Daniel Powrie, Project Director, Sydney Metro West; Angela Jeffery, Project Director, Sydney Metro–Western Sydney Airport; and Hugh Lawson, Project Director Sydney Metro City & Southwest project).



Case study

Support to Bear Cottage



Wheelchair accessible pathway for Bear Cottage residents.

Bear Cottage provides support, respite and end-of-life care for children with life-limiting conditions and their families and is an initiative of the Children’s Hospitals at Westmead.

The John Holland CPB Ghella Joint Venture delivering the Sydney Metro City & Southwest project’s Tunnel and Station Excavation works has provided support in fundraising and work-in-kind valued at \$1,115,000 to Bear Cottage through a variety of activities during the reporting period. These include:

- a Gala Dinner in the newly constructed 230-metre underground cavern
- helping to build a wheelchair accessible pathway to the beach for residents and their families to enjoy
- on-site return and earn scheme and contributions from sales at vending machines, raffles, head shaves, trivia night
- management donning superhero costumes during Bear Cottage Superhero week
- naming one of their tunnel boring machines ‘Wendy’ (after a volunteer) in acknowledgment of all Bear Cottage volunteers.

The scale and duration of our construction projects presents an opportunity to form meaningful relationships with communities and organisations working within them. Recognising this, Sydney Metro sets expectations on delivery partners, to give back to the local and broader community. This has led to a strong response from companies, groups and individuals, leveraging their skills and resources as appropriate, despite the challenges raised by COVID-19 and associated restrictions this reporting period.

Initiatives implemented by our delivery partners during the reporting period include:

- financial contribution towards the establishment of a new women and children’s shelter in the Canterbury-Bankstown Council area
- rejuvenation of community gardens in Lakemba
- raising \$18,897 in 2020 and \$27,606 in 2021 to support the work of the Wayside Chapel through the Long Walk Home Challenge
- extracting 140 kilograms of plastic from the Cooks River during a ‘Paddle Against Plastic’ event
- International Women’s Day Donation to Muslim Women’s Australia of essential household goods and vouchers
- engaging social enterprises which support disadvantaged people and communities, including CitizenBlue, Plastic Police, Mates on the Move and The Freedom Hub
- holding a fundraiser gala event for Bear Cottage
- upgrades to various men’s, women’s and youth shelters including painting, gardens and setting up a music room
- running food and clothing drives for various charities
- clearing litter in neighbourhoods around project sites as part of World Clean-up Day
- continuing Return and Earn bottle schemes across various Sydney Metro construction sites, with proceeds going to charity
- organising blood donation drives
- using ‘Who gives a crap’ toilet paper at many site offices – 50 per cent of profits fund clean water and toilets in areas of need.



Top: Taldumande Youth Services crisis accommodation receiving a fresh coat of paint.

Bottom: A canoe clean-up of the Cooks River in May 2022 that yielded 140 kilograms of plastic and other waste.



Lakemba Community Garden after the rejuvenation and addition of five new planting beds.

10 Respect the environment

Aim: Minimise impacts and take opportunities to provide environmental improvements.



10.1 Our approach to environmental management

To ensure we optimise environmental outcomes, Sydney Metro takes a life cycle approach to managing our environmental impacts, influencing our projects from early development through to construction and operation.

This ongoing commitment is evident through our sustainability principles, environmental management system and construction frameworks, which all aim to minimise impacts to the environment and surrounding communities.

Sydney Metro achieved certification of our environmental management system to the International Standard for Environmental Management Systems (EMS) ISO 14001:2016 in July 2020. This EMS will be maintained and recertified on a 3-year cycle.

Sydney Metro underwent an annual EMS surveillance audit in May 2022 and is pleased to report the audit was a success, with only one area for improvement identified, namely the development of an internal audit program. Actions are already underway to address this matter in preparation for a recertification audit scheduled for 2023.

In 2020, Sydney Metro developed a new tailored online system for managing and monitoring environmental compliance tasks across the organisation. It enables the team to manage all of these activities, including capturing all incidents, site inspection issues, non-compliances and planning approval compliance as well as keeping an archive of data. This online system has also provided opportunity to improve reporting and access for construction contractors and client-side contractors anywhere and on any mobile device.



Kellyville Station.

10.2 Project environmental performance

Sydney Metro is committed to best-practice environmental management. Key environmental management outcomes over the reporting period are summarised below.

Environmental requirements

As of June 2022, the total number of planning approval conditions and mitigation measures being managed across Sydney Metro projects was 2024. This is considerably higher than the 1636 planning approval requirements reported in June 2021. This demonstrates the substantial increase in environmental compliance activities across the 2021–22 financial year, as construction under the Sydney Metro West and Sydney Metro – Western Sydney Airport project planning approvals and associated stages ramped up.

Environmental incidents

- 97 environmental incidents were reported during the 2020–21 financial year. All environmental incidents were classified as Class 3 (the lowest level) as they caused no material harm to the environment as defined by the *Protection of the Environment Operations Act 1997* (NSW).

- A total of 155 environmental incidents were reported during the 2021–22 financial year. Of the 155 environmental incidents, there were:
 - zero (0) Class 1 incidents
 - two (2) Class 2 incidents. Immediate actions were taken to adequately address each incident
 - 152 Class 3 incidents, which caused no material harm to the environment.

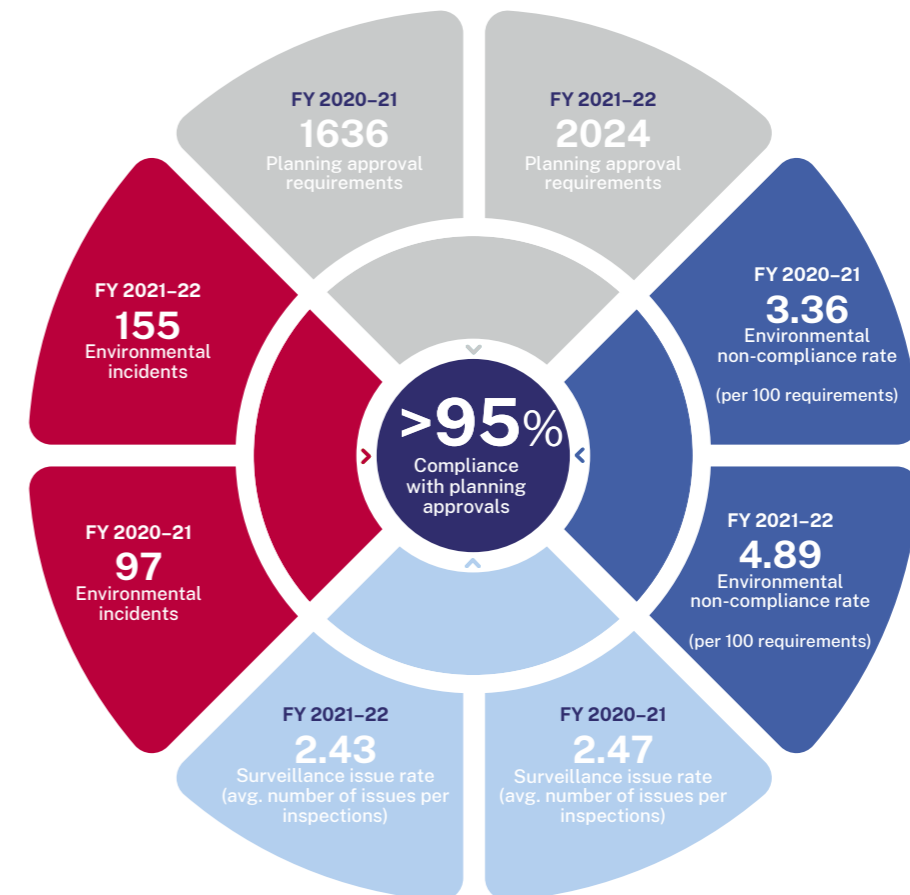
Non-compliances

A total of 55 non-compliances (3.36 per 100 requirements) were reported during the 2020–21 financial year and 99 non-compliances (4.89 per 100 requirements) during the 2021–22 financial year, collectively resulting in over 95 per cent compliance with planning approvals.

Environmental compliance

Sydney Metro monitors and reports on all incidents and non-compliances across the program, ensuring investigations are completed and corrective actions are taken as required to eliminate the cause of the environmental incident or non-compliance and prevent its recurrence.

Figure 13: Environmental compliance rate, 2020–21 and 2021–22 financial years



10.3 Minimising our construction impacts to the community

One way in which Sydney Metro aims to minimise our impacts is through adapting noise and vibration mitigation measures to suit local conditions. This has been particularly important during the 2020–22 reporting period, with restrictions in place due to COVID-19 affecting noise and vibration impacts and the availability or suitability of options for mitigation measures. Sydney Metro worked with the Independent Acoustic Advisors, the Department of Planning and Environment, contractors and the Independent Environmental Representatives to implement appropriate responses to manage these impacts during the COVID-19 restrictions and fulfil the requirements of the Conditions of Approval.

With large numbers of people working from home, residential receivers were likely to be more sensitive to daytime construction noise and vibration. Traditional respite offers such as movie or dinner vouchers or alternative accommodation offers were not suitable at this time, so shopping vouchers were offered instead to impacted residents. Mitigation measures that were implemented to reduce noise on site impacting on nearby residents and businesses include the use of battery-powered lighting for night works, rather than motorised diesel-powered lighting towers.

Extensive community consultation occurred across the projects. This included completing multiple door-knocks when possible, notifications, weekly emails, Metro Connect app updates, resident information packs and personalised telephone calls to ensure that where possible, Sydney Metro was speaking with and informing the community of what they could expect from our work.

Following weekend works on the Bankstown Line, feedback from the community was reviewed and relevant outcomes were then taken into consideration for follow-on works to further minimise potential impacts to the community, such as the re-scheduling of noisy works away from specific sensitive times.

In order to address cumulative impacts from adjacent construction projects, stronger communication lines between different projects were established, for example for works near the Rozelle Interchange. This included the use of acoustic modelling software that enabled collation of multiple projects' noise impacts and adjusting works as required.

In addition to the risks, the COVID-19 situation presented some opportunities. For example, workplaces were expanded, and more hours made available for noisier works at Central Station, when patron numbers were low. Similarly certain road works were undertaken during the day-time hours rather than at night due to reduced public vehicle numbers. Some works took place under State Government Orders made, allowing some construction activities to be extended into Saturday afternoons, Sundays and Public Holidays.

Equine behaviour study

Equine behavioural scientists were engaged to monitor, using high quality cameras and computer algorithms, the impacts of construction noise generated at Clyde on racehorses stabled at the adjoining Rosehill Gardens Racecourse. This process provided Sydney Metro with greater insight regarding the impacts of construction noise on equine behaviour and in turn will be used to inform best practice for the management of noise and vibration impacts associated with its works.



Work to upgrade and convert the tracks and platforms to Sydney Metro standards on the Bankstown Line (Canterbury Station).

10.4 Enhancing the environment

Seed collection

The Sydney Metro–Western Sydney Airport project is undertaking a seed collection program to preserve native and endemic vegetation species, particularly the critically endangered Cumberland Plain Woodland ecological community which is impacted by the project. The seed collected from the project area will be used to restore and enhance biodiversity throughout the corridor once construction is complete, creating a legacy for the new Western Parkland City.

Sydney Metro engaged Muru Mittigar, a Supply Nation registered organisation based in Western Sydney, to carry out the seed collection works. Muru Mittigar is a social enterprise that provides employment opportunities and financial counselling for Indigenous Australians, whilst fostering a better understanding of Aboriginal culture in the wider community.



Top: Muru Mittigar collecting seeds for propagation.

Bottom: Andrew Brophy, Associate Director Design, Project Delivery, on the tools at Hills Showground Station.

Urban planting trial to increase biodiversity

In a collaboration between Sydney Metro, the University of Melbourne and the design firm Hassell, over 100 varieties of largely native groundcover vegetation were planted in the Hills Showground Station plaza. The plantings replaced a small range of plants with limited visual appeal and negligible biodiversity value. The new mixes have been designed to achieve a biodiverse, densely planted, beautiful ground-level landscape and provide habitat and nourishment to pollinators while naturally repressing weed growth. The introduction of a low-nutrient, free-draining growing medium that favours native plants over exotic plants and weeds is a critical component of the trial. The progress of the planting will be closely monitored to determine the most successful plants and plant mixes over time, with the intention that the results will inform the design of other public landscapes across Sydney.

Greening Sydney

As the spine of the Western Parkland City, the Sydney Metro–Western Sydney Airport project presents an opportunity to enhance the environmental condition of the corridor and contribute to the blue and green grid of the city. This includes contributing to the Premier's Priority of 40 per cent tree canopy cover target and the Greater Sydney Commission's efforts to reduce urban heat island effect. To achieve this, the project will incorporate native and endemic vegetation, rejuvenate the landscape and re-establish riparian ecosystems, and use water-sensitive urban design to ensure water is held in the landscape.

In addition, 254 trees were planted in this reporting period in the Willoughby Council local government area as part of Sydney Metro's tree replacement program which ensures that every tree that is removed as part of the construction of the project is replaced in accordance with the relevant planning approval conditions. Sydney Metro is working closely with other local councils to ensure selected trees are suited to the character and environmental conditions of the area and are maintained for the long term.

11 Future activities

While many of the initiatives outlined in this report will continue, going forward new key areas of focus will evolve. These will include:

- Publishing the Sydney Metro West Sustainability Plan, which will identify sustainability initiatives and targets benchmarked against past Sydney Metro projects and international best practice on similar infrastructure projects.
- Developing a net-zero emission pathway for Sydney Metro construction and operations, in line with broader government commitments.
- Finalising our climate change risk assessment procedure.
- Exploring further collaboration opportunities with internal and external stakeholders to advance our climate change response.
- Starting work on developing a net-zero water pathway in an effort to further reduce our potable water consumption during construction and operation.
- Reviewing and improving the way we and our contractors assess and manage modern slavery risks and publishing our results in the next annual report.
- Developing a sustainability communication plan, to increase community awareness and engagement in sustainability initiatives and associated benefits on Sydney Metro projects.
- Developing Aboriginal Cultural Design principles and continuing to deliver the Connecting with Country framework on the Sydney Metro West and Sydney Metro – Western Sydney Airport projects.
- Developing guidance, tools and specifications to better support the integration of green infrastructure and water sensitive urban design into our projects, including delivering education around the value of biodiversity for our projects.
- Propagation of seeds collected along the Sydney Metro – Western Sydney Airport corridor and incorporation into landscaping upon conclusion of construction activities, with the aim of preserving and restoring native and endemic species, particularly the critically endangered Cumberland Plains Woodland ecological community.
- Ramping up of permanent built surface works and landscaping on the Sydney Metro City & Southwest project as per the Station Design and Precinct Plans, Interchange Access Plans and Heritage Interpretation Plans for each site. The first examples of final design becoming visible to the public are Sydenham Station Junction, Artarmon traction substation and parts of Central Station. Blues Point will be next as the site is handed back to the community in late 2022 with new heritage interpretation and sustainable landscaping.



An artist's impression of Parramatta metro station.



An artist's impression of Crows Nest metro station.

Appendices

Appendix A: Sustainability data

Data	Unit of measure	Sydney Metro City & Southwest project				Sydney Metro West				Sydney Metro – Western Sydney Airport			Sydney Metro North West line		Sydney Metro
		Target	2020–21 FY	2021–22 FY	Cumulative to date	Target	2020–21 FY	2021–22 FY	Cumulative to date	Target	2021–22 FY	Cumulative to date	Target	Total in completion	Cumulative to date
Project construction dataⁱ						Project construction dataⁱ									
Scope 1 construction carbon emissions	Tonnes CO ₂ -e		17,202	4,231	47,747		670	3,394	4,064		67	67		–	N/A
Scope 2 (location based) construction carbon emissions ⁱⁱ	Tonnes CO ₂ -e		10,359	12,527	83,701		8	238	245		22	22		–	N/A
Scope 2 (market based) construction carbon emissions ⁱⁱ	Tonnes CO ₂ -e		6,360	3,588	51,175		8	220	228		2	2		–	N/A
Scope 3 construction carbon emissions ⁱⁱⁱ	Tonnes CO ₂ -e		100,507	92,268	548,194		745	11,054	11,799		208	208		–	N/A
Total construction carbon emissions (using location based scope 2)	Tonnes CO₂-e		128,068	109,026	679,642		1,423	14,686	16,108		297	297		536,667	1,232,714
Renewable construction electricity (scope 2) or offsets ^{iv}	% of construction electricity offset for completed contracts	25%	25%	25%	25%	25%	N/A	N/A	N/A	25%	100%	100%	20%	20%	N/A
Total construction and demolition waste generated	Tonnes		65,778	53,204	227,835		1,943	56,990	58,933		80	80		134,924	421,773
Construction and demolition waste reused/ recycled	Tonnes		63,797	51,594	220,366		1,939	54,462	56,401		73	73		128,518	405,358
	% of total waste generated	90%	97%	97%	97%	95%	100%	96%	96%	95%	91%	91%	95%	97%	96%
Usable spoil generated	Tonnes		446,383	32,801	5,104,278		301,210	200,337	501,547		5,020	5,020		6,416,099	12,029,944
Usable soil beneficially reused	Tonnes reused		446,303	32,800	5,104,198		301,210	200,337	501,547		5,020	5,020		6,416,099	12,026,864
	% of usable spoil generated	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Total water consumption	kL		104,623	53,944	1,400,547		8,003	16,884	24,887		801	801		889,283	2,315,518
	kL		5,517	7,854	509,331		0	3,628	3,628		696	696		227,738	741,393
Water sourced from non-potable sources ^v	% of total water consumption	33%	5%	15%	36%	33%	0%	21%	15%	33%	87%	87%		26%	32%
Steel use	Tonnes		38,766	31,229	78,868		457	1,649	2,106		0	0		60,308	141,282
Concrete use	Cubic metres		200,046	167,128	683,375		397	12,353	12,750		13	13		613,592	1,309,730
Concrete use	% replaced using supplementary cementitious materials (SCM)	25%	41%	45%	38%	35%	17%	50%	47%	35%	0%	0%	25%	38%	38%
Major pollution incidents	No. of major pollution incidents	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ⁱNote that data is correct at time of publication. Some data (including spoil) has been refined following data reconciliation exercises and other updates have occurred since publication of the 2020–21 and 2021–22 Sydney Metro Annual Reports.

ⁱⁱScope 2 emissions associated with electricity use are presented using both the location-based electricity accounting method, which reflects the average emissions intensity of grids on which energy consumption occurs, and the market-based methods aligned with the Climate Active Electricity Accounting Rules and the Greenhouse Gas Protocol Scope 2 Guidance. Market-based calculated emissions reflect emissions from electricity that companies have purposefully chosen and capture the use of voluntary purchases of renewable energy such as GreenPower and Large-Scale Generation Certificates (LGCs). Dual reporting with both market-based and location-based methods is considered current best practice and has been provided for all current projects in construction. Scope 2 emissions data for the Metro North West Line is only reported using the location-based method. This was common practice at the time of construction and while market-based emissions data is not available, carbon emissions were partially mitigated using both GreenPower and LGCs.

ⁱⁱⁱFrom an organisational perspective for Sydney Metro as defined by the GHG Protocol, all of the emissions associated with the construction of projects which are undertaken by third-party contractors would generally be seen as Scope 3 emissions. It is common practice, however, for the definition of emissions scopes for an individual project to be defined with a view of the proponent and its contractors as equivalent to a single organisation to better distinguish between emissions sources and the relative level of influence and control. This approach has been adopted when referring to Scope 1, 2 and 3 sources herein.

^{iv}Offsets are only purchased and retired if projects are not powered by renewable electricity to the extent required by the target.

^vNo metered rainwater tanks were installed in the Sydney Metro West project but an estimated 384 kilolitres of excess site water was captured and reused onsite using opportunistic temporary water collection systems.

Operational data

Data	Unit of measure	Metro North West Line				Sydney Metro
		Target	2020–21 FY	2021–22 FY	Cumulative to date	Cumulative to date
Operational electricity consumption	kWh		84,617,734	75,909,105	259,284,626	259,284,626
Operational zero emission electricity	kWh		84,617,734	75,909,105	259,284,626	259,284,626
	% of total operational electricity consumption	100%	100%	100%	100%	100%
Carbon emissions savings ^{vi}	Tonnes CO ₂ -e		72,759	60,324	221,169	221,169

^{vi}These figures are inclusive of Scope 2 and Scope 3 emissions.







Appendix B: Sustainability targets

Sydney Metro City & Southwest project







Demonstrate leadership		Tackle climate change		Manage resources efficiently		Drive supply chain best practice		Value community and customers		Respect the environment	
Target performance						Target performance					
Exceeding		Exceeding		Exceeding		On track		On track		On track	
<ul style="list-style-type: none"> A high level of attainment (minimum ISCA IS Rating of 65 'Excellent') for relevant infrastructure. 5 Star Green Star ratings for relevant buildings. 		<ul style="list-style-type: none"> Offset 25 per cent of the electricity needs for the construction phase of the project. Mitigate a minimum of 25 per cent of medium level risks. 		<ul style="list-style-type: none"> Use concrete which has an average Portland cement replacement level of more than 25 per cent. Recycle or reuse 90 per cent of recyclable construction and demolition waste. 		<ul style="list-style-type: none"> All principal contractors develop and implement sustainable procurement strategies. Increase opportunities for employment of local people, participation of local businesses and participation of SMEs. 		<ul style="list-style-type: none"> Prepare a Heritage Strategy, including stakeholder engagement with relevant stakeholders. Implement the Heritage Strategy during design and delivery, to conserve and activate. 		<ul style="list-style-type: none"> Minimise vegetation clearing. Native landscaping targets to be established. Zero major pollution incidents. 	
On track		On track		On track		On track		On track		At risk	
<ul style="list-style-type: none"> Align with a high rating using the TfNSW Sustainable Design Guidelines. Consider adopting a whole-of-life costing model to maximise sustainability benefits. Optimise development opportunities for residual land. Capture sustainability benefits in the business case for the projects. 		<ul style="list-style-type: none"> Achieve at least a 20 per cent reduction in carbon emissions associated with construction, when compared to business as usual.ⁱ Maximise the capture and reuse of energy generated from braking trains. Design buildings (stations and stabling buildings) to achieve at least a 15 per cent improvement over performance requirements set out in Section J of the National Construction Code. Mitigate all extreme and high-level risks. 		<ul style="list-style-type: none"> Reduce the environmental footprint of materials used on the project by at least 15 per cent compared to business as usual.ⁱ 100 per cent beneficial reuse of usable spoil. Recycle or reuse 60 per cent of office waste during the construction phase. 60 per cent of reinforcing steel is produced using energy-reducing processes in its manufacture. Source 100 per cent reused, recycled timber or responsibly sourced timber.ⁱⁱ Reduce water use by at least 10 per cent compared to business as usual.ⁱ Source at least 33 per cent of the water used in construction from non-potable sources. Implement rainwater harvesting and reuse systems at construction sites and feasible above ground stations. Source at least 33 per cent of the water used in operations from non-potable sources. 		<ul style="list-style-type: none"> Enable targeted and transferable skills development which resolves local and national skills shortages, supports industry to compete in home and global markets, end embeds a health and safety culture within all induction and training activities, promoting continuous improvement. Increase workforce diversity and inclusion: <ul style="list-style-type: none"> Target Aboriginal workers and businesses. Target female representation in non-traditional trades. Target long-term unemployed. Inspire future talent and develop capacity in the sector: <ul style="list-style-type: none"> Engage young people via education and work experience. Collaborate with higher education institutions to provide programs responding to rapid transit and other infrastructure requirements. Support vocational career development through apprenticeships and traineeships. 		<ul style="list-style-type: none"> Maximise opportunities for archaeological research and future interpretation of archaeological finds. Opportunities for heritage interpretation identified and implemented at appropriate station precincts. Station interchanges designed in accordance with the Interchange Access Plans and modal hierarchy. Stations and precincts designed in accordance with the Sydney Metro Design Guidelines. Promote access by cycling, through provision of bicycle parking, and safeguard for future expansion of bicycle facilities. Implement initiatives which will provide tangible benefits to local community groups during the construction period. Implement initiatives which will provide tangible benefits to the broader local community beyond the construction period. Identify key drivers for affordable housing and work with other lead agencies to identify opportunities and develop an appropriate response. 		<ul style="list-style-type: none"> New emission standards will be identified and applied to diesel equipment and vehicles during construction. 	
N/A Operational commitments		N/A Operational commitments		N/A Operational commitments		N/A Operational commitments		N/A Operational commitments		N/A Operational commitments	
<ul style="list-style-type: none"> Offset 100 per cent of the electricity needs for the operational phase of the project. Achieve at least a 20 per cent reduction in carbon emissions associated with operations, when compared to business as usual.ⁱ 		<ul style="list-style-type: none"> Recycle or reuse 80 per cent of the waste generated during operations. Recycle or reuse 65 per cent of office waste during operations. 									

ⁱ Note: 'Business as usual' (BAU) is defined as that which is used in the applicable rating scheme for the respective target (for example, IS Ratings, Green Star Ratings and TfNSW CERT).

ⁱⁱ 2020 report reported one non-compliance in relation to timber, with one contractor being unable to confirm compliance for a small quantity of timber used on site. The timber was from an Australian sustainably managed forest; however the chain of custody was incomplete. This accounts for <1% of total timber used to date.

 Demonstrate leadership	 Tackle climate change	 Manage resources efficiently	 Drive supply chain best practice	 Value community and customers	 Respect the environment
Target performance			Target performance		
On track	Exceeding	On track	On track	On track	On track
<ul style="list-style-type: none"> Publish performance benchmarks. Publicly report on performance against targets. Deliver sustainability-related knowledge sharing sessions on a quarterly basis. Obtain an Infrastructure Sustainability v1.2 'Leading' Design & As-Built rating for relevant infrastructure or equivalent. Engage and collaborate with stakeholders on sustainability-related matters on a bi-annual basis. Obtain at least a 5 Star Green Star rating for stations and relevant buildings or equivalent. Deliver at least five industry-recognised innovations. 	<ul style="list-style-type: none"> Offset at least 25 per cent of the greenhouse gas emissions associated with consumption of fuel and electricity during construction, through the purchase of approved offsets or renewable energy. <p>On track</p> <ul style="list-style-type: none"> Identify and implement adaptation measures to reduce 100 per cent of all very high and high climate risks (to at least a medium) Identify and implement adaptation measures to reduce all medium climate risks to as low as reasonably practicable, with at least 50 per cent reduced to low. Capture data on the impacts of, and response to climate-related events on customers, staff, service and infrastructure. 	<ul style="list-style-type: none"> Reduce potable water use by at least 10 per cent compared to business as usual and monitor consumption throughout construction and operations. Demonstrate a minimum 33 per cent of water used in construction is from non-potable sources and maximise non-potable water use in operations. Reuse at least 80 per cent of concrete production operation water in concrete production at on-site and off-site batching plants. Reuse at least 85 per cent of 'train wash' water at the stabling facility. Beneficially reuse 100 per cent of reusable spoil, in accordance with the spoil management hierarchy. 	<ul style="list-style-type: none"> All reported instances of actual or potential environmental or social risk in the supply chain will be investigated. Support the delivery of the Sydney Metro West Workforce Development and Industry Participation Plan, and Sydney Metro West Aboriginal Participation Plan. Provide sustainability training to high-impact suppliers (those that potentially have significant environmental, social or socioeconomic impacts). Enable targeted and transferable skills development which resolves local and national skills shortages, supports industry to compete in home and global markets, end embeds a health and safety culture within all induction and training activities, promoting continuous improvement. 	<ul style="list-style-type: none"> Each station to include Heritage Interpretation. Develop a line-wide Heritage Interpretation Strategy. Prepare archival recording of all heritage items within our construction sites. Report on customer-centric design at the completion of each design phase for stations. Each station to include safe and, where possible, weather-protected access to bicycle parking and safeguard for future expansion. Deliver at least 100 initiatives that benefit local communities and provide positive social outcomes during the project's construction phase. 	<ul style="list-style-type: none"> Restore and regenerate the ecological function of Duck and A'Becketts Creeks within the project boundary. Plant two trees for every tree removed by the project. Provide a net increase in canopy cover. Ensure environmental management plans are established, and demonstrate that works are in compliance with the plans. Target zero major pollution incidents.
N/A Operational commitments				N/A Operational commitments	
<ul style="list-style-type: none"> Obtain an Infrastructure Sustainability Operations rating or equivalent. 	<ul style="list-style-type: none"> Achieve at least 20 per cent improvement on the minimum performance requirements stipulated in the National Construction Code (NCC) for stations and relevant buildings. Achieve at least a 20 per cent reduction in carbon emissions across the infrastructure lifecycle, when compared to business as usual. Source at least 10 per cent of the low voltage electricity required from on-site renewable energy sources. <p>N/A Operational commitments</p> <ul style="list-style-type: none"> Report on operational electricity consumption. Offset 100 per cent of the greenhouse gas emissions associated with consumption of electricity during operation. 	<ul style="list-style-type: none"> Recycle or beneficially reuse at least 95 per cent of construction and demolition waste. Recycle or beneficially reuse at least 60 per cent of office waste. Recycle or beneficially reuse at least 40 per cent of customer waste. Minimise the embodied impacts of concrete through the use of at least 35 per cent supplementary cementitious materials project wide and prioritise the use of alternate binder systems on non-structural elements. Prioritise products made from recycled content with a minimum of six products used in the construction phase. <p>N/A Operational commitments</p> <ul style="list-style-type: none"> Recycle or beneficially reuse at least 80 per cent of operational maintenance waste. 	<ul style="list-style-type: none"> Require environmental product declarations for trains. Engage at least 100 social enterprises or social benefit organisations during construction and operations. 	<ul style="list-style-type: none"> Deliver at least 50 initiatives that continue to benefit local communities and provide positive social outcomes beyond the project's construction phase. <p>N/A Operational commitments</p> <ul style="list-style-type: none"> Use Opal data to monitor metro usage associated with activation approaches. 	

Note: 'Business as usual' (BAU) is defined as that which is used in the applicable rating scheme for the respective target (for example, ISCA Ratings, Green Star Ratings and TfNSW CERT).

 Demonstrate leadership	 Tackle climate change	 Manage resources efficiently	 Drive supply chain best practice	 Value community and customers	 Respect the environment
Target performance					
On track	Exceeding	On track	On track	On track	On track
<ul style="list-style-type: none"> • Publish performance benchmarks. • Publicly report on performance against targets. • Obtain an Infrastructure Sustainability rating for relevant infrastructure; ‘Leading’ for design and as-built, ‘Excellent’ for operations. • Obtain at least a 5 Star Green Star rating for relevant buildings and precincts. • Deliver at least five industry recognised innovations. • Facilitate sustainability-related knowledge share sessions within the project on a quarterly basis. • Engage and collaborate with stakeholders (other local projects, councils, industry bodies) on sustainability-related matters on a bi-annual basis. 	<ul style="list-style-type: none"> • Offset at least 25 per cent of the carbon emissions associated with consumption of fuel and electricity during construction through the purchase of approved offsets or renewable energy. <p>On track</p> <ul style="list-style-type: none"> • Identify and implement adaptation measures to reduce 100 per cent of all very high and high climate risks (to at least a medium). • Identify and implement adaptation measures to reduce all medium climate risks as low as reasonably practicable, with at least 50 per cent reduced to low. • Capture data on the impacts of, and response to climate-related events on customers, staff, service and infrastructure to enable continuous improvement. • Report on operational electricity consumption. • Achieve at least 20 per cent improvement on the minimum performance requirements stipulated in the National Construction Code (NCC) for stations and relevant buildings. • Achieve third party net-zero carbon emissions certification. • Achieve at least a 20 per cent reduction in carbon emissions across the infrastructure life cycle, when compared to business as usual. • Source at least 10 per cent of the low voltage electricity required at stations and the stabling facility from on-site renewable energy sources. • Target minimum 20 per cent of parking spots safeguarded for electric vehicle (EV) charging points and provision for electric bus charging in suitable locations. • Report on carbon emissions from construction and operations. <p>N/A Operational commitments</p> <ul style="list-style-type: none"> • Offset 100 per cent of the carbon emissions associated with consumption of electricity during operation. 	<ul style="list-style-type: none"> • Reduce potable water use by at least 10 per cent compared to business-as-usual, and monitor consumption throughout construction and operations. • Demonstrate at least 33 per cent of water used is from non-potable sources throughout construction and operations. • Reuse at least 80 per cent of concrete production operation water in concrete production at on-site and off-site batching plants. • Reuse at least 80 per cent of train wash water at the stabling. • Beneficially reuse 100 per cent of reusable spoil, in accordance with the Spoil Management Hierarchy. • Recycle or beneficially reuse at least 60 per cent of office waste. • Recycle or beneficially reuse at least 40 per cent of customer waste. • Recycle or beneficially reuse at least 80 per cent of maintenance waste. • Minimise the embodied impacts of concrete through the use of at least 35 per cent supplementary cementitious materials project-wide and prioritise the use of alternate binder systems on non-structural elements. • Prioritise products made from recycled content, with a minimum of six products used in the construction phase. • Minimise the embodied impacts of steel through the use of at least 50 per cent Australian steel, including concrete reinforcing and structural steel. • Source 100 per cent of all timber products from either reused timber, post-consumer recycled timber, Forest Stewardship Council or Programme for the Endorsement of Forest Certification certified sources. <p>At risk</p> <ul style="list-style-type: none"> • Recycle or beneficially reuse at least 95 per cent of construction and demolition waste. 	<ul style="list-style-type: none"> • Provide sustainability training to all high impact suppliers (those that potentially have significant environmental, social or socio-economic impacts). • All reported instances of actual or potential environmental or social risk in the supply chain will be investigated. • Require environmental product declarations for trains. • Engage at least 15 social enterprises or social benefit organisations during construction and operations. 	<ul style="list-style-type: none"> • Each station to include heritage interpretation. • Engage with Aboriginal knowledge holders to develop corridor landscaping approach. • Target 75 per cent of the project surface area (excluding track) to comprise elements which reduce the Urban Heat Island effect, including vegetation and permeable or lighter coloured surfaces. • Each station to include safe and, where possible, weather protected access to bicycle parking and safeguard for future expansion. • Deliver at least 20 initiatives that benefit local communities and provide positive social outcomes during the project's construction phase. • Deliver at least 20 initiatives that continue to benefit local communities and provide positive social outcomes beyond the project's construction phase. • Ensure delivery of at least 5 per cent affordable housing at precincts with residential development. <p>N/A Operational commitments</p> <ul style="list-style-type: none"> • Report on customer centric design at the completion of each design phase for stations, validating that the design meets customer needs, delivers an easy travel experience and addresses each of the nine Transport for NSW satisfaction drivers: timeliness, comfort, ticketing, convenience, accessibility, cleanliness, safety & security, information and customer service. • Use Opal data to monitor metro usage associated with precinct activation approaches. 	<ul style="list-style-type: none"> • Demonstrate a minimum 5 per cent improvement in ecological value in the corridor area. • Target at least 25 per cent tree canopy cover in precinct areas, and aspire to 40 per cent canopy cover across the project area.ⁱⁱⁱ • At least 50 per cent of station and plaza landscaping to use Australian native species.ⁱⁱⁱ • At least 90 per cent and aspiring to 100 per cent of corridor landscaping to use Australian native species, prioritising endemic plants to preserve Cumberland Plains identity in the Western Sydney region.ⁱⁱⁱ • Integrate water sensitive urban design solutions, including the provision of vegetated swales where feasible and at least 40 per cent surface area around stations and corridor (excluding track) to be permeable. • Ensure environmental management plans are established, and demonstrate works compliant with these plans. • Target zero major pollution incidents.

ⁱⁱⁱ Note: Landscaping must comply with Western Sydney International Airport wildlife hazard and landscaping requirements where relevant.

Appendix C: Climate Disclosure Statement

Sydney Metro's response to the recommendations of the Task Force for Climate-Related Financial Disclosure (TCFD) is shown below and should be read in conjunction with other sections of this report.

TCFD recommended Financial Disclosures	Sydney Metro response
Governance <ul style="list-style-type: none"> Describe the board's oversight of climate-related risks and opportunities. Describe management's role in assessing and managing climate-related risks and opportunities. 	<p>Sydney Metro's approach to sustainability is governed by the Sydney Metro Environment and Sustainability Statement of Commitment, which outlines our commitment to climate resilience, carbon and energy management, including offsetting 100 per cent of our operational electricity.</p> <p>Climate change risks and opportunities are incorporated into our Enterprise Risk Management register. The register is reviewed at least every six months and key risks presented to the Board.</p> <p>The Sydney Metro Sustainability team has oversight of project-wide climate change risk assessments and mitigation actions. Progress and issues are escalated to the Director Environment, Sustainability and Planning as required. During the 2021–22 financial year, we have collaborated with the Risk Directorate and presented progress to the Deputy CEO to strengthen governance and visibility of our climate change strategy.</p> <p>Climate change assessments and mitigations are integrated into project delivery via contractual arrangements with delivery partners. These include broad requirements to adopt, develop and address risks in pre-developed climate change risk registers as well as specific requirements to integrate future climate tolerances into design specifications. Operational climate change risks are managed by the Operator in conjunction with Sydney Metro.</p>
Strategy <ul style="list-style-type: none"> Describe the climate-related risks and opportunities the organisation has identified over the short, medium and long term. Describe the impact of climate-related risks and opportunities on the organisation's businesses, strategy and financial planning. Describe the resilience of the organisation's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario. 	<p>Acknowledging the long design life of our assets, and commitment to delivering reliable transport services, we have embedded resilience into project design and delivery. Sydney Metro climate change assessments have adopted a precautionary 'worst case' scenario (Representative Concentration Pathway (RCP) 8.5) which represents warming of close to 4°C by the end of the century. Identified risks include increased temperatures, flooding, and extreme weather events which will become more severe across the lifespan of our assets. Potential impacts to Sydney Metro include a reduction in staff and passenger safety leading to accidents or health impacts; passenger discomfort leading to reduced customer satisfaction and patronage; infrastructure failure leading to service disruptions and increased maintenance costs. Financial exposure includes a loss of revenue from delayed or cancelled services, reduced patronage and increased maintenance and rectification costs.</p> <p>In 2022 the Sydney Metro sustainability team undertook a PESTLE (Political, Economic, Social, Technological, Legal and Environmental) workshop to consider Sydney Metro's climate change strategy in the context of transition to a low carbon economy. Two climate change scenarios were considered; a rapid and orderly transition to decarbonisation, leading to a 2°C or lower temperature increase; and a delayed and disorderly transition with little early investment or collaboration between sectors. Risks, opportunities and associated actions have been incorporated into the Enterprise Risk Management register.</p>

TCFD recommended Financial Disclosures	Sydney Metro response
Risk management <ul style="list-style-type: none"> Describe the organisation's processes for identifying and assessing climate-related risks. Describe the organisation's processes for managing climate-related risks. Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organisation's overall risk management. 	<p>Climate change risks assessments are carried out in accordance with the Transport for NSW Climate Risk Assessment Guidelines, AS 5334:2013 Climate change adaptation for settlements and infrastructure – A risk based approach (AS 5334), and AS/NZS ISO 31000 – Risk management – Principles and guidelines.</p> <p>Climate change risks are identified at the outset (that is, at business case development) by cross-disciplinary panel and presented to the public for review and comment as part of the Environmental Impact Statement (EIS). Following approval of the EIS, the climate change risk register is managed as part of project delivery.</p> <p>Sydney Metro has incorporated design and operational mitigation measures to increase its resilience to climate change events – for example by:</p> <ul style="list-style-type: none"> requiring design and construction teams to regularly assess and respond to climate change risks for the lifecycle of the asset adopting conservatively high predictive flood levels for station entries, portals, underground access points, precincts, interchanges and critical equipment and infrastructure adopting the recommended per centage uplift in rainfall intensity in drainage design designing tunnel ventilation and air conditioning equipment with spare capacity for increasing ambient temperatures requiring critical equipment to continue to operate at high temperatures. <p>The repurposed train line from Sydenham to Bankstown is located in an area of existing vulnerability to flooding, and has been subject to numerous flood studies to inform mitigation and management of potential impacts to our assets and neighbouring properties.</p> <p>At the completion of construction, a final risk register is handed over to the operator. The final risk register will contain both risks mitigated in design, as well as those with mitigation measures to be managed by the operator itself.</p>
Metrics and targets <ul style="list-style-type: none"> Disclose the metrics used by the organisations to assess climate-related risks and opportunities in line with its strategy and risk management processes. Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks. Describe the targets used by the organisation to manage climate-related risks and opportunities and performance against targets. 	<p>Sydney Metro sustainability plans include the following metrics and targets. Performance against these targets is provided in this sustainability report.</p> <ul style="list-style-type: none"> 100 per cent of all 'extreme', 'very high' and 'high' climate change risks, and 25–100 per cent of 'medium' risks, are to be mitigated as part of the climate risk assessment process. 100 per cent of the electricity needs for the operational phase of the project to be offset (Sydney Metro has sourced 100 per cent of the operational electricity consumption requirements for the Metro North West Line operations from renewable energy via a power purchase agreement with the Beryl Solar Farm in regional NSW). New buildings (stations and stabling buildings) to be designed to achieve at least a 15–20 per cent improvement over performance requirements set out in Section J of the National Construction Code. Source 5–20 per cent of the low voltage electricity required at above ground stations on the Sydney Metro City & Southwest project from onsite renewable energy sources where feasible. Achieve at least a 20 per cent reduction in carbon emissions associated with construction, when compared to business as usual. Offset at least 25 per cent of the electricity needs for the construction phase of the project and (on the Sydney Metro West and Sydney Metro – Western Sydney Airport projects) at least 25 per cent greenhouse gas emissions associated with consumption of fuel. Achieve at least a 15 per cent reduction in carbon emissions associated with operations, when compared to business as usual on the Sydney Metro City & Southwest project, and at least a 20 per cent reduction across the infrastructure life cycle, when compared to business as usual on the Sydney Metro West and Sydney Metro – Western Sydney Airport projects. The Metro North West Line has completed two years of operation. Performance measures include the percentage of services delivered, and the percentage delivered within an agreed travel time. It is therefore in Sydney Metro's interest to ensure that the infrastructure it is constructing is resilient to the impacts of climate and climate change prior to handover, and in the operator's interest to ensure it is aware of its responsibilities regarding its climate and climate change resilience of the assets it operates. Sydney Metro has reviewed the climate extremes of the Metro North West Line's first year of operation and its response to these risks.

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