



**FUTURE
READY®**

Case Study

SYDNEY METRO

Project Overview

As Australia's biggest public transport project, Sydney Metro is a standalone railway that will deliver 31 metro stations and more than 66 kms of new metro rail. Aimed at revolutionising the way we travel, Sydney Metro means a new generation of world-class fast, safe and reliable trains easily connecting communities to the places they want to go.

Sydney Metro Northwest (formerly North West Rail Link), opened in May 2019. As the client's Technical Adviser, WSP played a key role in developing the engineering and architectural design and our Property and Buildings team was engaged separately to provide detailed documentation for the Operations, Trains and Systems (OTS) package as well as sustainability, acoustic and environmental requirements for the Surface and Viaduct Civil Works package.

Sydney Metro City & Southwest is due to open in 2024. WSP was a technical advisor on the project developing the reference design and contract documentation for the city changing project through the heart of the Sydney CBD.

Sydney Metro West will link greater Parramatta to the Sydney CBD. The locations of seven proposed metro stations have been confirmed at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock and The Bays. Further planning and design work is underway to determine the location of a new metro station in the Sydney CBD. WSP has provided Scoping and Definition Design to support final Business Case development of the project.

What Future Trends Did We Consider?

In future proofing design requirements for Sydney Metro we considered:

Climate	Society	Technology	Resources
More Extreme Weather	Health and Wellbeing	Ubiquitous Connectivity	Circular Economy
Hotter & Drier	Ageing Population	Automation	Renewables Reign
	Densification		

How Did We Consider These Trends?

Climate



Resilience as a key consideration was embedded into the design methodology from project inception through the completion of ongoing climate change risk assessments and application of the increased requirements throughout the design. Specifically, we analysed the drainage systems to assess risks and impacts related to increases in rainfall resulting from

climate change induced temperature increases. We also focused on providing building services equipment that perform better than industry standards.

Technology



A suite of digital technologies has been used in the design of the three Sydney Metro lines including 3D modelling, geospatial mapping and virtual and augmented reality station testing.

We used digital tools to verify and optimise the alignment and minimise impact on properties while maximising train speeds, we leverage GIS tools to display options and relevant spatial information, investigate hydrology impacts and produce aerial flyovers. With this knowledge, the client had confidence to investigate options and make strategic decisions in collaboration with key stakeholders.

In addition, through our operations modelling, we created a virtual railway of the completed metro to provide a detailed analysis of rail operations, exploring aspects such as journey times, timetable analysis and impacts of tunnel, ventilation and associated systems. On Metro West, we leveraged data analytics and developed a Customer Connectivity Tool for rapid testing and design of the railway alignment in terms of connectedness, supporting delivery of improved customer experience and community benefit.

Detailed pedestrian modelling was used to optimise the location of station elements including escalators, gate lines and walkway configurations. The design was tested against a 'resilience scenario' or 'stress test' that takes into account a theoretical 'maximum line' capacity.

Society



As part of our work with Sydney Metro, we applied a human centred design approach to ensure we've designed for the future needs of users and the community. Stations, interchanges, precincts and public domain elements have been designed to enhance experiential outcomes rather than focussing only on functional requirements.

Taking a more holistic understanding of the role that public transport plays in the foundation of communities, we designed the customer journey to be seamless and intuitive to drive a greater adoption of public transport. We did this by working with those with visual, mobility, hearing and cognitive impairments to ensure equitable, and easy to use, public infrastructure. The Customer Connectivity Tool used on Metro West enabled us to design to measure and validate future customer access to ensure future communities can access social, cultural and economic hubs (hospitals, universities and



employment) early in the process. Each station option was assessed against this criterion to give the client so that it can deliver the needs of customers at this stage of scoping design.

Over the course of the project approximately 160 station locations were assessed against this criterion.



Resources

On Sydney Metro City & Southwest we minimised carbon emissions associated with activities including: energy avoidance and reduction strategies; low carbon and energy efficiency practices and initiatives; low carbon transportation options and alternative sustainable fuels.

We also completed footprint assessments in accordance with the requirements in ISO 14064-1, ISO 14064-2 and ISO 14064-3 that incorporate direct and indirect emissions associated with electricity and fuel consumption, on-site process emissions and embodied emissions for all concrete and steel.

How Was the Approach Better?

By employing digital technology, a better understanding of the overall project was gained by all stakeholders. We went so far as learning what we don't already know about customers – their decision-making processes when travelling, their likes and dislikes about public transport and ways to make it easier for them to use, adopt and recommend.

The Outcomes

Our long-term involvement in the Sydney Metro project means that the project will enhance people's lives, through an intuitive and customer-led design approach that accounts for climate, society, technology and resources needs.

It has considered the growing travel demands of the future population and how to alleviate current congestion while recognising the application of placemaking, customer experience and reliability.

The Sydney Metro will boost economic activity and support jobs and business growth in the local community.

With design focused on innovation, social, technology and sustainability outcomes, WSP is helping Sydney Metro to deliver a world-class public transport interface which will help create a better future city for everyone.



Image courtesy of Sydney Metro

For More Information

Sam McWilliam
Rail Team Executive

+61 2 9272 5433
Sam.McWilliam@wsp.com

Find Us

WSP Australia Pty Limited
Level 27, 680 George Street
Sydney, NSW 2000

wsp.com