

A long-term approach to delivering rail in Aotearoa New Zealand

Aotearoa New Zealand is under pressure to deliver transport infrastructure that is sustainable and meets the needs of its growing population. So, how do we ensure we have the right skills to deliver these projects? Michael Than, Service Line Leader Rail Engineering Services, explores the implications of a national skill shortage, the shift in focus from roads to rail, thinking internationally but acting locally, and the need for a longer-term solution to building the capability to deliver Aotearoa New Zealand's rail infrastructure needs.

Since July 2020, the government has committed to spend \$2.6B on more than 150 infrastructure projects as part of the COVID-19 recovery plan. While this may sound like music to the ears of our engineering and construction sectors, the reality is that less than half of these projects have begun. The intended kick-start for the economy in the form of an infrastructure boom seems to have hit pause.

To address this lag, the government has committed to setting up an 'Implementation Unit' to monitor and support these investment decisions so that they see the light of day. But delivering on these complex infrastructure developments will require more than just good governance. It will require a strong workforce with the right skills and expertise.

One of the biggest challenges facing the construction industry today is a shortage of people with the skills required to deliver Aotearoa New Zealand's long-term transport infrastructure needs.

We must improve our capability so that we can meet the government's 10-year vision for rail investment. But for us to do this, we need a long-term commitment from the government, with projects locked-in and a secure pipeline of work no matter who the successive government is.



Work currently underway in the construction of Mt Eden Station, part of the CRL network.



The worsening road traffic congestion in our biggest city should make us re-think where we invest in public infrastructure.

Shifting our expertise from roads to rail

Shifting investment from roads to rail requires a shift in how we invest in and build our expertise. Right now, we're in a place of demand with very little supply.

While City Rail Link (CRL) has boosted the number of people in Aotearoa with rail experience, upskilling and supporting those with transferrable skills will be essential. But for this to work, we need to build a basic understanding of what rail is and what skills will be required in the future.

An engineer's role is constantly changing. Career paths are fluid, you don't have to be bound by sector, role or even industry. So, we have an opportunity to look at alternative ways to build the capability needed to deliver the major design and construction required to deliver rapid transit infrastructure in Aotearoa.

Changing the perception that apprenticeships are for those straight out of university would provide more opportunities for skilled people to develop within the rail sector through upskilling. We can do this by actively promoting training opportunities for those in already established careers.

On the job training such as cadetships or by pairing our graduates with senior members of the team and having them work across all aspects of a rail project could also see rail specialists develop faster.

Thinking internationally and acting locally

The success of billions of dollars of rail infrastructure the government has committed to delivering over the next 10 years is reliant on a long-term holistic approach to building local capability. It requires both an investment in infrastructure and people.

A traditional solution to a skills shortage is importing specialists from around the world to bridge the gap. But several challenges come with a heavy reliance on this method alone, and sourcing and developing homegrown talent should also be a priority.

Experts from WSP collaborated with the University of Auckland to establish a teaching and research programme dedicated to the rail industry.

The Covid-19 global pandemic has created additional challenges to bringing people across to Aotearoa. New Zealand's response to the pandemic has been to close our borders, and with that we've seen a significant drop in net migration.

But with this also comes opportunity.

The latest report from WSP and The Helen Clark Foundation, *Nau Mai: Welcome Home*, written by Holly Walker, WSP Fellow and Helen Clark Foundation Deputy Director, explores how we can understand and tap into the potential of our offshore diaspora, attract some of them home, and prepare our infrastructure for trends in a post-pandemic future. In fact, we've seen the biggest net gain of New Zealand citizens, the first net gain in two decades, and more kiwis are set to return home.

With millions of New Zealanders living around the world with valuable skills, experience and expertise to share, we have a huge opportunity to welcome them home. In doing so, we will gain much-needed knowledge from work on major rail projects such as the East London Line Extension, Sydney Metro City and Southwest, Doha Metro, Crosslink in London, and Melbourne Metro Tunnel.

Reform in education and training systems

To build a strong foundation of knowledge in rail, we need a vertically integrated approach driven by the rail industry and universities which fosters innovation, education, and research. Our tertiary educators need to be agile to change and adapt the curriculum to meet future needs.

This has been done successfully in Sweden, where a dedicated rail development programme focussed around research, innovation, and teaching provided students with a basic knowledge of how rail traffic systems and rail vehicles work and different parts of the rail system interact. Taking a similar approach to this would work well in Aotearoa.

In collaboration with the University of Auckland, rail experts from WSP are working to establish a teaching and research programme dedicated to the rail industry. Working with the School of Engineering, we've introduced the first couple of rail courses to 10 post-graduate students and plan to develop similar undergraduate programmes. The goal would be to see this expand into peer review and technical accreditations, where people within the rail industry take a one or two-day course to gain credits.

While there is seemingly no long-term workforce plan in Aotearoa, representatives from KiwiRail, the Auckland University of Technology, the University of Auckland, and within the industry have shown willingness to be part of growing this foundation of knowledge in rail in Aotearoa.



Delivering rail in Aotearoa

It's our role as engineers to provide our clients with certainty. If we want to construct light rail, heavy rail, metro rail, or freight rail, it's not only about training people but getting the knowledge right through, from decision makers to users and suppliers.

Delivering light rail in Aotearoa will require strong planning and design solutions that are sustainable, innovative, and provide value for money. Adopting things like accelerated construction will improve site constructability, reduce delivery time, material quality and durability.

WSP has delivered low-carbon light rail systems and other rapid transit systems for cities across the world. With over 50,000 experts worldwide, we can use our unique position to bring technical experts from around the world together with our local experts to provide world-class solutions that work for local communities. Under the current environment with the pandemic, we can harness technology to make virtual connections with our experts and bring rail knowledge right to our doorstep.

We have the potential to transform transportation in Aotearoa and we need urgency in getting the rail programme of work underway. But for this to happen, we need ongoing investment in rail, and not just in the form of money.

The future of rail in Aotearoa and support to get this sector moving with funding coming online through KiwiRail is exciting – we just need to keep it on track.

Projects in mention



City Rail Link

The City Rail Link (CRL) will improve travel options and journey times and double the number of Aucklanders within 30 minutes travel of the city centre.

CRL is a 3.45km twin-tunnel underground rail link up to 42 metres below the Auckland city centre that will transform the downtown Britomart Transport Centre into a two-way through-station better connecting the Auckland rail network.

WSP is one of seven companies that make up the Link Alliance, delivering City Rail Link (CRL) - New Zealand's first completely underground railway line and the first major New Zealand infrastructure project to make an entirely new, comprehensive shift to a digital approach with Building Information Modelling (BIM).



East London Line Extension

When it officially opened in 2010, the extended East London line introduced a new rail route for London and with it a new range of travel possibilities for millions of passengers, offering fast and frequent train services between the capital's eastern and southern suburbs.

The project was split into three phases, the first creating the London Overground service between Dalston Junction and New Cross, Crystal Palace and West Croydon, with the two further extensions to Highbury and Islington and then to Surrey Quays to complete the orbital railway.

Appointed by TfL in 2005, WSP supplied the program management services for phase one, our experts co-locating and integrating seamlessly with the client team to achieve every key milestone and deliver this transformative project.

Our remit included redeveloping and extending the existing East London Line system, providing four new stations, managing interfaces and agreements with Network Rail and London Underground for their related works, and introducing new rolling stock.

The project was delivered three weeks early and on budget.



Sydney Metro and Southwest

Sydney Metro City & Southwest is the second stage of Sydney Metro and will deliver 30 km of new metro rail between Chatswood and Bankstown. The extension provides a faster and more reliable service — increasing train numbers by 60 percent during peak periods and serving an extra 100,000 customers per hour.

Transport for NSW engaged WSP as their technical advisor. The team worked collaboratively to provide the engineering, rail infrastructure and architectural design support to develop the reference design, tender documentation and final business case for the preferred alignment and station arrangements. Together, the multidisciplinary team resolved complex issues, including tunnelling methodologies, station depths and arrangements, and interfaces and interchanges with the existing transport network, particularly in the dense North Shore and central business district environments.



Doha Metro

The broad goals of the Qatar Rail Development Program (QRDP) will be to deliver a world class, environmentally friendly, safe and reliable rail network for Qatar, and also to support the Qatar 2030 Vision for achieving the highest economic, social and environmental development standards for the Qatar community through a sustainable urban development plan.

WSP, in a joint venture consortium with Egis Rail, has been selected by QRail for providing project management consultancy services for the 14.4-km long Gold Line, the Msheireb and Education City stations, and the elevated and at-grade packages of phase 1 of the Doha Metro Program.

The elevated and at-grade package includes three 6-km viaducts for the Red Line South, Red Line North and Green Line, in addition to six aboveground stations and depot enabling works.

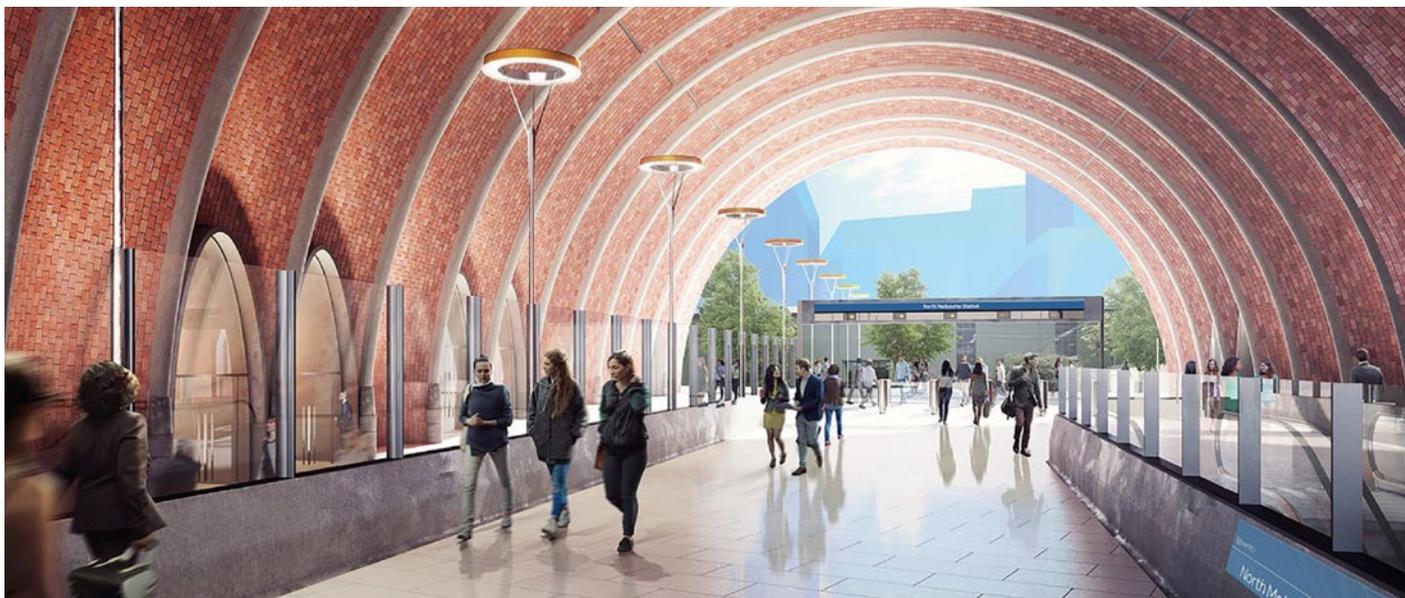
London Crossrail

Government proposals for a new High Speed 2 (HS2) and Crossrail station at Old Oak in London could make it one of the UK's best-connected railway stations by 2026. The proposed interchange will bring long and medium distance rail access, delivering huge regeneration potential to Old Oak. However, the HS2 Hybrid Bill did not include providing more local rail access via connections to London Overground services.

WSP was appointed by the clients Transport for London (TfL) and Network Rail to develop options and recommend a preferred solution for a London Overground station to link to the proposed High Speed 2/ Crossrail interchange at Old Oak Common.

In 2013, WSP was again appointed to work collaboratively with client Transport for London (TfL) and Network Rail to develop and assess opportunities to connect the London Overground network to the HS2 and Crossrail interchange.

Our team, including Terry Farrell Architects, Sweets Cost Consultant and Laing O'Rourke, provided engineering, environmental and station planning services to the study, with TfL providing most of the railway planning, operations and public consultations input.



Melbourne Metro Tunnel

The 10.23 CAD (AUD 11 billion) Metro Tunnel is Melbourne's biggest rail project since the City Loop was built in the 1970s. It includes 9 km of rail tunnels and 5 underground stations at North Melbourne, Parkville and Anzac, with 2 new central business district (CBD) stations – State Library and Town Hall – which will directly connect to the City Loop.

WSP, together with Arup and Arcadis, is in a design joint venture working with CYP Design & Construction (John Holland, Lend Lease and Bouygues Construction) to deliver the Tunnels and Stations package of works as a public-private partnership.

WSP is involved in the tunnel, civil, structure, surface transport, and rail infrastructure design, together with the mechanical, electrical and hydraulic design. We are also delivering specialist services including tunnel ventilation, fire and life safety, security and blast assessment, pedestrian modelling, noise and

vibration, and environmental and sustainability services. Metro Tunnel's two new CBD stations will be built as "trinocular" caverns whereby three overlapping tunnels are mined by road headers, creating a wide-open space that allows the concourse and platforms to be integrated on a single level.

The result will be a spacious station with vaulted ceilings. At 19 m, the underground metro platforms will be among the widest in the world. The project will create: - more room on the network, enabling over 500,000 additional passengers per week to use Melbourne's train network during peak periods, plus time savings of up to 50 minutes per day when travelling to Parkville and/or St Kilda Road. - new stations (Parkville and Anzac) in areas not currently served by trains, improving access to a combined catchment of more than 200,000 jobs, enrolled students and residents. - new, modern-technology trains to run every two to three minutes, beginning the transformation into a "turn up and go" rail system for Melbourne.



WSP for Rail and Transit



Learn more about our work
with the Helen Clark Foundation.