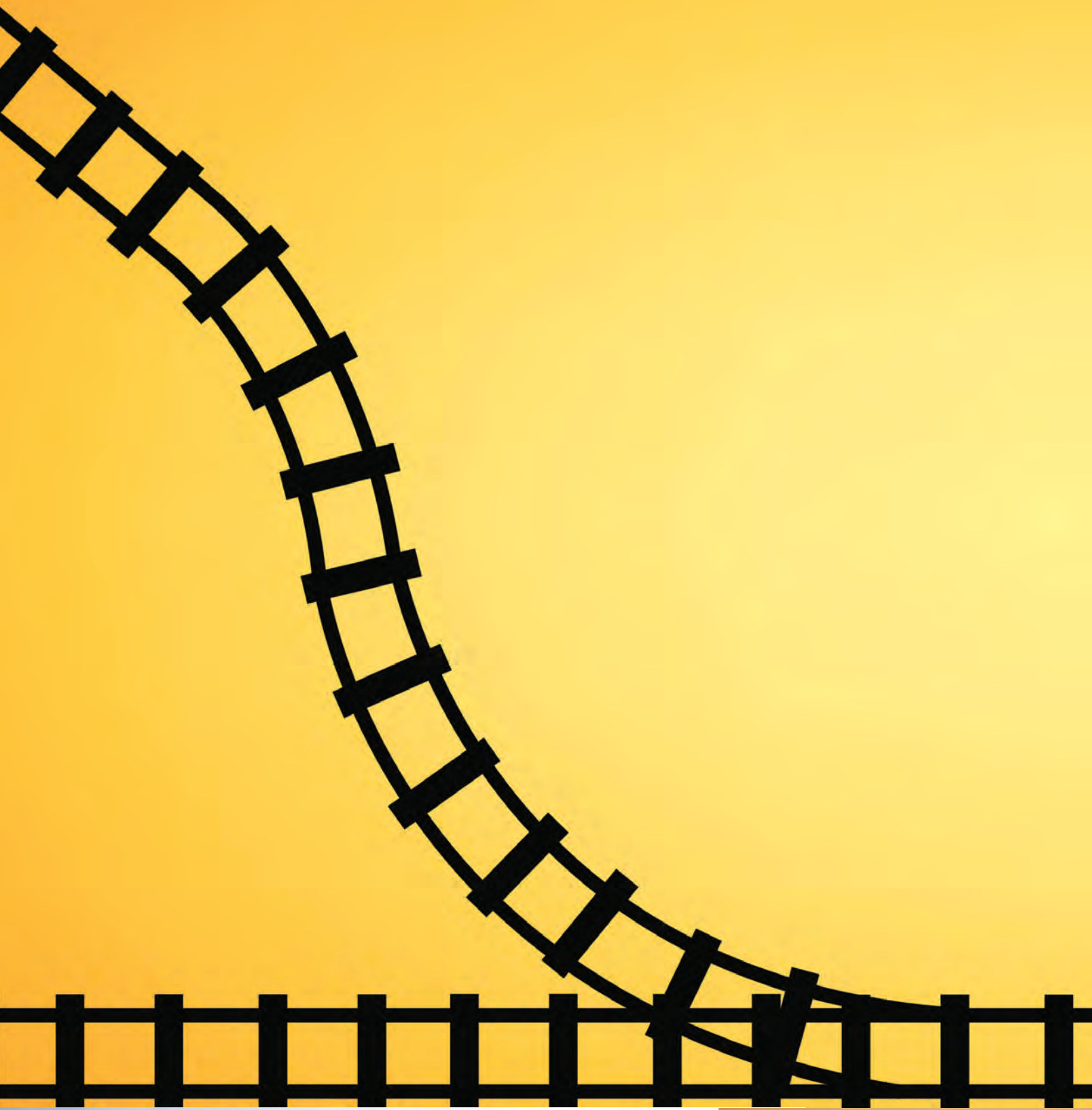

On the RIGHT TRACK

A closer look at railway projects around the world

BY ETHEL NAVALES

Over 200 years ago, the world was introduced to rail through the steam engine, and suddenly the method of transporting passengers and goods changed forever. Today, rail continues to be a major form of passenger and freight transport, carrying over 40 percent of worldwide goods. Rail options include everything from city trams, electric subways, freight trains and even high-speed bullet trains. And despite its 200-year history, the industry continually strives to take innovation to a new level.

Today, unprecedented railway projects can be found all over the world, promising to leverage the latest technology. We had the opportunity to speak with representatives from three different rail projects—in three different countries. In the United States, the **California High-Speed Rail Program**, the **Elizabeth line** in London, England and the **Inland Rail** in Australia. We've found that although there are differences between them in terms of location, challenges and progress, they all have one goal in mind: to improve the quality of people's lives through infrastructure development.

*For the extended interviews covering funding and government support, please visit our **Magazine Archives** located under Publications on irwaonline.org.*

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CALIFORNIA . . . .

High-Speed Rail

To meet California's transportation needs in the 21st Century, the California High-Speed Rail Authority is working with partner agencies, corridor cities and stakeholders on the nation's first high-speed rail project. Once completed, it will improve the region's mobility and enhance the safety and efficiency of complimenting rail services. Don Grebe is the Deputy Directory of Real Property for the California High-Speed Rail Authority. In this role, he helps oversee all aspects of property acquisition and right of way, as well as relocating businesses and residences impacted by the rail project. He handles this monumental task with a staff of experienced right of way agents, real property reviewers, contract managers and over 200 project consultants working in the field.

Can you describe the rail project?

Don: In 2008, Californians approved a high-speed rail project that has become one of the largest infrastructure projects in the nation. Not only will it contribute to economic development and a cleaner environment, it will also create jobs and preserve agricultural and protected lands.

By connecting the mega-regions of the state, we're making it possible to take a train from Southern California to San Francisco in under three hours. The segment connecting the Silicon Valley to the Central Valley will be the first operational segment, with service expected to begin in 2025. By 2029, Phase 1 of the system will run from San Francisco to the Los Angeles basin in under three hours at speeds capable of over 200 miles per hour. The system will eventually extend to Sacramento and San Diego (Phase 2), totaling 800 miles with up to 24 stations.

What are the major benefits of this rail project?

Don: There are many important benefits. First is the increased mobility it offers by connecting the major population centers of the state. Since California is home to some of the country's worst traffic congestion, rail offers a much-needed alternative to driving or flying. Of course, job growth is another major benefit. Already, the Central Valley region has seen an uptick in their economy since the project has started right of way and construction activities. And better air quality will follow as we reduce carbon emissions and provide clean, sustainable, electric energy using the latest technologies.

Young Professionals of Sacramento showing support for the California High-Speed Rail.

What are some of the challenges you have faced?

Don: The hybrid nature of the California High-Speed Rail Program's organizational structure has been one of them. With a small percentage of state staff, the vast majority comes from private sector consultants who work on all the project delivery activities. This combination, along with a steep learning curve and a very aggressive schedule, proved to be a challenge. We've addressed this by developing and establishing policies, which have helped to reduce the learning curve. We have also established regular status meetings to ensure communication is occurring regularly, reducing bottlenecks and developing strategies to mitigate schedule impacts when they occur.

By 2029, Phase 1 of the system will run from San Francisco to the Los Angeles basin in under three hours at speeds capable of over 200 miles per hour.

With many right of way consulting firms working on the project, there were various approaches to First Written Offers (FWOs). Some were not well received by property owners and generated complaints. In response, we developed an orientation session with a list of do's and don'ts to be implemented by all right of way firms across the board. What we learned was that, in order to reduce negative exposure, this kind an orientation should have occurred prior to any of the offers being made.

How has the public reacted and what kind of community outreach is being done?

Don: Similar to many other major infrastructure programs in California and the U.S., the high-speed rail program has also been seen as somewhat controversial among certain political or special interest groups. Several lawsuits in recent years delayed the Authority's ability to begin acquiring property in the Central Valley. The courts ultimately ruled in our favor, and now communities that were once hesitant about high-speed rail are embracing it as the project creates jobs and opportunities for them.

We regularly host Community Open House meetings, working group meetings and other stakeholder engagement events to engage the public and help them better understand the project and its many benefits. Most of the meetings have "information stations" staffed by project delivery personnel, displays with the alignment alternatives and stations where a property owner can input their address and see its proximity to the proposed alignment alternatives. Additionally, community organizations are offered the opportunity to request representatives from the Authority to speak at their events.

Can you describe your right of way process?

Don: High-speed rail follows essentially the same right of way processes as other public works projects: appraisal, acquisition and relocation. We manage excess properties as necessary with a view toward selling off the remainders. Our goal is to negotiate and settle amicably. Eminent domain is used only when necessary.

How has technology impacted your project?

Don: Our right of way database and document storage systems keep the need for paper files to a minimum and add quick response times to user inquiries. We've also been able to utilize various digital renderings in demonstrating how the project will look in relation to remaining and/or adjacent properties.

How do you see this project shaping future rail projects?

Don: This is the largest public works project and the first truly high-speed rail project in the United States. We're blazing uncharted territory organizationally with a hybrid of public and private sector staff. And we're pushing the envelope in what our partner agencies have been used to doing. I believe that their involvement in this project will help the federal government one day establish a national high-speed rail network that it will oversee in coordination with other states to improve connectivity across the nation, following the example set by the California High-Speed Rail Program.

Realignment project in Fresno, California to make way for the high-speed rail line.

LONDON

The Elizabeth Line

London is on the brink of groundbreaking change with the completion of the Elizabeth line (formerly known as Crossrail), which is expected to carry more than half a million passengers every day. The £14.8 billion Crossrail program is currently Europe's biggest infrastructure project and is set to be fully operational in just a few years. Colin Smith, the Senior Director Head of Compulsory Purchase and Compensation for CBRE London, has dealt with many significant compensation claims since he began working on the project in 2009. In this interview, he teams up with Transport for London and the Crossrail Press Office to give us an in-depth look into this innovative railway project.

Can you describe the rail project?

Colin: Delivered by Crossrail Limited, the Elizabeth line is a new railway for London and the South East. It runs from Reading and Heathrow in the west, through 26 miles of new tunnels under central London to Shenfield and Abbey Wood in the east. Construction began in 2009 at Canary Wharf with tunneling finishing in 2015. The project is now 80 percent complete—and it is on time and on budget.

The service will be run by Transport for London (TfL) through central London from December 2018, when the new railway will be fully integrated with TfL's existing transport network. There will be 40 Elizabeth line stations including 10 new stations at Paddington, Bond Street, Tottenham Court Road, Farringdon, Liverpool Street, Whitechapel, Canary Wharf, Custom House, Woolwich and Abbey Wood.

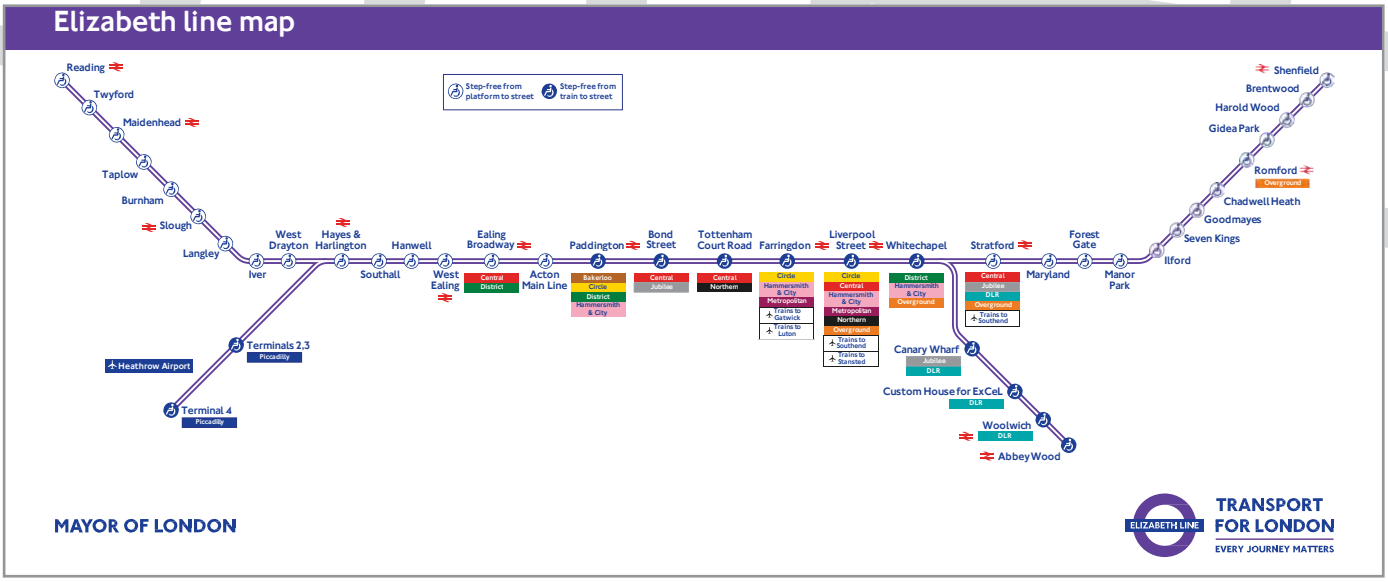
What are the major benefits of this rail project?

Colin: New state-of-the-art trains will carry an estimated 200 million passengers a year. The new service will reduce journey times, increase the capital's rail capacity by 10 percent and reduce crowding on the existing transport network. The railway will also help to drive regeneration across London and the South East, connecting London's main commercial and financial districts and helping to support the delivery of an estimated 58,000 new homes across the route and three million square feet of office, retail and residential space above the new stations in central London. During the construction phase, the project is helping to create jobs and business opportunities across the UK. An estimated 55,000 jobs are being supported by the project.

What are some of the challenges you have faced?

Colin: Building a new railway through one of the world's biggest cities is a significant engineering and logistical challenge. Excavating 26 miles of new tunnels required the use of 150-meter long custom-built tunnel boring machines weighing 1,000 tonnes. These machines had to construct the tunnels with utmost precision as they navigated their way beneath the streets of London, avoiding existing infrastructure below ground including sewers, the existing Underground train network and utilities. A huge amount of work was done before the tunneling began to make sure that we knew the location of everything that was already below the surface and the exact geology through which we would be tunneling.

Workers in the Western tunnels of the Elizabeth line.



With 40 Elizabeth line stations, the new state-of-the-art trains will carry an estimated 200 million passengers a year, increasing the capital's rail capacity by 10 percent.

How has the public reacted and what kind of community outreach is being done?

Colin: There is large public support for the project in London as the new railway will deliver numerous transport benefits. A significant amount of work has been undertaken to make sure that local communities along the route are kept up to date about the work and how it will affect them. This includes notification letters, community drop-ins, liaison events and newsletters to communicate how work is progressing and how residents and businesses will benefit once the new railway is up and running. Beyond that, the more informal face-to-face contact is a vital part of the job.

Can you describe your right of way process?

Colin: The statutory powers to acquire land and rights are set out in the Crossrail Act of 2008, which applies the English compulsory purchase code—the collection of compensation legislation that had its roots in the original railway building boom in the 1840s.

The process involves notices being served on affected landowners and occupiers to undertake what we call compulsory purchase. Compensation is then negotiated and if an agreement is not reached by the sixth anniversary, the statute of limitations requires referral to The Lands Tribunal for determination. Such referral can take place at any stage during the six-year period.

The vast majority of compensation claims are settled by negotiation. The Crossrail project passes through some of London's most valuable real estate including Mayfair in the West End. As a result, several compensation claims involving offices and retail property required payments in excess of $50 million.

A notable difference with rail projects elsewhere in the world is that the UK is entirely reliant on compulsory purchase from the outset, there being no acquisition or commitment/agreement in advance of the statutory powers to acquire land and rights being obtained.

How has technology impacted your project?

Colin: Building Information Modelling (BIM) is the process of generating, building and managing data by using model-based technologies linked to a database of project information. BIM incorporates data—physical, environmental and commercial—on every element designed for Crossrail.

A BIM environment has never before been created on this scale for a European transportation infrastructure project. Crossrail is focusing its efforts in maximizing the opportunities BIM can bring not only in delivery of the railway, but also in driving forward design innovation within the construction industry. The key benefits include reduction of risks, improved safety, reduced errors from using a trusted "single source of truth" approach, improved collaboration through linked data sets and integrated 3D models, reduced information loss and improved project delivery.

How do you see this project shaping future rail projects?

Colin: Crossrail's Learning Legacy initiative was launched to share insight from the project with the wider UK infrastructure industry. Passing on the lessons and best practices that we have learned at Crossrail is an absolutely essential part of raising the bar in the delivery of major infrastructure projects. With an unprecedented number of infrastructure schemes around the corner, this will enable the UK to build on its reputation for delivering safely, on time and on budget.

AUSTRALIA

Inland Rail

Australia's freight task is set to experience significant growth over the next several decades. The current national infrastructure network cannot support this projected growth, with increasing pressure on already congested roads. Inland Rail will provide a high performance and direct interstate freight rail corridor between two of Australia's largest cities—Melbourne and Brisbane. By also connecting southeast Queensland more directly with Adelaide and Perth, Inland Rail will deliver immediate interoperability with the high performance east-west trans-continental line. Speaking on behalf of the project is Peter Dorrough, who was appointed Manager Property Services in 2014 and leads all property related activities associated with the Melbourne to Brisbane Inland Rail program.

Can you describe the rail project?

Peter: The Inland Rail, a 1,700 km (1,056 miles) rail line between Melbourne and Brisbane, will address the growing freight task by helping to move freight transport off the congested road network. It also aims to stimulate growth for interstate and regional/bulk rail freight, lower freight transport costs, improve road safety by easing congestion, free up train path capacity for other services and act as an enabler for regional economic development along the Inland Rail corridor.

Inland Rail is a priority infrastructure project for the Australian Government. With a projected budget of $10 billion, the government is reaching out to the private sector to identify possible options and opportunities to fund the project. The Australian Rail Track Corporation (ARTC) has been tasked with preparing a 10-year delivery strategy for Inland Rail, of which it is three years into.

What are the major benefits of this rail project?

Peter: The Inland Rail is expected to increase Australia's GDP by $16 billion and create up to 16,000 new jobs at the peak of construction. It will not only improve connections within the national freight network, it will also provide better access to and from our regional markets by making it easier for freight to move from farms, mines and ports to national and overseas markets. We project a reduction in freight travel costs, along with better transit time, improved reliability and increased road safety. The project will improve sustainability and amenity for the community by reducing carbon emissions and road congestion, while increasing the capacity for passenger services. Inland Rail will also serve as a catalyst for complementary private sector investments, such as fleet upgrades, new metropolitan and regional terminals and integrated freight precincts.

ARTC employees inspecting the Inland Rail.

What are some of the challenges you have faced?

Peter: Inland Rail will pass through three eastern Australian states: Victoria, New South Wales and Queensland. Each state jurisdiction has different planning, development and environmental legislation requirements that require approval and consent. As such, each state will require inter-governmental agreements to build and operate Inland Rail.

At 1,700 km in length, the Inland Rail connects two of Australia's largest cities, Melbourne and Brisbane.

Additionally, the route faced some dynamic terrain challenges for the engineers. Some innovative solutions were needed to ensure safety. The study corridor needed to be refined from many thousands of possible options before the most appropriate "fit for purpose" route was identified.

How has the public reacted and what kind of community outreach is being done?

Peter: Our community engagement work is ongoing and critical to the success of the Inland Rail program. In order to actively engage with community members along the study areas, we are working with local Councils and state governments. Recently, ARTC opened an information center in Toowoomba, Southern Queensland. This serves as a central hub for people in the community to get information and give face-to-face feedback about Australia's largest infrastructure project. Positive and active community feedback has provided ARTC with the opportunity to explore other route options.

Can you describe your right of way process?

Peter: In Australia, acquiring a rail corridor is closely linked to its ultimate land tenure. The Inland Rail route passes through the Australian states of Victoria, New South Wales and Queensland. The ARTC holds tenure over its existing rail network in several ways, including freehold ownership and leasehold. The model of land tenure proposed for Inland Rail is consistent with the arrangement that is a state owned/ARTC leased back tenure model.

In accordance with our constitution, consent of the relevant state government is required to construct and extend a railway. Our Constitution also requires that any land be acquired under "just terms," bringing into play the legal issue of fairness. In most instances, private land is acquired through direct negotiation with the landowner, with compensation assessed and negotiated by qualified appraisers. If there are substantial disagreements in the quantum of compensation, then this is resolved via a number of methods including negotiation, mediation or arbitration with court action as an ultimate result. Although ARTC is fully owned by the government, it does not hold power to compulsorily acquire land. If negotiations fail, ARTC can request the various state governments to commence the compulsory process.

Once acquired, the land becomes part of the leaseback arrangement. The states acquire title to the rail corridor, and ARTC obtains long-term tenure and control to develop, construct, operate and maintain the rail asset. With most projects, ARTC acquires whole properties, ultimately distributing the land as rail corridor, road reserves and surplus land.

How has technology impacted your project?

Peter: ARTC proposed to implement its own Advanced Train Management System for Inland Rail, which will provide significantly upgraded capabilities to the rail industry of Australia. The system will provide new digital network control centers, each capable of controlling all traffic on the ARTC national network. This replaces trackside signaling with in-locomotive displays of authorities to drivers. The system will show the precise location of trains both front and rear, provide a backup capability in the event of failure at one control center, and will enforce authorities on each locomotive if a train is at risk of exceeding its authority. It offers switch settings and automatic route clearances, as well information via voice and data to all locomotives via the Telstra 3G National Network. Overall, the system will dramatically improve rail network capacity, operational flexibility, train service availability, transit times, rail safety and system reliability.

How do you see this project shaping future rail projects?

Peter: Inland Rail is an investment in strategic infrastructure for the future, providing capacity to serve the east coast freight market for the next century. Inland Rail will be an important contributor to national productivity by reducing train operating costs and improving service standards. This vital piece of infrastructure will enable us to complete the National Freight Network, and for Australia, this represents a significant modal shift for freight—from road to rail. ✪