




# Infrastructure Sustainability Update 2014

**ISCOA** Infrastructure  
Sustainability  
Council of Australia



A man in an orange safety vest and dark clothing is walking through a complex industrial facility. He is looking towards a piece of machinery that consists of several large, horizontal, white cylindrical tanks or pipes. The facility has a high ceiling with various pipes, ducts, and electrical conduits. The lighting is bright, and the overall atmosphere is one of a busy, modern industrial environment.

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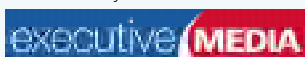
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# Foreword

By David Singleton, Chairman, ISCA

The pace at which urban development is happening across the world in the 21st century is intense. Highly concentrated demographic growth in cities is one of the greatest challenges that leaders face as they look to protect the future of their nations in the face of the global sustainability challenge. There are few easy answers when it comes to infrastructure investment – these projects are huge and risky, and most nations face far greater demand for projects than there are resources to support them.



In an Australian context, the combined population of Australia's capital cities will grow by nearly 16 million by 2061, and the proportion of Australians living in a capital city will significantly increase – from 66 per cent in 2011 to 69.3 per cent in 2031, and 73.4 per cent in 2061. These 'medium' projections suggest that the population of Melbourne will grow to 8.6 million by 2061, Sydney to 8.5 million, Perth to 5.5 million and Brisbane to 4.8 million. The implications of this growth for urban infrastructure will be significant.

As a consequence of this growth, Australia is facing several difficult decades and must come to grips with a backlog of infrastructure investment that has been – and will continue to be – exacerbated by population growth, by increasing demand and by the impacts of climate change.

Australia's lack of transparency in infrastructure decision-making has often led to inefficiency and community distrust, and has constrained informed debate about the implied trade-offs – projects, service outcomes, prioritisation, funding, and so on.

To get the greatest value from future infrastructure investments, leaders must think more strategically about how to plan, fund and implement these projects. This could include creating platforms to engage the public in discussions about investment decisions; creating greater transparency around spending; incorporating environmental and social issues into decision-making; and partnering with private organisations to find new sources of funding and design ideas. When leaders take the time to learn from each other's successes and failures, infrastructure challenges can be overcome. Achieving this will involve continuing to take advantage of the financial resources and innovation brought to the table by the private sector, as well as integrating community feedback into operations through ongoing engagement and stakeholder management.

Together, these strategies will help leaders to transition our nation for the future, and will ensure that our cities can attract the investment and global talent that can enable their economies to grow.

*Australia's lack of transparency in infrastructure decision-making has often led to inefficiency and community distrust, and has constrained informed debate about the implied trade-offs – projects, service outcomes, prioritisation, funding, and so on*

*“There is no shortage of capability within the sector for assessment of complex, multi-faceted infrastructure proposals, allowing for community engagement as appropriate. But how should such investment projects be selected and evaluated?”*

There is no shortage of capability within the sector for assessment of complex, multi-faceted infrastructure proposals, allowing for community engagement as appropriate. But how should such investment projects be selected and evaluated? The development of the IS rating tool, launched in 2012 by the Infrastructure Sustainability Council of Australia, has enhanced industry’s capacity to understand and articulate the benefits of alternative solutions to particular infrastructure investment challenges. The rating process, when employed at the project planning stage and then taken through to design, construction and operation, provides the basis for illustrating and communicating the benefits of a project to decision-makers and the community.

The employment of a transparent decision-making process, in which decisions about the kind of infrastructure that is required are made in a sensible way, should help to ensure that the community understands the rationale for the decisions made. The IS tool can be used to communicate the differences between different schemes. Publishing the technical underpinnings of strategic plans and project business cases (or at least their key findings and assumptions) would improve the public’s ability to scrutinise project proposals and, perhaps, be comfortable with the outcomes.

So, some progress has been made in advancing our understanding of infrastructure sustainability, but much more is needed.

ISCA made excellent progress in 2014, but we are not resting on our laurels – far from it. We have expanded the ‘footprint’ of the organisation to include New Zealand and the South East Asian region, with discussions underway to make the IS rating tool available for use in those geographies.

*“ISCA made excellent progress in 2014, but we are not resting on our laurels – far from it”*

We are also moving forward with upgrading the rating tool, not only to address the necessary updating of reference data and embedded statistical routines, but also to develop themes around economic impact and the workforce implications of infrastructure development.

Our progress last year was also affirmed by the strong interest that was shown in the election of members of our board at our Annual General Meeting in 2014. We bade farewell to three long-serving board members in 2014: Anne Davis, Scott Lambert and Scott Losee. Their contributions to the development of ISCA and to the IS rating tool were

significant, and I would like to record my appreciation for that.

In calling for nominees for election to fill three vacancies on the board for 2015, we received nominations from four strong candidates. At our 2014 AGM, three new board members were elected: Dale Connor (Lend Lease), David Kinniburgh (GHD) and Craig Tucker (Leighton). We are pleased to welcome them to the board.

2015 promises to be an exciting year at ISCA, and I look forward to leading the board in engaging with our transformation agenda. **C**

**David Singleton**  
Chairman, ISCA

# A message from the CEO

By Antony Sprigg, CEO, ISCA



## Celebrating success

**C**elebrating success is key for our industry, which is why we hosted the inaugural Sustainability in Infrastructure Awards in August 2014. These awards recognise and reward projects, organisations and individuals demonstrating leadership in advancing infrastructure sustainability.

The winner of the Infrastructure Sustainability (IS) Project/Asset Award was the Gold Coast light rail, through McConnell Dowell; the winner of the Organisational Leadership in Infrastructure Sustainability Award was Main Roads Western Australia; and the Individual Leadership in Infrastructure Sustainability Award went to Katrina O'Mara from AECOM based in Western Australia.

The awards were followed by the inaugural Infrastructure Sustainability Conference, which in 2014 was themed 'Blue is the new Green'.

Building the business case for sustainability was one of the key topic areas of the conference, and it resonated with all attendees. All of the case studies that were presented are part of the foundation for the business case for sustainability – the more case studies, the stronger the foundation. Building the business case is also at the heart of ISCA's strategy going forward.

## Knowledge

On the education, training and knowledge-sharing front, we saw 158 new Infrastructure Sustainability Accredited Professionals join the ISAP cohort, which now exceeds 450 members. ISCA has also listened to member feedback, and in 2015 we will be expanding our training offering to include sustainability in infrastructure training for management, and new training for ISAPs to keep their knowledge and skills current.

## Engagement

A key area of focus for 2014 moving into 2015 was to step change the level

of industry engagement; the inaugural awards and conference was one aspect of this change, and the other was establishing industry working groups comprising ISCA member representatives. Some of the groups have a more strategic infrastructure sustainability focus, while others have a more technical focus.

Four ISCA Working Groups were launched late last year, with focusing on 'Contractors', 'Local Councils', 'Materials' and 'Stakeholder Participation'. We will be establishing a fifth ISCA Working Group for 'Urban and Landscape Design' in 2015.

ISCA is constantly reviewing its member services to ensure that members get the most value possible from their ISCA membership. ISCA recently conducted a member survey and will be incorporating the feedback from that survey into its advocacy, marketing, working groups, knowledge hub and training programs.

## Infrastructure Sustainability (IS) rating scheme

All rating tools need to be ahead of the curve, and the IS rating scheme is no exception. That is why we are currently developing the Economics Theme, funded by the Federal Department of Infrastructure and Regional Development, and why we are seeking funding to commence development of the Workforce Theme.

In parallel, at the end of 2014 ISCA had eight certified IS ratings, with a capital value of \$2.3 billion, and 25 more registered, with an additional capital value of \$35 billion – including four IS Operations rating pilots and three New Zealand IS rating pilots with a capital value of \$2.8 billion. These ratings reflect projects or assets from the tens of millions to billions, and IS registrations are growing rapidly in 2015.


This level of IS rating scheme activity has spawned a great opportunity to harvest the lessons learnt to date, and,

incorporated with the research and development of the new themes, will inform and define the next generation of the IS rating scheme.

Although the IS rating scheme is benchmarked to Australian conditions, the framework and process is applicable anywhere in the world with the appropriate tailoring and support. New Zealand has trialled and given explicit technical feedback on how the IS rating scheme can be localised, while lead agencies in Malaysia and Indonesia have analysed the IS rating scheme's application locally. We have also been approached by stakeholders in Europe and Africa. All of this is evidence of ISCA's global leadership in the rating of infrastructure sustainability.

Finally, it's worth noting that in a relatively short period of time, we have seen infrastructure proponents applying the IS rating scheme during project planning and pre-procurement stages. This thought evolution has sparked higher-level integration of sustainability issues, and adoption of the IS rating scheme into the planning, design and delivery of infrastructure projects and operating assets – a trend that demonstrates traction to date, and that is also a sign of the future.

Valuing, integrating, measuring and recognising sustainable performance will reduce capital risks and increase availability, improve social licence, reduce environmental footprints and regulatory burden, and concomitantly be integral to more liveable and productive cities and regions. However, these outcomes can only be realised through sustained industry collaboration, knowledge sharing, building the business case and never ignoring the current elephant in the room.

ISCA looks forward to taking on these challenges with industry, and 2015 looks like it is already off to a good start. 





Arup are proud to be working closely with ISCA to ensure the delivery of sustainable infrastructure projects.

# Infrastructure development: a dynamic work in progress

By the Hon. Warren Truss MP, Deputy Prime Minister, Minister for Infrastructure and Regional Development

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I am pleased to again contribute to the Infrastructure Sustainability Council of Australia's *Infrastructure Sustainability Update*, and I congratulate the Council for its important and lively contributions to the development of Australian infrastructure.



In 2012, the Infrastructure Sustainability Council of Australia (ISCA) launched the Infrastructure Sustainability (IS) Rating Tool, which is used to benchmark and rate the sustainable performance of new infrastructure projects and asset portfolios. The tool applies to a diverse range of infrastructure types, including road transport, public transport, active transport, ports, water infrastructure and parklands.

Last year, ISCA embarked on further enhancing the rating tool to integrate economic rating capabilities to fully define the benefits of sustainability for infrastructure projects, with this work to be completed in 2015. While the tool already facilitates innovation in resource efficiency, cost reductions and risk management in terms of environmental sustainability, this enhancement to the IS tool will help inform better transport infrastructure performance.

Developing an environmental rating system that can be applied across the design, construction and operational stages of infrastructure helps us to better understand infrastructure sustainability.

Sydney's WestConnex motorway project, for instance, is a very significant addition

to the infrastructure networks for New South Wales and the nation – and a very important part of the Australian and New South Wales Governments' infrastructure investment portfolios. It is particularly pleasing that the WestConnex Delivery Authority has committed to registering the whole WestConnex project with ISCA, and achieving a minimum rating of Excellent for the Design and As Built phases of the project. This is an important commitment, and I congratulate WestConnex and other participants on their actions in an important area.

WestConnex's efforts underline how infrastructure projects have a broader significance that extends beyond their immediate purpose, and helps to ensure that their net benefits are maximised and contribute to Australia's overall economic development. There is never a set recipe for success – but, as it has throughout the nation's history, Australia's national economic success depends on access to modern infrastructure across the nation's cities and regions. This access, in turn, depends on clearly identifying the nation's infrastructure investment priorities, matching infrastructure supply and demand, and maximising the pool of funds for infrastructure investment.

Access to modern infrastructure also increasingly depends on having a keen awareness of trends in both national and international infrastructure markets. The G20 Summit last November achieved some very positive results, not least of which was the decision to proceed with the Sydney Global Infrastructure Hub. This highlighted, in a practical way, the international dimensions of infrastructure development.

Australia is open to international investment and expertise in developing our infrastructure, and the growth of the Asia-Pacific region creates major opportunities for us to export our infrastructure capital and expertise within our region.

The requirements for delivering modern infrastructure are simple enough to set out, but securing them requires significant efforts. Australian infrastructure development in 2015 is a dynamic work in progress. The Australian Government is proud to be making an important contribution to this effort, through our direct investments in infrastructure assets and, equally importantly, through leading reforms to the nation's infrastructure investment and delivery systems.



We recognise that governments at all levels must continue to play a key role in delivering infrastructure; however, governments should no longer seek to fill the infrastructure space on their own, either as investors or as sources of ideas. It is becoming increasingly clear that it makes good commercial sense for the private sector to invest in infrastructure and fully engage in other aspects of its development. The Australian Government is doing its utmost to leverage this increased engagement.

### The Coalition's infrastructure vision

Our approach to infrastructure investment addresses the realities of Australia's economic and social needs today, and those of the future. We recognise that prudent economic management is fundamental to Australia's future prosperity. Running the nation's economy well demands commitment to balance the national books – and much more.

Good economic management also demands investment in assets, including transport infrastructure that delivers social and economic gains, especially in lifting the nation's productivity. It also demands commitments to tackle shortfalls in our systems for funding, financing and delivering infrastructure – and the determination to make decisions about difficult but essential infrastructure needs, like the Western Sydney Airport.

That is why we are investing a record \$50 billion in the critical transport infrastructure needed to secure Australia's future prosperity. Our contribution is projected to leverage additional investments of \$75 billion from state governments and the private sector.

The Australian Government's investments include the \$11.6 billion Infrastructure Growth Package, announced in the 2014 Budget, which has three new measures: the Asset Recycling Initiative, new investments, and the Western Sydney Infrastructure Plan.

The government's investments are being directed towards transforming infrastructure projects all around the country – including Sydney's WestConnex, Adelaide's South Road and Brisbane's Gateway Upgrade North. Our investments in regional areas are equally important. They include completing the long-awaited duplication of the Pacific Highway from Hexham to the Queensland border by the end of the decade; kickstarting the Melbourne to Brisbane Inland Railway; and the well overdue refurbishment of Queensland's Bruce Highway.

*Good economic management also demands investment in assets, including transport infrastructure that delivers social and economic gains, especially in lifting the nation's productivity*

This investment will cut the economic and social costs of congestion in our towns and cities, and will help transform the safety, efficiency, and security of moving people and freight around the country and into the wider world. This investment will also better integrate Australia's regions into the national economy and social fabric – and will better position the nation for the rise of the Asia-Pacific economies in our own wider neighbourhood.

This repositioning is critical – we need modern, 21st-century infrastructure for many reasons, including the need to sustain our international competitiveness and our international collaborations.

### Western Sydney Airport

The economic and social benefits that the Australian Government and the nation seek from infrastructure investment are embodied by the proposed airport for Western Sydney.

In April 2014, the Australian Government determined that Badgerys Creek will be the site for a new airport for Western Sydney; this decision ended a half-century of frustrating indecision and uncertainty.

An important first step towards the delivery of a new airport in Western Sydney involves meeting our obligations under the 2002 Share Sale Agreement for Sydney Airport. That agreement provides the owners of Sydney Airport with a right of first refusal to develop and operate a second major airport for Sydney. It also sets out provisions for consultation in developing plans for a new airport.

The government issued a notice to consult to the Southern Cross Airports Corporation, the owners of Sydney Airport, on 18 August 2014, and commenced an expected nine-month consultation phase on 1 October 2014.

The Western Sydney airport is expected to be operational in the mid-2020s, and will be a key economic driver for Western Sydney, New South Wales and the nation into the future. The general rule of thumb for airports is that for every million passengers per annum, around 1000 jobs are created. Analysis by Ernst & Young found that an airport at Badgerys Creek has the potential to generate \$24 billion in economic activity by 2060, generating thousands of additional jobs – a significant yield in both economic and social terms.

Estimated passenger numbers mean that an airport in Western Sydney would initially be similar in size to the Canberra and Gold Coast airports, which handle three and six million passengers per annum respectively. Capacity would expand as the demand for services grows.

In partnership with the New South Wales Government, we are committed to the Western Sydney Infrastructure Plan associated with the proposed airport, which will deliver an investment of \$2.9 billion in upgrades to major and local roads. This includes the construction of a new four-lane motorway between the M7 Motorway and The Northern Road, together with a \$200 million local roads package.

The Australian Government is providing 80 per cent of the funding for these upgrades, except for the local roads package, which we have fully funded. This investment will transform Western Sydney's capacity to handle future traffic growth and improve accessibility to the M7 and M4 motorways. It will significantly reduce travel times for the people of Western Sydney, and it will provide a long-overdue infrastructure bonus for the region.

Our decision involved moving beyond the three-year federal election cycle so that we can secure these critical benefits, which will help cater for Western Sydney's growing population, and so that we can meet growing domestic and international demand, especially from the Asia-Pacific region.

#### **Private and public engagement in infrastructure**

Our investment agenda will transform the capacity and efficiency of Australia's infrastructure networks, and reform how we build and finance them. The constraints on public balance sheets mean that we cannot meet all infrastructure needs from public purses and wallets alone. Matching infrastructure supply to growing infrastructure demand increasingly

depends on expanding private investment in infrastructure – and on governments being innovative in their infrastructure approaches.

*“We recognise that our infrastructure investments need to be aligned with reforms to the ways in which Australian infrastructure is developed and delivered”*

Our investment in the Perth Freight Link is one example of our innovative approach. The Freight Link is designed to achieve substantial economic and social benefits by separating commuter and freight traffic. The Freight Link is projected to yield benefits of \$2.80 for every dollar invested. It will also cut travel times by nine and a half minutes, and will generate savings in heavy vehicle operating costs of \$8.15 per trip. Part of the cost of the project will be recovered through the introduction of a heavy vehicle user charge along the corridor from Mueha to Fremantle, reflecting the expected productivity gains for the freight industry.

We will provide a concessional loan of up to \$2 billion to accelerate the new M5 East section of Sydney's WestConnex. The loan will be available from mid-2015 to late 2018, and will bring forward the completion of the new M5 East by about 18 months. This is the first time that a federal government has used the concessional loan mechanism to deliver a major road project.

A third innovation in our approach to infrastructure leverage is the Asset Recycling Initiative within the Infrastructure Growth Package. The Initiative aims to provide incentives to the states to invest in infrastructure renewal, and to provide incentives to the private sector to expand their infrastructure role by purchasing established infrastructure assets. There are several successful precedents for the Initiative, including the partial funding of WestConnex from the sale of Port Botany and Port Kembla.

The Assets Recycling Initiative is building on this momentum, and is an important part of the pipeline for national infrastructure renewal. The Initiative has attracted significant interest from state governments and the business community.

#### **Productivity Commission inquiry**

We recognise that our infrastructure investments need to be aligned with reforms to the ways in which Australian infrastructure is developed and delivered. In November 2013, the government tasked the Productivity Commission to undertake an inquiry into public infrastructure, which sought to inform debate on the optimal role for the private and public sectors in infrastructure funding, financing and delivery.

The Commission's final report, which was tabled in Parliament in July, found that Australian infrastructure investment was strong by international standards; however, the Report also found room for improvement, particularly around governance and project selection, and setting project priorities.

We released the government's response to the final report last December. Our response focused on issues relating to infrastructure planning, procurement and pre-approval processes – and we will use the Productivity Commission's report as a platform for delivering system-wide improvements in these processes. We are also determined to make better use

*“Developing Australia’s infrastructure rejuvenates the nation’s productive and social capital – and the Coalition Government understands the importance of this reinvigoration. Australian infrastructure is a blue-chip product that is vital for the nation’s aspirations for greater prosperity and wellbeing. Investment in this product will deliver very solid gains for everyone”*

of project data, including for assessing whether expensive infrastructure projects meet their objectives.

An essential part of all of these improvements is ensuring that how we plan, fund and build infrastructure directly aligns with the needs of the people who will use it.

#### **Reforming Infrastructure Australia**

Another important element of our revival of Australia’s infrastructure delivery is focused on institutional reform.

Like any other endeavour, the success of Australia’s infrastructure efforts depends on the adequacy of the institutional arrangements within which they operate. We came into office recognising that these arrangements needed marked improvement. In particular, although Infrastructure Australia was a good concept, it had serious operational flaws that were evident in the politicisation of its decisions, in the shortfalls in its governance arrangements, in the definition of its role, and in its less-than-optimum relations with the states.

We amended the Infrastructure Australia Act to reform these arrangements.

Infrastructure Australia is now much better placed to provide independent expert advice on infrastructure issues, including through its current audit of the nation’s future needs.

Infrastructure Australia will collaborate with the states on developing a 15-year plan about the types of infrastructure that governments should invest in. This will provide a longer-term strategic assessment that will clearly signal to all governments the sort of infrastructure assets that should be selected, in turn providing more certainty to the private sector about the nature of our longer-term infrastructure investment pipeline.

The market needs confidence that Australia will not be subject to a continuing boom and bust cycle in investment, and we are acting to remove any uncertainty about the nation’s longer-term plan to build the foundations for our economic and social growth.

#### **Conclusion**

The Australian Government’s infrastructure vision, and our work in bringing it to fruition, reflects ideas that have long been active in Australian public debate. For instance, in 1949, distinguished economist Sir Douglas Berry Copland advanced the idea that Australia was over-focused on consumption, and neglected investment in the capital assets that generate productivity gains.

The Australian Government understands the urgent need to shift expenditure towards investments that help to create a national economy that is more productive and richer – in every sense. Australia earns its living in a tough global

marketplace, so raising productivity must be a permanent fixture of how we do business. It must also be a permanent part of our national psyche.

Developing Australia’s infrastructure rejuvenates the nation’s productive and social capital – and the Coalition Government understands the importance of this reinvigoration. Australian infrastructure is a blue-chip product that is vital for the nation’s aspirations for greater prosperity and wellbeing. Investment in this product will deliver very solid gains for everyone.

The Australian Government understands the critical importance of the private sector to this rejuvenation, and this underpins its efforts to expand private engagement in infrastructure investment, financing and delivery.

I am pleased to be part of a government that is making strategic infrastructure investments, and encouraging more of them. Developing Australia’s infrastructure is vital for achieving the nation’s aspirations of greater prosperity and wellbeing. The nation’s success depends on access to modern infrastructure that can be scaled up to meet economic growth and expanding demand – and this is essential for dealing with the great opportunities that the Asia-Pacific ascendancy is creating for the nation. **C**



# Sustainability – a key driver for the business

by Hollie Mapson, Laing O’Rourke Sustainability Leader

**F**aster, cleaner, cheaper, stronger, for longer. Sustainability touches on every part of our business, and our strategy promises huge rewards.

The word ‘sustainability’ carries myriad meanings. From cutting carbon emissions and recycling waste, to hiring responsibly and leaving meaningful and positive legacies among communities, it requires an eye to the future and is a priority for businesses committed to being relevant and competitive.

By treating sustainability as a core business value, we have changed the way we think about products, technologies, processes and business models. As such, Laing O’Rourke is proud to be a member of the Infrastructure Sustainability Council of Australia, committed to advancing sustainability.

We have assessed our sustainability priorities to develop a cohesive strategy and a set of targets for 2020. Through our sustainability agenda – which focuses on environment, people, industry and community – we have identified the social, economic and environmental pressures that will shape the industry well into the future. By taking the necessary steps now, empowering our people to challenge and change the industry, and aligning our practices accordingly, we are well-placed to turn sustainability challenges into opportunities.

Sustainability at Laing O’Rourke means reducing our use of carbon, cutting water usage and waste, boosting development and diversity, and increasing staff retention and employee engagement. We seek to enrich communities and give our employees the time to leave meaningful and positive legacies where we operate. Guaranteeing client satisfaction, conducting business ethically, sourcing responsibly and growing our research and development (R&D) are critical parts of our sustainability agenda.



Biodiversity assessment and community clean-up

Through our R&D operation, the Engineering Excellence Group (EnEx.G), we invest in leading research and innovations to advance the face of construction. For example, EnEx.G is piloting the world’s first large-scale re-deployable solar–diesel hybrid generator in collaboration with the Australian Government. The group has also developed the unique soil-binding polymer Stabilar, which enables the rapid construction of roads, hardstands, embankments and related infrastructure, with wide-ranging sustainability benefits.

Innovation like the solar–diesel generators (patent pending) may

one day help us address the market’s need for cheaper and cleaner off-grid electricity. With off-site construction and rapid pack-up and pack-down, this innovation has the potential to lower costs and reduce risks associated with delivering infrastructure in regional and remote Australia – a drive that benefits us all.

We believe innovation is a key component in driving sustainability, and Laing O’Rourke being named eighth on *BRW*’s 50 Most Innovative Companies 2014 list is recognition of our longstanding commitment to sustainability and innovation. [C](#)



LAING O'ROURKE

Laing O'Rourke's pilot redeployable solar-diesel hybrid technology



Public and social infrastructure expertise



Community and environmental campaigns



Water treatment and processing plants



Indigenous housing and infrastructure projects

**At Laing O'Rourke, we believe in doing business in a way that is fair, transparent and, above all, safe and sustainable.**

As Australia's largest privately-owned construction company, and part of an \$8 billion global engineering enterprise, Laing O'Rourke is committed to fully understanding the needs of our clients, protecting and enhancing the value of their assets, and delivering on our promises, regardless of the scale or complexity of the challenge.

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# Pushing the boundaries

By Stephen Troughton, Main Roads Western Australia

I've been with Main Roads Western Australia for just over two years now, and I'm happy to say that this time has been full of innovation, initiative and exciting projects around our vast state.

As a leader in an organisation that already has an excellent reputation, it can be challenging to ask everyone to take that extra step to make us a truly great organisation, delivering innovative sustainable infrastructure that adds not only to the economy of Western Australia, but also to building communities, protecting our fragile natural environment, protecting our state heritage, and leaving a sustainable future for the next generation.

That, however, is the request I have put to all staff members at Main Roads in relation not just to our traditional business of road building, but also to the management and operation of a truly integrated transport network.

We have just launched our new strategy – 'Keeping WA Moving'. This strategy focuses on the external challenges facing Main Roads, underpinned by our six guiding principles. The strategy has four key areas of focus, of which sustainability is one.

I think it's important for organisations such as Main Roads to have a solid commitment on sustainability, and to take a leadership role in the road construction industry on practices and approaches to being sustainable.

Our Sustainability Policy commits Main Roads to 'creating lasting benefits through an integrated consideration of the social, environmental and economic

aspects in all that we do'. We are continually embedding this policy into everything we do in order to create a culture of sustainability; to seek economic, social and environmental benefits; and to build and operate a sustainable road transport system in partnership with others.

There is continuing pressure for us to deliver outcomes that protect the state's interests into the future, and also to demonstrate that what we are doing is on the right path.

What this translates to in an operational sense is our infrastructure projects seeking to use alternative, sustainable construction materials; seeking to provide innovative road designs that use fewer resources to build, maintain and use. This then needs to translate into reduced waste and emissions, improved community and social amenity, and longevity to reduce ongoing maintenance of the asset.

I am continually challenging our project teams to think strategically and long-term. Take noise mitigation, for example. Currently we use noise walls, but my question is: should this be the case? What other longer-term approaches can we take? Should we consider vegetation – a more sustainable, longer-term noise mitigation barrier – or is there something else that we can do in relation to the materials we use for construction to actually reduce the noise generated by vehicles?

As part of our future focus, my challenge is for us to consider all forms of transport, rather than just roads. How, for instance, do we encourage more vehicle users to consider and use alternative transport options, such as public transport or cycling, and how do we build these considerations into our future network plans by accommodating



bus routes and separated cycling facilities? We also need to learn lessons from other countries about how connected a city can be, and work with our partners and stakeholders to make this a reality for Western Australia.

Ultimately, this comes down to our organisation continuing to push the boundaries in its contribution to making Western Australia a more livable place, in order to help our people to be healthier and happier. But how do we bring our customers along for that ride when car ownership continues to grow? Mode shifting is one of the keys to the long-term functionality of our transport network, as well as for congestion management, so we need to target the aspects of travel that will help people make the shift.

While there is a lot that we should challenge ourselves to achieve in the future, I am also extraordinarily proud of what we are already doing, and what we have achieved. We are fully aware of our responsibility in a broader context to reduce our ongoing carbon emissions, and we have adopted a carbon reduction target – a first in Australia for a road agency. However, our peers are raising the bar and have set higher targets, so the push to work harder is constant, and the challenge is back on us.



Our project teams also have sustainability targets, including the adoption of the Infrastructure Sustainability (IS) rating scheme, as part of their construction challenges, and this is something that I will continue to champion as we deliver more than \$2 billion of road programs and services. We have six projects currently registered for an IS rating, which demonstrates our commitment to sustainability within our infrastructure investments.



Some of our projects have already risen to the challenge. The Great Eastern Highway Upgrade – Kooyong Road to Tonkin Highway was completed nine months ahead of schedule, and under budget. While we also achieved an outstanding safety record, I am really proud that the project was awarded the Civil Contractors Federation National Earth Award for Category 5 (projects worth more than \$75 million).

This project was also recognised by the Infrastructure Sustainability Council of Australia with an IS As Built rating of Commended – the first infrastructure project in Australia to receive an As Built rating.




These achievements are a reflection not only on Main Roads, but also on our industry and project partners. Without their support for sustainability, and for what Main Roads is trying to achieve through its infrastructure investments, none of these outcomes would be possible. Our business and support activities continue to focus on sustainability and effective environmental management. We are improving the carbon efficiency of our offices both in the city and regionally, while reducing the amount of waste that goes to landfill. We have reduced our vehicle fleet and, where possible, we use video conferencing and unified communications rather than travelling between offices. My view is that if everyone made small changes, it would have a large impact – and I will continue to advocate this approach with my personal actions and support.

The number-one issue for us at the moment is congestion, and its environmental, social and economic impacts. It's a tough, multifaceted issue that has seen us come together as an organisation to deliver our Traffic Congestion Management Program (TCMP). This program comprises innovative, practical and low-cost solutions to improve the public's driving experience and 'Keep Perth Moving'.

We've had some simple, quick wins, such as installing roundabout metering at the Point Lewis Roundabout – a first in Western Australia. This has also reduced congestion and emissions, and reduced frustration for motorists at the site. We will continue to find and implement these quick, low-cost solutions as part of a coordinated approach to the issue. As we move forward, we share

the challenge of operating in a lean economic environment that pushes us to consider smarter, more efficient ways of doing business. While this is good for business, it's also good environmentally, as we find ways to reduce the use of resources, and improve output.

I'd like to finish with a reflection about leadership, which I feel is particularly important to sustainability. Ian Cheshire, Chief Executive Officer of Kingfisher, says, 'Leadership is about getting people to go where they wouldn't have gone on their own'. My role as the leader of Main Roads is to ensure that I inspire our people to do just that, and to step up to the challenges of making our state sustainable and a great place to live. 

Main Roads Western Australia was the winner of the Organisational Leadership in Infrastructure Sustainability Award 2014.

# Representing IPWEA members' interests

## The Roads & Transport Directorate represents members' interests in a variety of forums, including:

- National Asset Management Strategy (NAMS) meetings
- IPWEA (NSW) Road Safety Panel
- the Street Openings Conference
- Roads and Maritime Services (RMS) reviews, including:
  - Road Maintenance Council Contracts (RMCC) Review Committee
  - natural disaster arrangements
  - State Road Asset Maintenance Responsibilities

- Transport for NSW Level Crossing Working Group
- other Transport for NSW consultative meetings.

## The Directorate makes presentations to a variety of audiences, including:

- Each of the 13 IPWEA (NSW) Regional Group Forums
- the NSW Local Roads Congress
- a number of IPWEA Group Meetings
- AITPM Regional Forums
- waste association groups covering the use of recycled crushed glass in civil construction.

## Other activities include:

- holding the NSW Local Roads Congress
- submissions to other levels of government on behalf of members
- representing local government to both state and federal governments
- publishing documentation to assist public works practitioners in their activities. [C](#)



Roads, bridges and road safety are critical issues for local communities.



Institute of  
Public Works  
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Australia  
(NSW Division)



# IPWEA (NSW) ROADS & TRANSPORT DIRECTORATE

The Roads & Transport Directorate is a joint undertaking between Local Government NSW and IPWEA (NSW). The Directorate commenced operations in October 2004.

## The Directorate was set up to meet the following objectives:

### Assisting members in discharging their road management roles:

- Effectively
- In accordance with current legal obligations
- Using the most recent technical practices
- Applying consistent and cost effective asset management

### Assisting:


- IPWEA (NSW)
- Local Government NSW
- Individual Councils
- Directorate members

### In lobbying:

- For a higher priority to be placed on road infrastructure provision and maintenance
- For a more equitable share of resources and funding

### Providing for:

- IPWEA members and
- The Local Government Industry
  - A powerful technical and research resource on transport issues at Regional, State and National level.



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# IS ratings for complex projects – the North West Rail Link

By Jo Haggerty (Manager Sustainability) and Stuart Hodgson (Principal Manager Sustainability Environment & Planning), North West Rail Link Project Delivery Office, Transport for NSW



Visualisation of the Windsor Road Bridge

Sydney’s \$8.3 billion North West Rail Link (NWRL) is Australia’s biggest public transport project currently under construction. Key features include:

- a train every four minutes in the peak on Australia’s first fully automated rapid transit rail network
- eight new railway stations, five upgraded stations and 4000 new commuter car parking spaces
- 14 million fewer car trips per year, or 12,000 fewer trips in an average two-hour weekday morning peak.

The NWRL is the first transport project in Australian construction

history to use four tunnel-boring machines, with all four now in the ground. Starting four months early in September 2014, the NWRL is currently ahead of schedule as we work towards rapid transit rail services starting in the first half of 2019.

The NWRL is being delivered via three major contracts:

1. Tunnel and Station Civils (TSC) – 15-kilometre twin tunnels between Bella Vista and Epping – the longest railway tunnels ever built in Australia, by Thiess John Holland Dragados joint venture

2. Surface Viaduct Civils (SVC) – delivering the four-kilometre skytrain between Bella Vista and Rouse Hill, along with other surface works such as bridges, embankments and railway cuttings, by Impregilo Salini joint venture
3. Operations Trains and Systems (OTS) – delivering new and upgraded railway stations, commuter car parking spaces, Sydney’s new rapid transit trains, and upgrading the railway between Chatswood and Epping, by the Northwest Rapid Transit consortium (MTR, John Holland, Leighton, UGL, Alstom, Plenary Group).



### Our sustainability commitment

Since inception, the Transport for NSW (TfNSW) NWRL Project Delivery Office (PDO) has had a clear vision to set new benchmarks in infrastructure delivery. During the early stages of the project in 2011, the NWRL PDO was challenged by its international peer review body to be an exemplar in delivering sustainable outcomes.

This challenge has driven the NWRL project to be at the forefront of using best practice initiatives to deliver environmental, social and economic improvements across the project. Sustainability underpins the core project program, and has been integrated across all project stages – it is not an afterthought or an add-on.

Our commitment is to ‘contribute to environmental, social and economic sustainability by improving livability, minimising our impact on the environment and the community, and delivering value for money’.

### Delivering and innovating

Early on, the NWRL PDO developed a sustainability strategy that ensures that the project delivers and promotes sustainable infrastructure in terms of objectives, targets and measurable outcomes across key policy themes throughout the project’s life cycle.

Sustainability requirements (including targets) have been built into all of the major contracts to drive improvements and innovation. The breadth of coverage of our program on this project is unique, and provides plenty of scope for innovation in policy development, design and delivery. Some examples of requirements and outcomes to date include:

- the application of a full suite of sustainability targets, including the requirement to achieve Infrastructure Sustainability (IS) ratings of Excellent (score 65)
- establishing a carbon policy that requires that 100 per cent of our

operational carbon emissions from electricity use (approximately 80 to 100 gigawatt hours per year) are offset

- providing performance incentives to drive energy efficiency
- using a climate risk management approach that interrogated our designs and generated contract requirements aimed at ensuring resilience to climate change
- ensuring the re-use of all clean excavated material (more than two million cubic metres of crushed rock) and mandated 90 per cent waste recycling targets
- preparation and implementation of a workforce development strategy and a multi-stakeholder NWRL Skills Employment Advisory Group targeting and promoting a skills legacy. Targets have included employing a significant number of apprentices. Local employment and diversity targets have also been established
- developing a pre-employment training program in partnership with TAFE
- making design changes to avoid the remains of a previously undiscovered hotel (dated 1830), which has non-Indigenous heritage value
- uncovering more than 10,000 Aboriginal artefacts, some more than 4500 years old
- biodiversity offsetting at a ratio of approximately four to one for removed vegetation communities.

### Targeting IS ratings

The NWRL project as a whole, and each of the major work packages (TSC, SVC and OTS), is aiming to achieve a minimum IS rating of Excellent for both Design and As Built, and this requirement is mandated in the relevant contracts.

Because the NWRL PDO set this performance level at a time when the IS rating tool was relatively new to the market, the project sustainability team needed to clearly demonstrate to the project decision-

makers and transaction advisers that the IS rating tool would benefit the project, and was achievable by the contractors. This was accomplished through:

- benchmarking the IS rating tool against other tools that have been used on similar large, complex projects internationally (for example, CEEQUAL, BREEAM)
- applying the IS rating tool in the development of the concept design for the project, to test the level of performance that would strike the balance between being achievable and driving good outcomes, supported by budget allocation for key sustainability initiatives
- working closely with ISCA to understand partnership and implementation details, and nuances of the tool so that we could overcome any barriers for implementation
- extensive consultation with project designers and decision-makers.

As a result of the work done early on, the NWRL became the first project to register with ISCA in New South Wales, and the requirement to achieve an IS rating of Excellent was embedded in all three major contracts. Contractual incentive payments have been established in some instances to encourage performance over and above the minimum IS rating of 65.

Each of the TSC, SVC and OTS work packages is responsible for achieving its own IS ratings with ISCA. Passing on the responsibility for achieving IS ratings to the contractors has ensured that they maintain ownership and accountability for their sustainability performance, and has ensured that dedicated sustainability managers and supporting resources are being used on the projects.

Using a formula pre-agreed with ISCA, the NWRL PDO will be building on the ratings achieved by our contractors to identify a ‘whole of project’ IS rating.

It is worth noting the achievement of the NWRL early works team, led by Lend Lease. Early works for the project comprised environmental investigations, demolition works, road and traffic adjustments, service relocations, and the provision of high-voltage power construction of the rail tunnel. Although an IS rating requirement was not included in the early works contract, the early works team has attained a certified rating of Commended.

### Implementation plan

Because the project involves three major contractors working concurrently, it has been important to have a clear understanding of how boundaries and responsibilities for IS rating scheme credits will apply. In consultation with ISCA and our project delivery partners, the NWRL PDO has developed an Implementation Plan to document responsibilities and keep track of decisions. The Implementation Plan is a live document, updated periodically, that:

- outlines roles and responsibilities for implementing the IS rating tool, including establishing the NWRL PDO's role as a facilitator
- clearly sets out the boundaries and scope of the OTS, TSC and SVC works
- provides transparency around the 'scoping out' or shared accountabilities for credits. The Plan describes the basis for the 'scoping out' of credits for some of the contractors. In many cases, evidence toward credits may need to be collected by more than one contractor and/or the NWRL PDO. The Plan documents responsibilities for credits
- aims to provide assistance to verifiers by concisely presenting the outcomes of technical clarifications and credit interpretation requests relevant to the NWRL project
- sets out protocols for communication between ISCA, the NWRL PDO and contractors.



### Sustainability forums

The NWRL PDO facilitates monthly sustainability forums involving ISCA representatives and sustainability managers working on each of the main contracts. The forums are an opportunity to share information on progress and lessons learnt, to discuss common issues, to explore synergies, and to seek informal feedback from ISCA and the NWRL PDO. The forums have been really useful in building collaboration across the teams.

### Successes and challenges

While it is relatively early days for IS ratings on the project, we are confident that our approach to embedding IS ratings in contracts, managing the process through an Implementation Plan and collaborating via sustainability forums is heading in the right direction to deliver good sustainability outcomes.

Our contract delivery partners are working very hard on integrating the IS credits into their projects, and gathering evidence. The work they are doing to

clarify and interpret credits, and to validate the calculators, will likely be of great benefit to ISCA and future projects.

As described earlier in this article, an IS rating is just one of the sustainability initiatives being implemented on the NWRL project. The main contractors are also variously required to implement the Green Star and NABERS tools, and the NSW Sustainable Design Guidelines for Rail, which makes for a complex sustainability framework and means that keeping track of IS rating scheme credits has proved to be challenging.

The NWRL PDO will be closely monitoring the costs and benefits of using the IS rating tool, and seeking lessons learnt along the way. In the future, subject to a mandate, the Sydney Rapid Transit network will be extended from the end of the NWRL at Chatswood, under Sydney Harbour, through the CBD and west to Bankstown. Our experience on the NWRL project will inform the IS rating strategy adopted for this next stage of the Sydney Rapid Transit network. **C**



# Steel as a sustainable material for infrastructure projects

A key means of using steel to improve sustainability in infrastructure projects is by reducing the impact of materials. This can be achieved by:

1. reducing the total steel quantity
2. re-using existing structural elements
3. recycling steel materials at the end of life.

## 1. Reducing the total steel quantity

Higher-strength grades can facilitate the use of lighter structural sections in place of heavier sections, reducing the tonnage of material required and thereby reducing the use of raw materials.

Non-standard products can contribute to improved sustainability through minimising wastage. Customers can select the specific thickness, width and length

combination according to their project requirements, reducing the amount of waste at the end of the fabrication process. Wind towers are an example of where non-standard dimensional products have assisted in minimising waste and considerable cost savings.

## 2. Re-using existing structural elements

Steel can readily be welded or bolted, adding new elements to existing structural members in a functional, aesthetically pleasing and efficient manner.


The benefits of incorporating existing structures into projects include:

- material saving
- energy saving
- reducing recycling costs of the material removed from site.



Wind towers in Codrington, Victoria

## 3. Recycling steel materials

At the end of a structure's life, a key sustainability consideration is the amount of material that can be recovered and recycled. The overall recovery rate for steel in buildings at the end of their life in Australia is estimated to be greater than 90 per cent. Steel is 100 per cent recyclable. 

## 3 STRATEGIES TO IMPROVE INFRASTRUCTURE SUSTAINABILITY WITH STEEL

- 1 Use higher strength steel to reduce material quantities.
- 2 Bolt or weld together new and existing steel structural elements where possible.
- 3 Recover steel from Australian buildings (currently >90%). Steel is 100% recyclable.

To find out more visit [steel.com.au](http://steel.com.au)

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# Defining the business case for sustainability

Competitive advantage is the primary benefit reported by global business executives amid an increasing recognition of the link between financial performance and sustainability; however, many businesses and industries are struggling to enunciate the value-adds or compile a business case to influence decision-makers. This is particularly the case in the construction sector. Glenn Hedges discusses the latest findings of studies examining the business value of sustainability, with a focus on the construction industry, and suggests how organisations working in the sector can better compile and articulate the business case for sustainability.

## Role of business: to maximise profit or to maximise value to shareholders?

The fundamentals of shareholder value maximisation are explained in many ways in finance textbooks, though many state that a firm's purpose is to maximise the current value of shareholders' equity. In 1970, Milton Friedman wrote in the *New York Times Magazine* that 'There is one and only one social responsibility of business ... to increase its profits so long as it stays within the game'. This assertion is based on an assumption that government is both willing and able to establish the rules of the game such that the interests of all non-owner stakeholders and the environment are adequately protected to achieve sustainable development.

This common perception has reinforced a belief that non-financial business outcomes are usually seen as immaterial, or are peripheral matters that add to costs or are of importance only when they directly affect financial outcomes. This view of value creation tends to focus decision-making on optimising short-term financial performance – decisions such as organisational restructuring and driving down supply chain margins

to reduce costs. This view can lead a business to miss its clients' real needs, and to ignore broader influences that generate longer-term success. And while discretionary corporate social responsibility activities have been designed to improve reputational capital, this has commonly been undertaken with an altruistic intent, and without any linkage to core business goals.

## Sustainability linked to financial performance and creating competitive advantage

The evidence is mounting of the relevance and importance of sustainability (described here as outcomes that extend beyond legal or business-as-usual standards) to financial performance, particularly in generating competitive advantage:

- 92 per cent of more than 1500 global corporate executives in 2009 agreed that sustainability-related issues were having, or would soon have, a material impact on their business.
- 86 per cent of 1847 senior corporate respondents in 2013 agreed that competitiveness is a key economic driver for sustainability.
- A global survey of 250 Chief

Financial Officers in 2012 found that 49 per cent saw a strong link between sustainability performance and financial performance.

- A causal link was found in 2013 between corporate social responsibility (CSR)-related shareholder proposals and superior financial performance in a range of United States-listed companies, in terms of short-term announcement returns in addition to longer-lasting profitability.
- A 2011 empirical study of 180 United States-listed corporations demonstrated that companies exhibiting several voluntary CSR practices significantly outperformed their industry sector competitors (of equivalent size and focus) over a 16-year period to 2009.

Competitive advantage and increased profits are being realised by firms that use their tangible and non-tangible resources in committing to sustainability as an organisational capability. In doing so, they generate cost reductions, reduce their risks, build better reputation outcomes, gain first-mover advantages, gain an enhanced ability to innovate, and become increasingly attractive as an employer of choice.

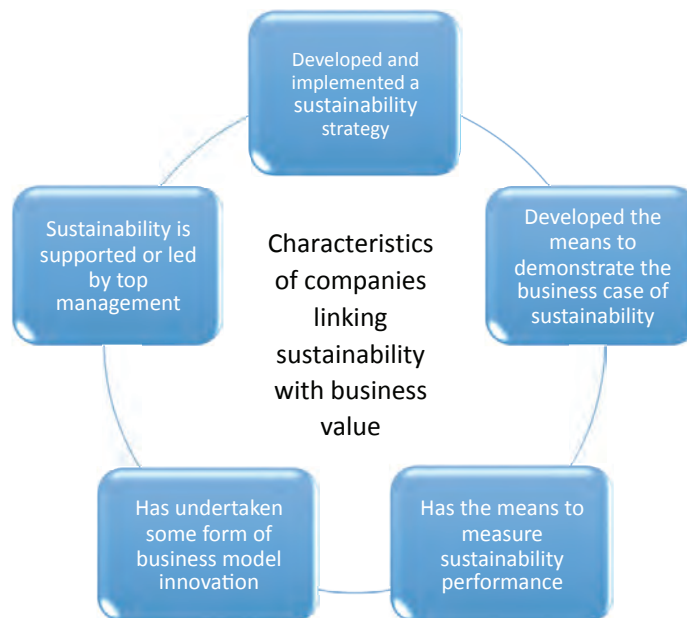


Figure 1. Characteristics exhibited by companies actively engaged in sustainability

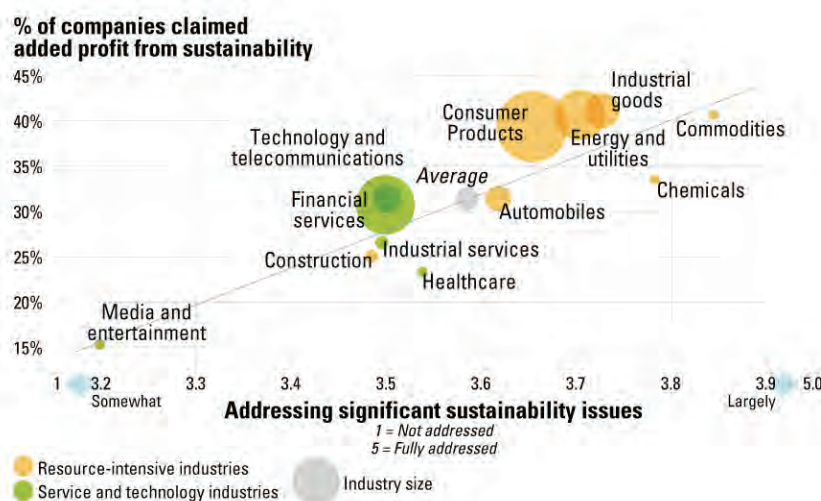


Figure 2. Industry sectors profiting from sustainability (Eccles et al., 2013; Kiron et al., 2013)

So, how does business maintain profitability and continuously build value for shareholders while balancing the economic, environmental and social needs of, and impacts on, its other key stakeholders? Studies have shown that companies that actively engage in sustainability and link it with business value exhibit the characteristics shown in Figure 1.

Despite the reported shift in corporate executives recognising and acting upon

the value-creation opportunities that lie in sustainability, only a small proportion of companies have been successful in developing a clear business case for sustainability. For example, only 37 per cent of companies surveyed in 2013 indicated that their company had developed a clear business case for sustainability, with 20 per cent indicating that they had tried and failed. So, what's involved in compiling a business case, and why is the construction sector struggling to profit from sustainability?

### Sustainability and business value in construction

Sadly, companies in the construction industry are some of the least likely to claim added profit from sustainability outcomes, or to indicate a favourable degree of addressing significant sustainability issues when compared to other industry sectors (refer to Figure 2).

Several reasons have been identified that explain these results, though the key barriers relevant to construction are that:

1. decision-makers in the construction industry adopt the traditional paradox of business and society, where sustainability is viewed as an imposition that incurs extra cost or delays, or requires a trade-off with financial performance
2. project performance management in construction is client-driven, with customer satisfaction mainly relying on the completion of projects on time, within budget, and with satisfactory quality, encouraging a 'best for project' culture and a disconnect from parent companies' business goals
3. short-term executive performance and rewards incentivise short-term financial performance to the exclusion of sustainability performance in either the short or long term. Similarly, incentives that are provided for results within an executive's own business unit, rather than the overall organisational performance, provide a disincentive to create value at an organisational level
4. sustainability risks are traditionally ill-analysed in infrastructure evaluation and planning decisions. Financial analysis frameworks, such as benefit-cost ratios, net present values, and internal rate of return methods, largely fail to quantify social and environmental capitals and risks. Environmental economics (which sometimes support these project evaluations) are also considered to be imprecise, with outputs quickly considered to be outdated.



Organisations that can overcome these barriers, develop the tools to define the business case for sustainability outcomes, and incorporate non-financial metrics into decision-making processes will better position themselves to understand the relationship between improved sustainability and financial performance. This, in turn, can lead to the creation of greater value for shareholders.

Developing a company-specific set of metrics for non-financials to inform decision-making sounds prudent, though efforts to reinvent the wheel are fortunately not required. A range of processes and frameworks exists to enable companies to articulate and measure value creation, including non-financials, in the context of business strategy, including integrated reporting, balanced scorecard, a variety of quality management systems, key responsibility area (KRA)/ key performance indicator (KPI) measurements, and assorted hybrids. A major drawback of these relates to their organisational focus, the absence of justifiable metrics enabling non-financial capital types to be compared (such as intellectual and relationship capitals), and the lack of provision for construction projects on which to base a sustainability business case in order to include project and parent company performance measures. And to add another layer of complexity, building a business case solely focusing on project performance outcomes is likely to undervalue the business case due to the exclusion of the parent company, and broader stakeholder benefits.

To overcome these barriers, a value driver based framework is envisaged to assist the construction industry to incorporate sustainability into decision-making at a project and organisational level.

### Value drivers and the Value Flow Framework

The 'Value Flow Framework' was first published in 2009, and it defined how business value must be associated with total shareholder return for commercial organisations. It recognised that shareholder value is a function of free cash flow that is available for

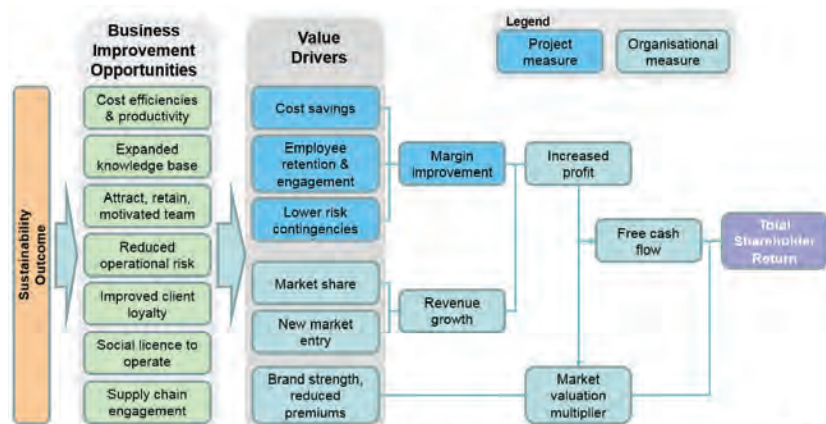
distribution, and the valuation multiple that the market places on a business over and above its net tangible asset value (for instance, market perceptions of risk and brand strength). The capabilities that give an organisation competitive advantage, and those over which it has some degree of control, are regarded as value drivers. Business improvements that act on these value drivers to increase profits through margin improvement, revenue growth and/or the valuation multiple are a means of demonstrating the business case of sustainability.

It is important to note that value drivers must be individually tailored to match the objectives, strategies, cultures and operational processes of industry sectors and each business. The dynamic nature of the construction industry, and the barriers noted earlier, make the ability to enunciate value more challenging.

A review of academic and industry studies identified several value drivers and business improvement outcomes that are most pertinent to construction companies. The top three key value drivers found in a 2012 Australian industry survey were cost savings, strengthened reputation and better risk management. Other relevant value drivers that were identified included improved employee retention, attraction and engagement;

improved market share; and new market entry. The business improvement outcomes that were also identified in these studies, and were considered most relevant to a construction company, were cost efficiencies and productivity; expanded intellectual capital; attracting talent and having a motivated team; reduced operational risk; improved client loyalty; maintaining a social licence to operate; and supply chain optimisation. The resultant Value Flow Framework (Figure 3) links these business improvement opportunities from sustainability with value drivers and total shareholder value. It also recognises the means by which value flows relate to construction project performance and organisational performance.

The Value Flow Framework recognises that a sustainability initiative could provide singular or multiple business improvement opportunities, and could affect one or more value drivers. For example, a project complies with all of its approval conditions, but it is still causing significant community disruptions (noise, for example). While some disruptions may be inevitable, the conversion of some financial capital to implement mitigations that reduce community impacts may generate sufficient social and relationship capital. This may also provide a longer-term financial return associated with the client, and community goodwill, enabling future



Hedges (2014) with key influences from Berns et al (2009) and Stapledon (2012)

Figure 3: Sustainability Value Flow Framework for construction companies

flexible work practices on the project (for example, extended work hours) and repeat business with the client.

This Framework also incorporates flexibility into the choice of metrics for the business improvement opportunities and value drivers that are used to generate a business case in describing how the project and parent company measures financial or non-financial performance. Furthermore, it complements the important role that ISCA's IS rating scheme plays in today's competitive tendering environment, encouraging the market to innovate and achieve meaningful sustainability outcomes as part of a consortium's value engineering proposition.

### The role of the IS rating scheme in creating business value

The specification of IS rating targets in tenders inherently requires competing consortia to innovate on a level playing field for beyond compliance sustainability solutions, which some forms of contract typically don't encourage or reward. There is also evidence that the extra focus on sustainability outcomes specified in the IS rating scheme during project delivery is creating business value through a variety of means, including by stimulating innovation and cost savings from improved efficiencies in the use of natural resources; through rewards practices, such as knowledge sharing, which increase a company's intellectual capital; and by rewarding client and stakeholder engagement and participation, which increases a company's social and relationship capital.

### Conclusion

Engaging construction industry decision-makers in the business value of sustainability requires the provision of a business case that links the benefits to the creation of total shareholder value. The Value Flow Framework assists in formulating the business case by describing business improvement opportunities that are created by

the initiative within the context of performance metrics used by the project at hand. It also assists by describing the parent organisation and how they act on value drivers that impact on margin improvement, revenue growth, and the market valuation multiplier for the parent company.

*It is important to note that value drivers must be individually tailored to match the objectives, strategies, cultures and operational processes of industry sectors and each business*

The absence of organisational metrics for non-financial capitals or value drivers makes this somewhat more of a challenge, and this should serve as a reminder for construction companies to better understand their strategic value drivers, and to implement simple and effective non-financial indicators of value enablers.

Infrastructure proponents responsible for establishing the nature of contracts and performance incentives also have an important role to play in defining project performance metrics to ensure that a business case for sustainability is based

on more than cost, quality, program and reliance on legislation and approval conditions in order to dictate sustainable development benchmarks.

When incorporated into a contract, the IS rating scheme can provide a practical structure to articulate a business case for sustainability outcomes within a competitive and cost-constrained environment, which benefits all project stakeholders and broader society. **C**

#### The author

Glenn Hedges is an environmental engineer with 20 years' experience in sustainability and the built environment within Australia and the United Kingdom. He was a co-founder and former Director and Company Secretary of ISCA (formerly the Australian Green Infrastructure Council), and is currently employed as Senior Engineer Sustainability within the Leighton Holdings Group. This article is based on preliminary findings of a Business Masters (Research) on defining the business value of sustainability in infrastructure delivery, which is to be completed by the author in 2015. The contents of this article are the views of the author in their entirety, and are in no way reflective of or related to the Leighton Holdings Group. For further information on this article or references contained within it, contact [glenn.hedges@leicon.com.au](mailto:glenn.hedges@leicon.com.au).

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# Three by three IS



Ultrafiltration membranes - Yarra Park Water Recycling Facility

## Proven and expected benefits across three Infrastructure Sustainability (IS) ratings, and three IS rating types

Downer has now achieved two IS ratings (Design and As Built for the Whitsunday Sewage Treatment Plant (STP) Upgrades Project in North Queensland), and a further rating – an Operations rating for the Yarra Park Water Recycling Facility in Melbourne – is underway.

The experience gained from the ratings to date has instilled confidence within the organisation and, for Downer, the IS value proposition has been proven. As a consequence, Downer now considers pursuing IS ratings a matter of course, and has set minimum internal sustainability standards (aligned with the IS rating tool) for new major projects going forward.

### Key findings

Downer’s use of the IS rating tool has produced both expected and unexpected outcomes. We have also ground-truthed the general benefits and claims promoted by ISCA, and found them to be realistic.

The key findings are outlined below.

**Overall costs versus benefits:** For the Whitsunday project, Downer found that the benefits of pursuing and achieving the ratings have outweighed the costs at least fivefold. While it is fair to say that some initiatives would have been pursued regardless of the ratings, it is equally reasonable to say that many would not have been pursued. A detailed breakdown of the specific costs and benefits is provided later in this article.

**Innovation:** The tool has provided a platform and driver for innovation. It has encouraged us to discover and pursue new ways of designing, building and operating infrastructure; for example,

the trialling of a world-first wastewater treatment process – parallel nitrification and denitrification – at the Proserpine Wastewater Treatment Plant. It is hoped that this process will open the way for more compact treatment plants that use fewer construction materials and less energy.

**More resilient assets:** A number of IS credits prompt consideration of issues and opportunities to design and deliver more resilient assets. By exploring likely climate change scenarios, we have identified key risks that were within our control, and have responded appropriately via changes to the design of the plants. For example, we changed the telecommunications arrangements to ensure that remote operation of the plants is still possible with the expected increase in cyclonic activity.

**Competitive differentiation:** There is growing interest in IS from our current and potential clients across a range of jurisdictions. Conversations are increasing in number and breadth. This is particularly the case for clients that



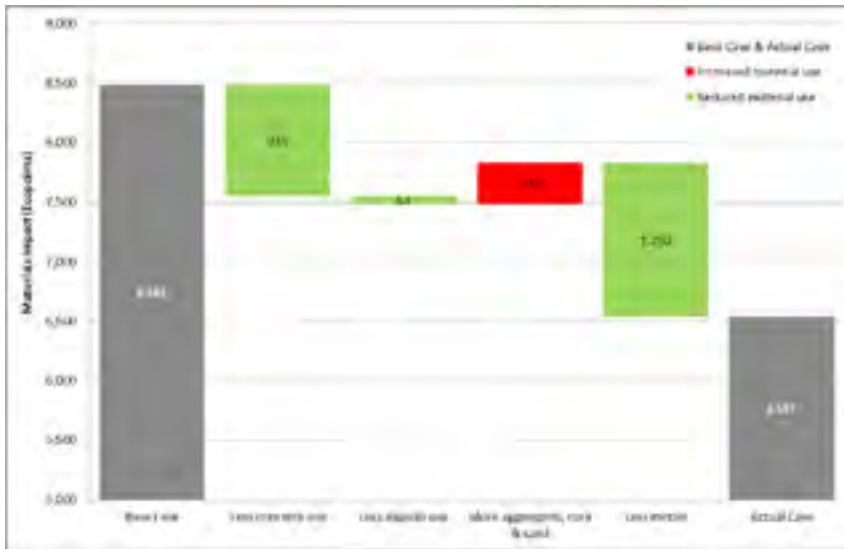


Figure 1: Materials 'waterfall' chart for Whitsunday IS As-Built rating

value (either explicitly or implicitly) sustainability, and/or want to have this knowledge and experience transferred back into their organisations.

**Articulating sustainability performance and achievements:** The tool has provided a clear and consistent

means of articulating sustainability performance and achievements. These may have been delivered in the past without being enumerated (for example, the financial impact of reducing material consumption and energy conservation outcomes). Importantly, an IS rating also helps to

avoid 'greenwash' by providing a robust, third-party verified and industry-accepted mechanism to communicate sustainability performance.

**Driver of internal change:** Pursuing and achieving the IS design rating for the Whitsunday STP Upgrades project provided sufficient confidence of the benefits at the leadership team level to approve a material policy change to our sustainability strategy and procedures. As a consequence, our Sustainability Policy now requires us to consider an IS rating for every project, and also to meet a minimum internal sustainability performance standard. The latter is based on the IS rating tool.

**It gets easier:** Not unexpectedly, the initial effort to achieve the first IS rating was significant. There were also uncertainties regarding approach, and expectations for the rating outcome, as well as the nature and burden of evidence. Pleasingly, we found that it gets easier with experience and through building the approach into our systems,

Table 1: Benefits

INITIATIVES/ELEMENT	BENEFITS (\$)	OTHER BENEFITS
Fewer construction materials – 4400 tonnes less material was used (compared to the base case)	\$900,000 less expenditure on materials	23 per cent reduction in environmental impact (1945 fewer EcoPoints – Figure 1) and 32 per cent fewer greenhouse gas emissions (1516 tonnes CO <sub>2</sub> e) by avoided consumption of materials
Energy-efficient wastewater treatment processes and equipment – annual electricity consumption is being reduced by 458 megawatt hours (MWh) (compared to the base case)	\$120,000 lower electricity costs per annum during operations	20,000 tonnes of greenhouse gas emissions will be avoided over the plants' operational lives (compared to the base case)
Green IT strategy during construction	\$4000 lower electricity costs during construction	19 tonnes of greenhouse gas emissions were avoided during construction
Process changes and hybrid vehicle use	\$3000 fuel savings during construction, and \$14,000 less expenditure on liquid sugar per annum during operations	Reduced greenhouse gas emissions and lower product consumption
More efficient sludge dewatering methods More efficient dust suppression – a sprinkler system was used in lieu of water carts	\$48,000 savings per annum during operations by selecting 'geotubes' over sludge cartage \$100,000 savings during construction period	Reduced traffic (water cart and sludge truck movements) in local streets
Climate change risk identification and management	Marginal increased cost (accounted for in costs table)	22 climate-change related risks were identified, considered and appropriately actioned. For example, communications ability will be maintained during extreme weather events. This allows remote operations of the plants in an event of road access being cut off due to flooding or cyclonic events
Supplier innovations	No additional cost	Reduced greenhouse gas emissions by biodiesel use in a crane Low halogen electrical cable used by an electrical contractor (will reduce emission toxicity in the event of a fire)

Local procurement target	No additional cost	Economic benefits were delivered to the local area and region with a total spend of \$21 million (47 per cent of total project cost) on goods and services
Enhanced revegetation strategy	Marginal increased cost (accounted for in costs table)	Creation of a carbon sink (283 tonnes of greenhouse gas capture) Significantly enhanced biological diversity at sites (21 and 25 new locally native plant species now exist at the Cannonvale and Proserpine sites respectively)
Trial of parallel nitrification/de-nitrification process	Intangible: Unable to ascertain at this time but will assist with market differentiation and increase capability	We expect that this will lead to smaller-footprint plants with higher effluent quality and lower energy consumption
Reputation enhancement and contribution to winning work	Intangible: Unable to ascertain at this time, but the ratings are assisting with market differentiation	
<b>Total savings from construction:</b>	\$1.1 million	
<b>Total annual operational savings:</b>	\$182,000	

**Table 2: Costs**

ITEM	ESTIMATED AMOUNT	COMMENTS
IS rating fees	\$43,000	Fees for Design and As Built ratings
Consulting assistance	\$16,000	Obtained for climate change workshop facilitation, ecology, soil productivity, and auditing of energy monitoring and modelling report
Enhanced vegetation	\$5000	Additional cost to increase extensiveness of revegetation and use an appropriate mix of locally indigenous species
Rating internal labour costs	\$150,000	Additional effort on behalf of project team and IS rating assessor (expected given this was the first time a rating had been pursued)
<b>Total additional costs:</b>	<b>\$214,000</b>	

such that the resource requirement has become manageable. The level of uncertainty also drops to the point where there is fairly good certainty as to likely rating outcomes.

**Costs and benefits – Whitsunday Design and As Built IS ratings**

The costs and benefits of pursuing a sustainability agenda and IS ratings on the Whitsunday project are articulated in Tables 1 and 2.

From the tables, it is apparent that the rating-related costs are around one-fifth of the benefits identified during construction. This does not take into account the intangible benefits associated with increased reputation or market differentiation. Further, it should be noted that the (one-off) costs are roughly equivalent to the annual savings expected to be realised during each year of wastewater treatment plant operations.

As the IS operations rating for the Yarra Park Water Recycling Facility is presently

underway, costs and benefits are not yet able to be determined.

Downer’s experience is that the rigour and framework of an IS rating offers a significant return for a relatively

modest investment. The costs for the Whitsunday Design and As Built ratings – not taking into account any savings driven via the ratings – represented 0.5 per cent of the project’s \$45 million value. [C](#)



Yarra Park Water Recycling Facility, Melbourne

# Preserving the past and building for the future

By Mark Sabolch, National Environment Manager, Engineering, Lend Lease



Artist's impression of the White Hart Inn

Putting sustainability into practice goes beyond minimising consumption and protecting the environment. When it comes to major projects, caring for cultural and heritage assets so that they can be enjoyed by future generations is equally important.

This is an approach that Lend Lease's Engineering business applied during the Early Works Package as part of the \$8.3 billion North West Rail Link project in Sydney.

Lend Lease adopted the Infrastructure Sustainability (IS) rating as a voluntary activity from the outset, and experienced its full value during initial works along the rail corridor.

During careful test excavations in the early phase of the project, the Lend Lease project team uncovered the

ruins of the White Hart Inn, a colonial-era landmark built in the 1820s. Lend Lease, along with the EMM heritage consultant team, successfully helped to preserve an important archaeological find that will reveal more about western Sydney and its contribution to the colony's development.

While the Inn had been previously identified, it had been regarded as low-value due to previous disturbance in the vicinity as a result of development and infrastructure upgrades.

Excavation work, however, uncovered the original sandstone and brick wall layout of the Inn, cellars and stables, as well as significant artefacts on site. In liaison with our client, Transport for NSW, Lend Lease's Engineering business commissioned further detailed archaeological work in accordance with an approved research design.

The subsequent archaeological investigations identified a site rich in historical value. Old children's toys, slate pencils and slate for writing, and crockery fragments are among some

of the historical artefacts that have been discovered and documented, illuminating what life was like in the area in the 19th century.

Every room in the Inn had an entrance from the verandah, and there may have been additional facilities for special guests.

The main users of the Inn were coach runs operating between large settlements, such as Parramatta and Windsor. Coach routes ran along Windsor and Old Windsor Roads, and are likely to have stopped at various inns along the way.

Using the foundations, archaeologists have been able to create an artist's impression of what the Inn could have looked like. The surviving architecture of the Inn complex has significance in its ability to physically demonstrate the historical use of the complex, as well as the future interpretative capabilities of the site. It is of State Significance.

Given the cultural and historical significance of the site, Transport for NSW made the decision to conserve the site, modifying the construction of the North West Rail Link as a result. A permanent pier that was originally located directly within the White Hart Inn site has been relocated, and the spans for the aerial rail structure redesigned.

The heritage outcomes we achieved on this project received welcome acknowledgement from ISCA – scoring the highest possible IS Heritage credits for Her-1 and Her-2.

While Lend Lease is proud of its approach to sustainability, the involvement and learnings through the process of adopting the IS credits to the Early Works program have been extremely beneficial for the site





Photos courtesy of EMM

management team. Chief learnings have been:

- scheduling test excavations early in the project program has enabled time for a considered heritage response to the discovery
- making the discovery known early with the client and authorities has meant that the later design and construction package had time to adapt to the find. This has saved the overall project from program delays and potential significant escalated construction costs.

From a sustainability perspective, the chief benefits of this heritage discovery have been:

- providing some tangible detail to illuminate what cultural life was like in the 19th century at this location
- enhancing the heritage value beyond that which had been identified for this site in existing government registers. The site has now been designated as of State Significance
- developing further partnerships with the local community and using the site discovery to promote local heritage values. A series of Heritage Open Days allowed heritage professionals, local school teachers and the general public to visit, inspect and witness the uncovered heritage items.

Above all else, Lend Lease has uncovered a new and tangible heritage asset that physically and culturally demonstrates what life was like in colonial Sydney.

By being adaptable and respectful of the heritage find, Lend Lease has shown that you can preserve the past and build for the future.

**What we found**

Archaeological experts EMM have carefully excavated the site and catalogued interesting finds, including:

- a toothpaste container with the inscription ‘Cherry toothpaste,

patronised by the Queen, for beautifying and preserving the teeth and gums, 27 Old Bond Street London’

- children’s toys, including a painted doll’s leg
- coins, including some from 1816 and 1853
- a salt container, inscribed ‘Weston and Westalis Superior British Table Salt’
- fragments of an iron container, possibly a milk pail
- slate pencils and slate used for writing, and ink bottles
- crockery fragments including plates, cups, bowls and serving dishes in blue willow pattern or Asian-style scenes
- wine, champagne, beer and ginger beer bottles
- patterned salad oil bottles
- a key and lock, horseshoe, and hand-made nails
- leather from shoes
- bone buttons.

**History of the White Hart Inn**

Existing archives have revealed that the White Hart Inn was originally owned by William Cox Esquire. Upon his death in 1836, the ownership was passed to his son, William Cox Junior.

Publican’s records show William Cross as publican at the White Hart from 1830–1831, with Sarah Tighe, a widow, holding the licence for the Inn from 1832–1833. ©



# A contractor's approach to sustainability



John Vida, NSW Engineering Manager for Lend Lease's engineering business at the 2014 ISCA conference.

Lend Lease's engineering business (formerly Abigroup) was one of the joint venture partners in the Bulk Water Alliance, which constructed the Enlarged Cotter Dam and provided other works to enhance the water supply in the Australian Capital Territory region.

Last year, Cotter Dam was one of two projects Lend Lease worked on that received an ISCA rating as a sustainable project. The other was the North West Rail Early Works project, which was the first project in New South Wales, as well as the first heavy rail project, to achieve a rating under the ISCA sustainability rating scheme.

According to John Vida, NSW Engineering Manager for Lend Lease's engineering business, the conversation around sustainability is an important one for contractors that are delivering major projects.

'Lend Lease is Australia's largest tier-one contractor. Our vision is to create the best places, and sustainability is one

of our three guiding principles – along with safety and diversity. Sustainability is about doing what is smart and right for the future,' says Vida.

'Having worked through the ISCA rating process with ACTEW on the Enlarged Cotter Dam, it is important to include key challenges in the conversation around the sustainable delivery of infrastructure projects.

'Generally, cost is the primary hurdle to contractors embracing sustainable practices. For me, the ideal situation is when sustainable practices lead to cost reductions or improved efficiencies, because they are more easily accepted and more likely to be adopted.

'Good examples of this are re-using excess soil classified as general solid waste on-site instead of transporting it to landfill; sharing excess mulch from land clearing with local farmers; or using a biofuel generator to power remote sites. In this way, innovation and sustainability go hand in hand.

'A second key challenge for contractors would be one of collaboration: making sure the contractor's expectations and enthusiasm for sustainable outcomes are aligned with the client. My business is lucky in that federal and state government bodies form the bulk of our client base, and sustainability is fairly high on the public sector agenda.

'Finally, certainty of supply of sustainable materials is a challenge. Some materials may be from sustainable sources, but cannot be supplied in the quantities or frequency required to meet the project objectives. In this regard, there is always a balance to be achieved.

'Challenges aside, the best outcome is when clients and contractors work together to deliver sustainable projects. I was pleased to be part of fine-tuning the ISCA rating tool with ACTEW at the Cotter Dam project,' says Vida. 