

CRCWSC Research Synthesis

Discussion Paper | CRC for Water Sensitive Cities

IDEAS FOR SOUTH BANK

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Ideas for South Bank: sustainability workshop

This "Ideas for South Bank" document contains potential water and energy initiatives for the South Bank business precinct, a prime lifestyle and culture destination in the city of Brisbane, Queensland. It compiles ideas generated by stakeholders during the South Bank research synthesis workshop, which was hosted by the Cooperative Research Centre for Water Sensitive Cities (CRCWSC) and Business South Bank on 20 and 21 September 2016.

The workshop used the Research Synthesis process (see page 34) to generate ideas towards a central question: what are the best ways to improve sustainability in the South Bank precinct? To approach this question from a new angle, the workshop engaged with the CRCWSC and Low Carbon Living Cooperative Research Centre to scope sustainability projects that harness the latest water, energy, and sustainable cities research.

Several members of Business South Bank were instrumental in organising the workshop, including:

- Arts Queensland
- Brisbane Convention and Exhibition Centre
- City Parklands
- TAFE Queensland



Context for the workshop

In 2009 Business South Bank established a goal: for South Bank to be Australia's most sustainable business precinct.

The precinct has already gone a long way towards achieving this goal, with numerous awards to its credit. To maintain these credentials, Business South Bank must ensure that South Bank remains at the forefront of sustainability innovation and achievement.

The business case for this objective is already strong. Beyond the operational savings that can accrue from sustainability measures, the precinct has attracted new business investments which demonstrate its commercial appeal. Visitor and resident numbers are also increasing (Figure 1) – people are attracted to the landscapes and experiences South Bank offers.

Previous sustainability actions have reduced the resource footprint of the precinct, and have been delivered through actions led largely by individual businesses.

With anticipated development, rising visitor and resident numbers (which put increasing pressure on current infrastructure), and a changing climate creating additional costs (e.g. to manage the effects of weather extremes), a review of the sustainability direction and priorities is required.

To create the world's best new urban precinct – a place that people want to come to and which provides the visitor with an authentic and uniquely Queensland experience.

— A vision for South Bank, 2016



Workshop aims

The workshop had several aims:

1. Determine what “sustainability success” looks like.

Business South Bank has an ambition for South Bank to be Australia’s most sustainable business precinct. To assist in this process, it conducted sustainability audits of businesses in 2010 and 2012 to benchmark the precinct’s performance, and to identify areas of improvement. This “learning by doing” approach is important and can be complimented by an agreed “finish line” that describes the attributes of a sustainable South Bank.

2. Identify opportunities for on-ground projects.

With an emphasis on action, it is important to identify sustainability projects that are feasible. The workshop focused on project ideas that harness emerging science and are evidence-based examples of sustainability best practice.

3. Enhance collaboration.

Many of the large land owners in the precinct have a strong commitment to sustainability. While there have been some joint initiatives, there is potential for further collaborative sustainability projects.

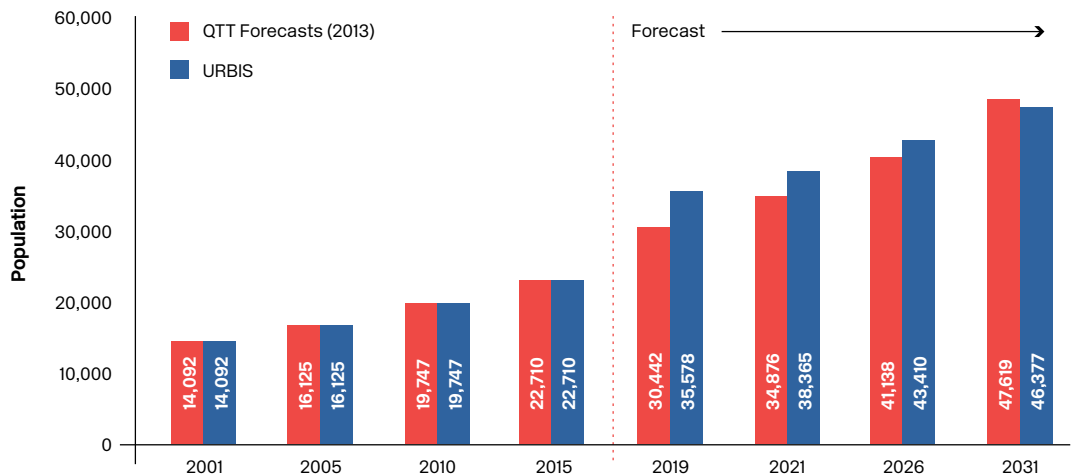


Figure 1. Forecast population growth for South Bank (Source: Business South Bank)

About South Bank

The South Bank precinct covers approximately 100 ha and hosts 10 million visitors each year. It comprises a number of sub-precincts (Figure 2), which are managed by different private and public businesses that can cooperate at a precinct-wide scale.



Figure 2. The main South Bank sub-precincts (Source: Business South Bank)

South Bank has a unique advantage in pursuing collaborative sustainability projects. It is well placed because:

- A small number of entities own or control a large portion of the land in the precinct.
- The major land owners have a strong commitment to sustainability.
- Governance arrangements (namely South Bank Corporation and Business South Bank) are in place to promote and coordinate sustainability initiatives.
- The close physical proximity of a number of large institutions (Arts Queensland, City Parklands, Brisbane Convention and Exhibition Centre, TAFE Queensland) creates the potential for synergistic projects.
- The importance of investing in the public realm is recognised. At 62 people/m²/year, estimates place the Parklands sub-precinct as the most intensively used public space in the world.

Sustainability at South Bank

The 2010 and 2012 sustainability audits of individual businesses (their practices and behaviours) demonstrated:

- Significant reductions in energy and water use, achieved through technology solutions such as lighting upgrades and use of recycled water for irrigation, and by behaviour change and education programs.
- Investment in innovation, including:
 - The award winning Rain Bank system, which produces up to 77,000 KL of water for use in the South Bank Parklands.
- The education potential of sustainability investments. The Rain Bank plant room, for example, has been designed as an educational tool for visitors who want to understand stormwater treatment.
- Strong support for sustainability from business. Approximately two thirds of businesses have implemented energy and/or water efficiency measures, and sustainability is universally supported by staff in the businesses surveyed.

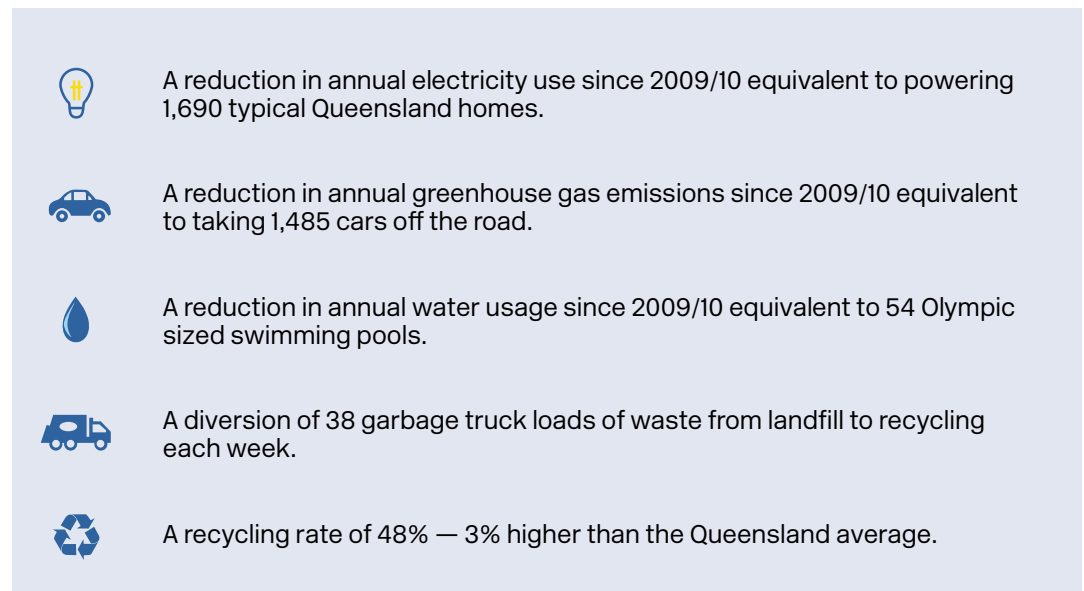


Figure 3. Key sustainability achievements described in the 2012 sustainability audit (Source: Ensign, 2013)

South Bank's next sustainability steps

Business owner perspectives

Business South Bank members at the workshop reflected on past achievements and future opportunities. Several insights emerged from these reflections (listed below, along with comments provided in the workshop):

Sustainability makes business sense for South Bank	<ul style="list-style-type: none">• Businesses in South Bank are looking to continually and incrementally reduce operating costs, and achieve environmental improvements.• Sustainability and inter-business collaboration are increasingly becoming a part of core business.
The journey has started – but there is a long way to go	<ul style="list-style-type: none">• The easy projects – LED light replacement, education programs, and doing audits – have been implemented. The next projects will be bigger and more complex.
South Bank is rich in resources, which can be harnessed if the precinct is managed as a whole	<ul style="list-style-type: none">• The recycling of dehydrated food waste from the Brisbane Convention and Exhibition Centre, and green waste from the South Bank Parklands (via the Roma Street facility) demonstrates the positive sub-precinct relationships in South Bank.• Further rainwater harvesting is limited by a lack of storage space within the Cultural Precinct. There is a need to look beyond individual sub-precinct boundaries for solutions.
Sustainability actions help to shape the visitor experience	<ul style="list-style-type: none">• TAFE aims to provide a world class educational environment for students. The students' experience is paramount, and that extends to sustainability initiatives.• Sustainable lighting has improved safety in the Rainforest, enabling it to be opened at night.
Heat waves are a sustainability issue	<ul style="list-style-type: none">• Longer summers and hotter evenings will draw increasing numbers of visitors to South Bank's unique landscape. This is evident from recent usage patterns of the Parklands pool.• Longer and hotter summers will impact the Cultural Precinct. The precinct's outdoor spaces are becoming increasingly popular destinations in their own right.
Other planned investments provide a window of opportunity	<ul style="list-style-type: none">• End-of-life-cycle replacements enable the transformation of buildings, and provide opportunities to introduce new sustainability technologies.• There are a number of scheduled asset replacements and planned infrastructure investments that provide opportunities for sustainability projects.
Future projects will harness collaboration between businesses	<ul style="list-style-type: none">• There is a small number of large-footprint land owners with a commitment to sustainability. A need exists to explore options for collaboration and working together.• Sustainability will (only) be achieved by building collaborative outcomes for South Bank.

South Bank as a water sensitive city

Water management provides a useful framework for mobilising the sustainability “next steps” outlined above.

An investigation of cities globally shows that our management of water evolves as community needs change. This evolution is described in the urban water transitions framework (Figure 4), which also predicts how water will be managed in cities of the future.

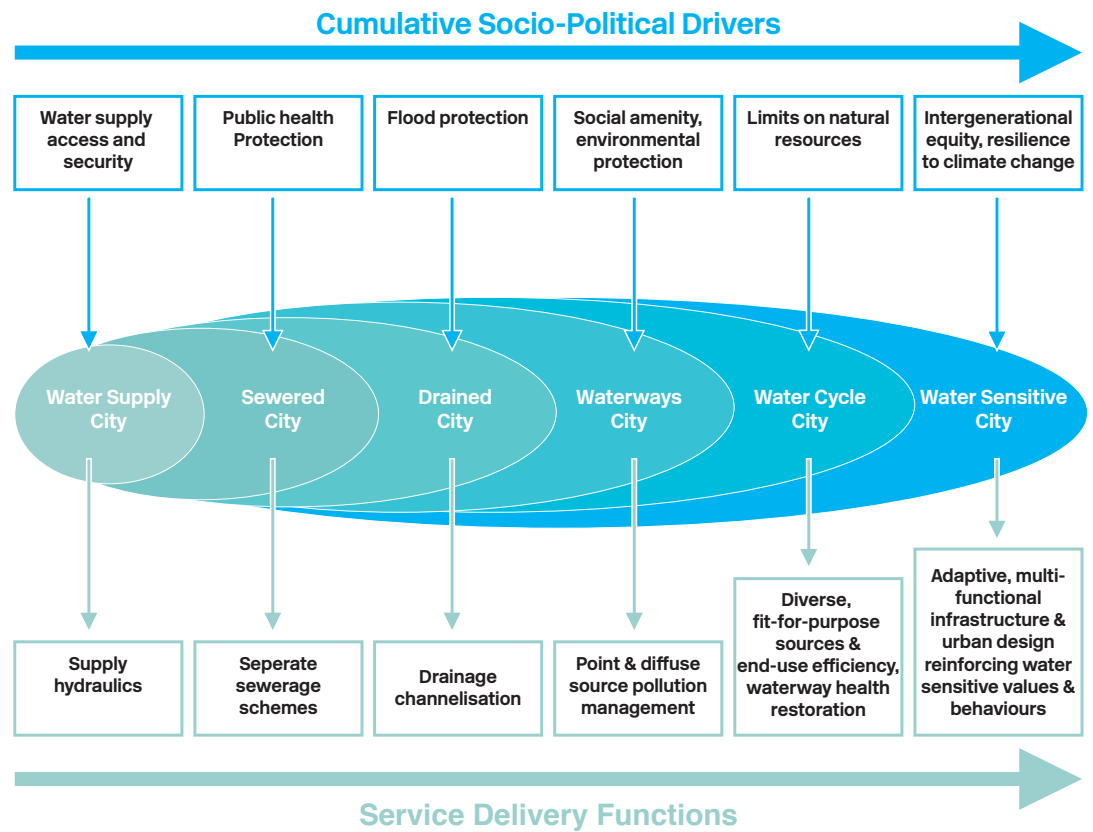


Figure 4. The Urban Water Transition Framework (Source: Brown and Keath 2009)

The ultimate state in this framework is a water sensitive city – a place where water is managed to deliver biodiversity, public green space, healthy waterways, connected communities, water security, and cultural significance.

This management framework focuses on achieving three high level outcomes:

1. The city is a water supply catchment, in which all the available water resources within an urban footprint are considered valuable supply sources.
2. The water infrastructure and the urban landscape provide multiple ecosystem services, including stormwater treatment, flood protection, heat mitigation, ecological health, and landscape amenity.
3. Communities feel connected to their local water environments, and engage in water-conscious behaviours.

If we expand this concept to “sustainability,” a water sensitive city approach provides a practical way for South Bank – as a precinct within Brisbane – to lead a broader sustainability transition for the city.

What does a water sensitive approach look like on the ground?

There are several elements of a water sensitive city that can be adopted and applied to help South Bank achieve its sustainability vision. Those elements are summarised below, along with a suggested context for their application in the South Bank precinct.

Use green infrastructure to reuse water

Key message Green infrastructure cleanses water via natural processes: filtration through soils, and nutrient uptake by plants. Treatment systems are available to suit a variety of installations, including vertical systems where space is limited.

Green infrastructure increases water storage and retention capacity in the urban landscape. By its nature, green infrastructure can be multipurpose and provide a range of other benefits.

These systems do require irrigation. If irrigation is provided from roof water, stormwater, or grey water sources, green infrastructure systems can be “overwatered,” and thus are also a tool for *producing* cleansed water for reuse.

Application in South Bank



Figure 5. Potential applications of different types of green infrastructure in South Bank.

Use green infrastructure to keep South Bank cool

Key message Cities are getting hotter, and this impacts human health and businesses. Green infrastructure produces “evaporative cooling” and shading effects that reduce these impacts.

Application in South Bank A strategic design for green infrastructure in South Bank could include:

- Using taller trees, along with green walls, in deeper streets such as Grey Street to provide a mix of ventilation, shade, and evaporation.
- A network of green parks to maximise coverage of the downwind cooling effect.
- Enabling air flow in streets perpendicular to the Brisbane River to allow the cooling effect of the water to propagate into South Bank.
- Shielding building facades with green walls to reduce radiant heat and internal air conditioning needs.
- Irrigating trees and green walls to ensure they are healthy and have large, full canopies to maximise shade.

Evidence

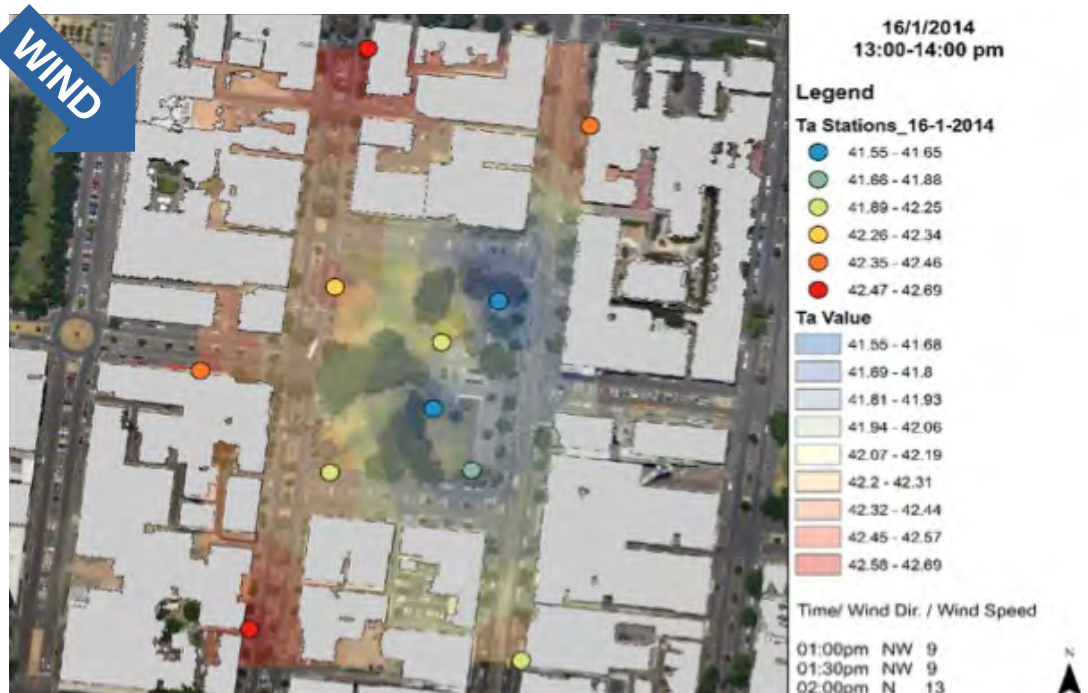


Figure 6. Green space and vegetation can provide a downwind cooling effect that reduces the temperature we perceive. This effect is localised, meaning that a network of distributed green spaces has the maximum cooling effect¹.

¹ Motazedian, Coutts, Tapper (2016).

Manage wastes as a resource, and resources as a product

Key message Organic waste from food and gardens is a valuable resource. Technology is available to recover water, nutrients, and biogas from this waste. Value is added when these resources are transformed into products like energy, fertiliser, or even food.

Application in South Bank South Bank is highly suited to a large scale organic recycling. It produces large volumes of organic waste from the Parklands, and from the high concentration of hospitality and event businesses. It also has a high demand for compost and soil to maintain the Parklands, and to extend green infrastructure into other sub-precincts.

Food waste offers further scope for recycling at South Bank: such waste is ideal because it is high in organics and nutrients (nitrogen and phosphorus), and is (generally) low in water.

Make sustainability and collaboration “business as usual”

Key message Technological solutions alone will not be enough to achieve a vision of South Bank as Australia’s most sustainable business precinct.

Instead, two types of sustainability actions are required: technological and social. Initiatives in the second category – social change – are needed to maintain momentum as future projects become more challenging.

Application in South Bank A “transition strategy” can take sustainability from niche to mainstream by:

- Establishing a common agreement of what the future looks like, and not just the intent.
- Enabling incremental changes that build cumulative impacts/benefits.
- Creating the collaboration, mindsets, and systems that support longer term change.
- Showing how change can be leveraged throughout the South Bank community and precinct.

Address “low-hanging” energy savings measures

Key message Energy and carbon savings are increasing easy and cost-effective to implement. Targeting simple measures first can help to lower the cost of reducing energy demands.

Solution Solutions for saving energy do not need to be costly or difficult to implement.

Understanding energy consumption patterns is the best place to begin. Reviewing historic energy consumption data (provided in your energy bills) and continuing to track consumption helps to identify unexplained consumption increases, or instances of energy being used when it should not be (i.e. out of hours). Facilities managers and sub-metering data can provide further details, and organisations such as City Switch² provide online resources to help building owner/operators reduce energy consumption.

Other “low-hanging-fruit” measures include undertaking energy efficiency audits, implementing building controls system (BMCS) improvements, and encouraging behavioural changes, such as switching off lights.

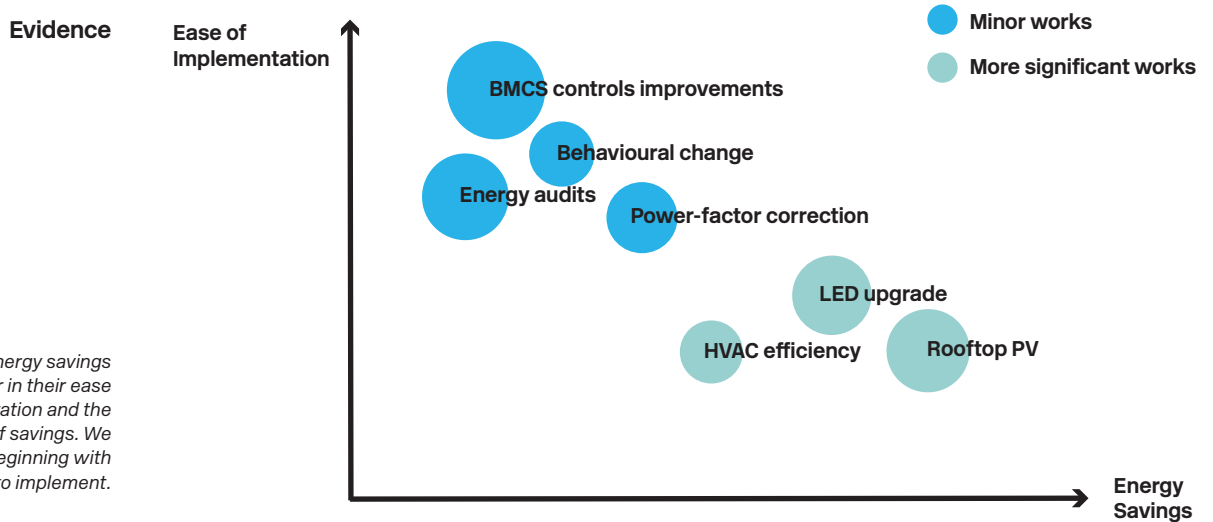


Figure 7. Energy savings measures differ in their ease of implementation and the magnitude of savings. We recommended beginning with those easiest to implement.

² www.cityswitch.net.au

Scale up renewable energy

Key message Energy conservation alone will not make South Bank an energy and carbon footprint leader. Conservation must be accompanied by an increase in the use of renewable energy.

With technology improvements and changes to government incentives, renewable energy is rapidly becoming more practical and cost effective to implement. With those barriers to renewable energy removed, the challenge becomes the “how” of facilitating its roll out across South Bank.

Solution Previously unsuccessful business cases for renewable energy should be revisited.

The business case for renewable energy can be multidimensional. It can capture benefits such as better security of power supply to core services and assets, as well cost savings (to South Bank Business and energy suppliers) based on reductions in both overall volumes and peak demand.

The business case is assisted by financing that is available for energy projects, and includes low interest rates and long term financing that preserve business capital expenditure and reduce operational expenditure to maximise savings from day one.

Evidence

Lowest cost opportunities to reduce emissions by 249 Mt CO₂e¹

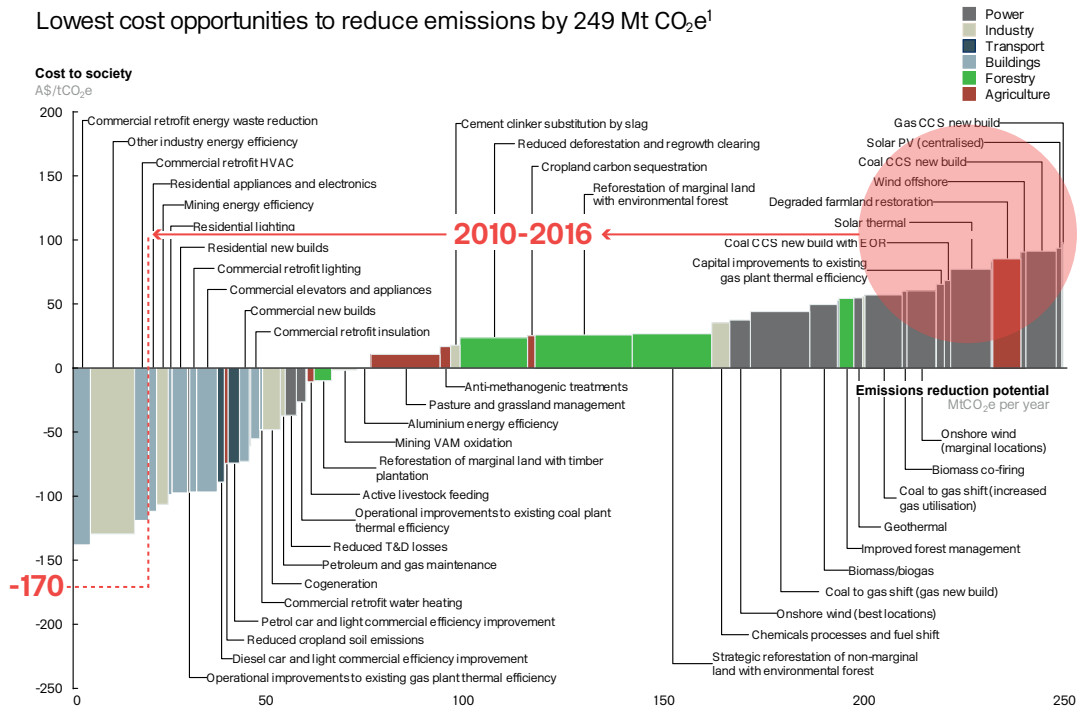


Figure 8. The marginal cost of abatement curve was produced in 2010 (Source: Climate Works Australia, 2010). Since that time, the case for renewables has flipped and now these options are a negative cost to investors.

¹ Includes only opportunities required to reach emission reduction target of 249 Mt/a (25% reduction on 2000 emissions); excludes opportunities involving a significant lifestyle element or consumption decision, changes in business/activity mix, and opportunities with a high degree of speculation or technological uncertainty
SOURCE: ClimateWorks team analysis (refer to bibliography)

Create a sustainability experience via public spaces and community interaction

Key message Public spaces provide an opportunity to engage visitors in South Bank’s sustainability journey. This has two benefits: it creates sustainability champions who take these messages back to their own communities; and it fosters a unique value proposition for visiting South Bank.

Some aspects of sustainability at South Bank – such as the Rainforest Walk – already provide a tangible sustainability experience for visitors. Other features, such as Rain Bank, are hidden away and not very accessible.

Solution For some, sustainability is a complex or even irrelevant proposition. South Bank can address this perception by enabling visitors to actively engage and interact with practical sustainability features. Sustainability features can achieve that outcome by activating South Bank’s public spaces.

Evidence



Figure 9. Active and passive interactions generate shared knowledge because they directly connect users with their environment in the public space, both literally and symbolically. (Source: Camilla Migliori)

Ensure the sustainability message gets through

Key message South Bank has many features that are important to people. The benefits cross boundaries and can be used to shape messages and visitor experiences. We can increase community engagement with sustainability by connecting the South Bank vision with the community's needs.

Solution When communicating:

- Know the audience. Know what your audience needs, and how they will be affected by the sustainability projects.
- Use clear language and avoid jargon. Many terms and concepts are unfamiliar, even though they are commonly used by professionals. Even environmentally conscious people are put off if the sustainability messages are too complex.
- Frame the messages around people's values, and speak to the benefits.
- Use a diverse array of communication techniques. Interactive features, visuals, and educational events will be well suited to South Bank.

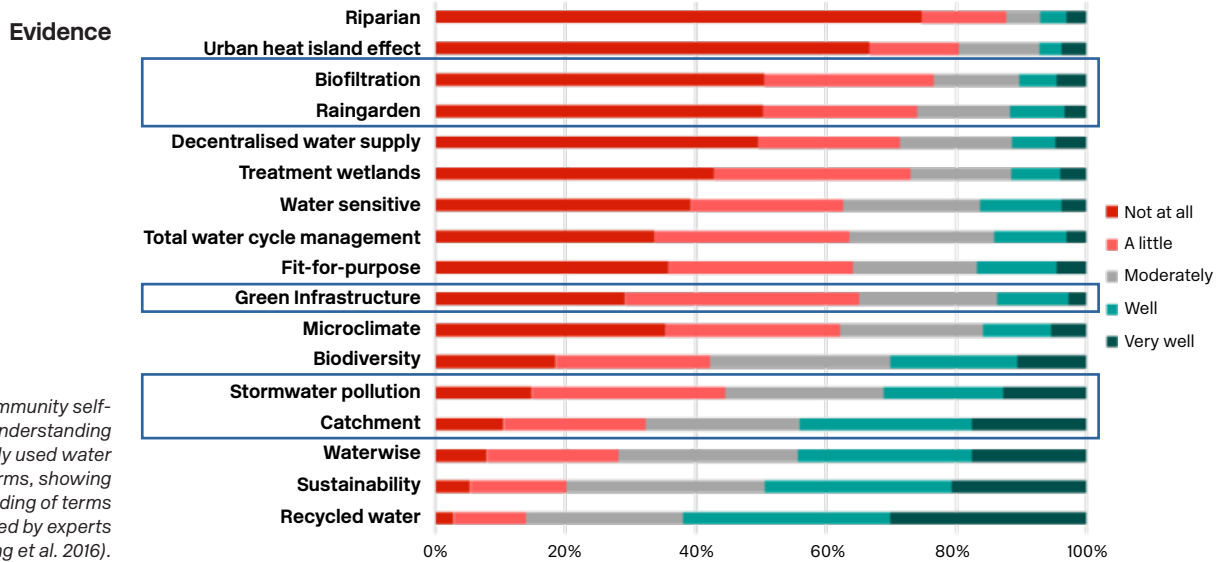


Figure 10. Community self-reported understanding of commonly used water management terms, showing poor understanding of terms commonly used by experts (Source: Fielding et al. 2016).

Sustainability ideas

The following ideas apply a water sensitive and low carbon approach to the sustainability challenge at South Bank. These ideas address the 2009 and 2016 visions (Figure 11) for South Bank by:

- Leveraging building-scale sustainability actions with precinct-scale opportunities.
- Encouraging a wider range of businesses to participate in sustainability actions.
- Unlocking the potential of resources generated within the precinct, using networks and collaboration.
- Making the most of existing assets and infrastructure, such as available roof space.
- Creating a public realm that offers a comfortable experience during heat waves and droughts.
- Making sustainability more understandable for the community.

Ideas are presented along with actions categorised visually as short (Invest now), medium (Promising projects), or longer term (Possible future projects) opportunities.

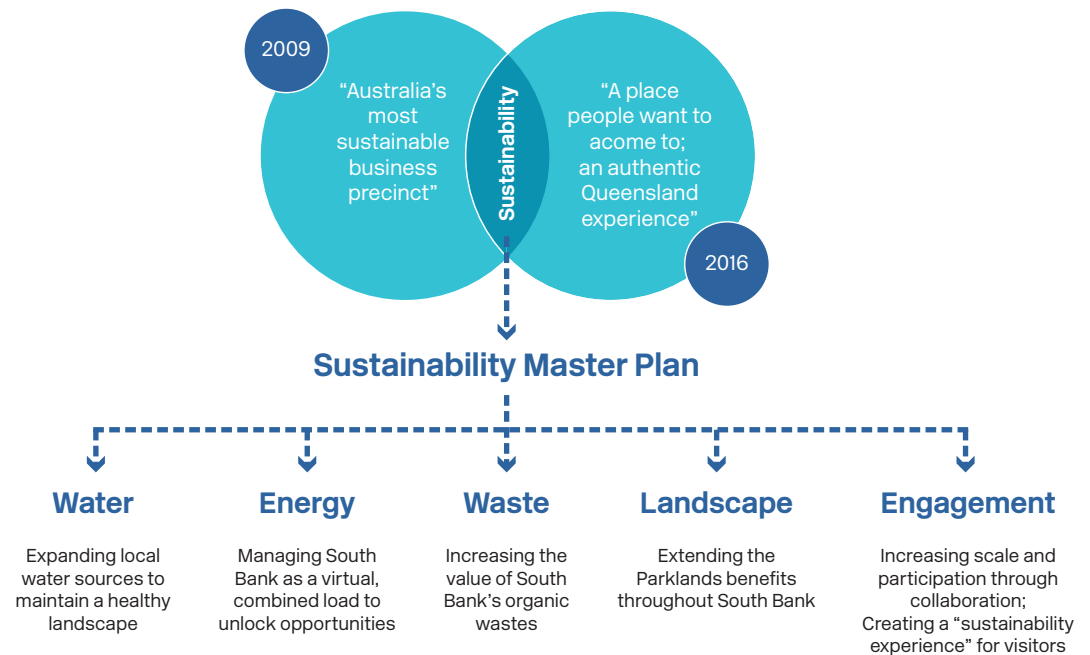


Figure 11. Opportunities for a new phase of sustainability projects to deliver the vision(s) for South Bank.

Idea 1. Develop a sustainability master plan

A sustainability master plan can create a precinct-scale view of sustainability, establish a common vision of success, and coordinate projects to deliver this outcome.

The master plan will focus on the next phase of sustainability for South Bank. It will move beyond sound efforts to reduce the resource footprint of South Bank, and instead focus on harnessing sustainability measures to build a liveable and resilient precinct. This will underpin the economic future of South Bank.

In that light, a master plan provides a way to:

- Manage the shift to collaborative, precinct-scale projects.
- Transparently prioritise projects.
- Provide a line of sight that connects sustainability actions in South Bank with priorities for greater Brisbane.
- Provide a lever for collaboration, especially if cost or risk sharing is required.
- Provide a prospectus to engage the participation of business across South Bank.

Implementation pathways



Invest now

Define the vision for sustainability. While the aspiration of being the most sustainable business precinct has been set, it has yet to be defined.

Develop a master plan in collaboration with businesses.

Use the master plan to **recruit** new South Bank businesses to participate in sustainability projects.



Promising Project



Future Possibility

Idea 2. Precinct-scale Water Network

Developing an integrated, precinct-scale water network can expand the reuse of rainwater and other water sources.

This idea addresses the future requirements for recycled and stormwater for landscaping, water features, and toilet flushing. It also reduces water and sewerage charges to businesses.

Although schemes such as Rain Bank have been very successful, there is potential for greater rainwater capture from the South Bank catchment. This requires two solutions: accessing the significant but underutilised roof catchments across South Bank; and providing additional water storage.

The solution lies in developing a water grid for the precinct in which buildings maximise their water harvest or storage, and export water that exceeds their needs. Excess water can be reticulated via an interconnected network, to deliver high quality water to where it is needed; or it can be directed to precinct stormwater storages.

A feasibility study could first be used to identify scope for harvesting water off the precinct's large roof areas (such as the Arts area), as well as opportunities to store water under buildings or under grass areas. Future investigations could assess the opportunity for additional, distributed "Rain Bank" facilities to increase water treatment capacity across the precinct.

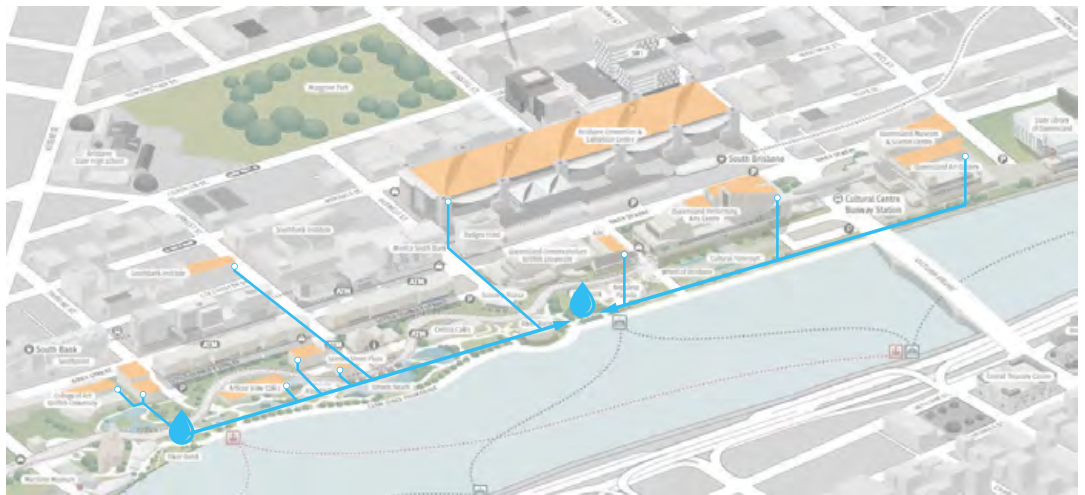


Figure 12. A water network that harvests and treats rainwater from multiple roofs can increase the volume of rainwater used across the precinct by matching harvesting to water demands.

Implementation pathways



Invest now

Undertake a feasibility assessment to map existing and new water storage and end use demands. For example, the potential for Arts QLD and others to "share" roof water with South Bank Parklands.



Promising Project

Develop a master plan for precinct-scale water harvesting. Where possible, **invest** in new local storages and harvesting.



Future Possibility

Create a water network to link storages across the South Bank precinct. **Expand** the initiative to other areas: Kurilpa and beyond.

Idea 3. A 20% energy reduction target by 2020

Setting a target to reduce use by 20% by 2020.

This target can be achieved through three actions.

First, Business South Bank members should consider “low-hanging-fruit” energy savings measures which have not yet been implemented, such as building energy efficiency audits, implementing building controls system (BMCS) improvements, checking building power-factor, and encouraging behavioural change among occupants. The Brisbane City Switch program provides valuable resources for adopting these easily implemented improvements.

Second, revisit previous business cases for solar energy, and revise them based on current incentives, technologies, and prices. This should typically be a quick task as the benefits of these schemes have previously been defined.

Third, evaluate the potential for a shared thermal network that links existing thermal facilities in buildings, and integrates additional thermal storage to create a precinct-wide network. It is anticipated that such a network would allow improved load management, and reduce overall costs. This can provide a significant benefit, as cooling is a substantial energy cost for the South Bank precinct.

Such projects will have additional benefits such as:

- Reducing potable water use by decreasing the load on cooling towers.
- Future-proofing the precinct by reducing pressure on already constrained regional energy supply networks.
- Fostering collaboration between businesses, if a scheme can be created to enable buildings with large roof areas to share solar generation with other users.
- Creating visual features (such as solar panels) that showcase sustainability leadership.



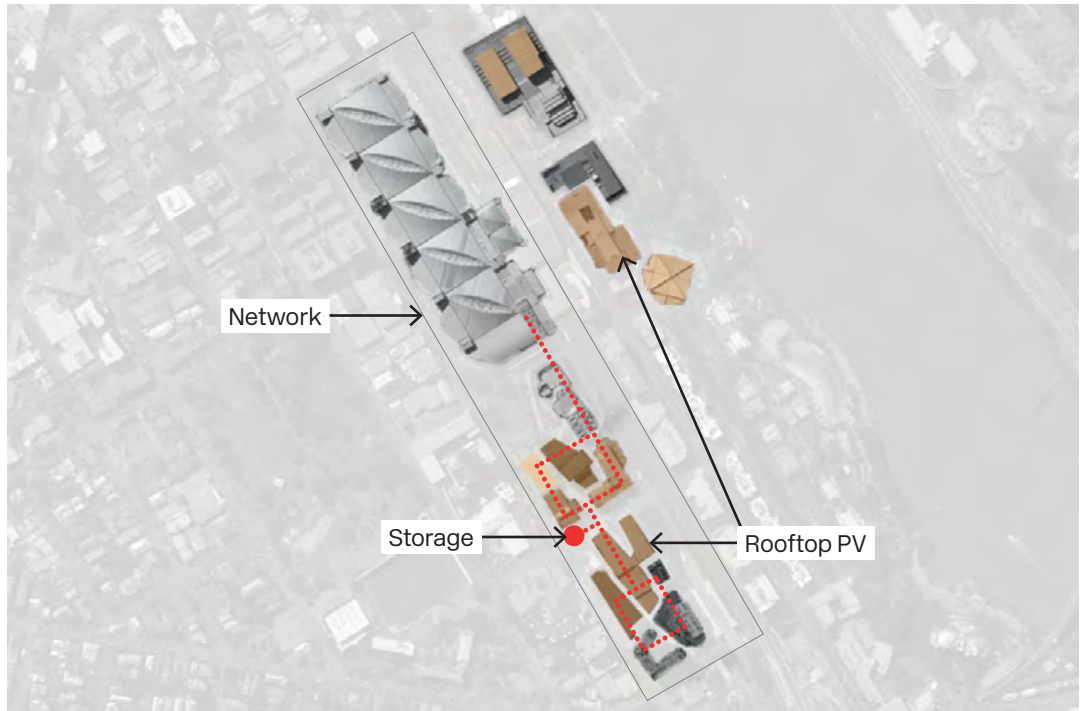


Figure 13. Energy infrastructure opportunities include increasing rooftop photovoltaics, creating chilled storage, and linking thermal networks across the precinct.

Implementation pathways



Invest now

Revisit existing business cases for rooftop solar.

Set an initial precinct target based on meeting Renewable Energy Targets internally.

Develop a thermal study, review plant lifecycles, and engage stakeholders.

Implement "quick-win" rooftop solar projects.

Develop a model for sharing solar across institutions – virtual or physical sharing.

Develop a pathway and targets to achieve a 20% reduction by 2020.

Share planning of plant and equipment upgrades and lifecycles.



Promising Project

Scope options for a shared thermal network and storage, and storage tanks under Colchester Street.

Implement off-site carbon offsets to achieve CO_{2-e} neutrality.



Future Possibility

Create a strategy to extend thermal network to other sites; identify further storage.

Idea 4. Joint engagement of energy suppliers

Leverage the large customer base of the combined precinct to engage with energy suppliers and improve energy sustainability and resilience.

Towards the goal of improving precinct energy sustainability and resilience, this idea promotes an alliance of South Bank businesses, to engage jointly with energy suppliers. As a joint negotiating force, it may be possible to achieve lower energy price; a free green power contribution (5%–10%) provided by the energy retailer at no extra cost; or a higher price for solar power fed back into the grid (feed-in-tariff).

As a combined entity, the alliance is also in a good position to engage with energy network provider Energex, to address current and future network constraints in the area. For example, the South Bank businesses could work together to reduce energy loads during peak events through rooftop solar, switching off plant, or running on-site generators – and be paid to defer costly network upgrades. These actions will also improve precinct energy resilience and mitigate against potential network failures that could impact business.

There is also the potential to convert the precinct into a single virtually metered customer (virtual net metering³), or even a small microgrid in the future. These innovative precinct energy system models describe scenarios in which the precinct would be viewed as a single customer/entity by the energy provider, with the ability to manage loads and renewable energy generation internally through intelligent controls systems. Under this model, energy could be freely traded between buildings; and loads, generation, and battery storage could be controlled as a single entity to produce the best outcomes for the precinct. This integrated approach would also allow investment in solar by smaller business at South Bank using roof area and solar infrastructure hosted by larger business.

Strategic engagement with the utility providers will be crucial, and it is recommended that this project be coordinated by Business South Bank.

Implementation pathways



Invest now

Develop energy use profiles and solar generation opportunities across the precinct; **develop** an engagement strategy.

Establish a collaboration model and recruit participants.

Review feasible business models.

Facilitate a discussion with Energex.

Make further investigations (audits) as needed.



Promising Project



Future Possibility

³ [www.uts.edu.au/sites/default/files/Microgrids conference_Sydney26April2016.pdf](http://www.uts.edu.au/sites/default/files/Microgrids%20conference_Sydney26April2016.pdf)

Idea 5. Green spines and outdoor cool zones

Further extend the cooling benefits of the Parklands into South Bank by increasing the permanent and temporary application of green infrastructure.

In cities, addressing heat waves and thermal comfort is emerging as a public health issue. To offset such problems, an opportunity exists to use a natural solution: vegetation irrigated using stormwater and recycled water.

Research shows the cooling effect of water and vegetation in urban landscapes. There is an opportunity to extend approaches that have been successful in the Parklands to other locations across South Bank.

If South Bank can become known as a cooler and more comfortable place to be on hot days, this will attract additional visitors and spending in local businesses.

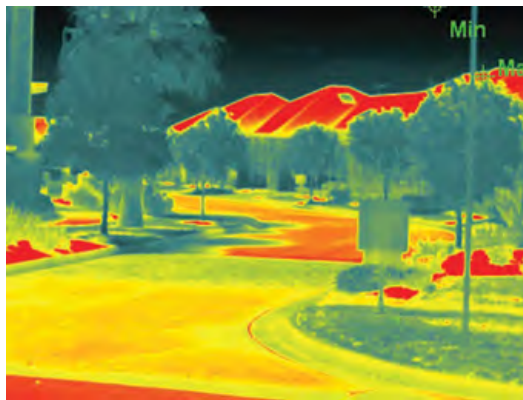


Figure 14 An example of the temperature benefits of street trees on a hot day (Source: Coutts et al. 2013).



Figure 15 The cooling benefits of a green building facade on a 27°C day (Source: Coutts et al. 2014).

Two ideas have been developed for consideration in precinct planning and streetscaping initiatives:

Figure 16 Median strip raingardens are one tool to create a self-irrigating, green street network that extends the benefits of the Parklands deeper into South Bank.



Green spines. Using trees and adding vertical green walls to building facades would develop subtropical boulevards along Grey, Glenelg, and Ernest Streets. These “green spines” could link South Bank Parklands’ major green spaces with Musgrave Park. Extending the Grey Street boulevard from Russel Street through to Peel Street and Stanley Place will create another green spine that lines the precinct.

This green infrastructure will encourage people to progressively move through these areas. Its vegetation would further enhance the character of South Bank, and contribute to the sustainability experience. Additionally, green infrastructure can help to capture and treat roof water for reuse.

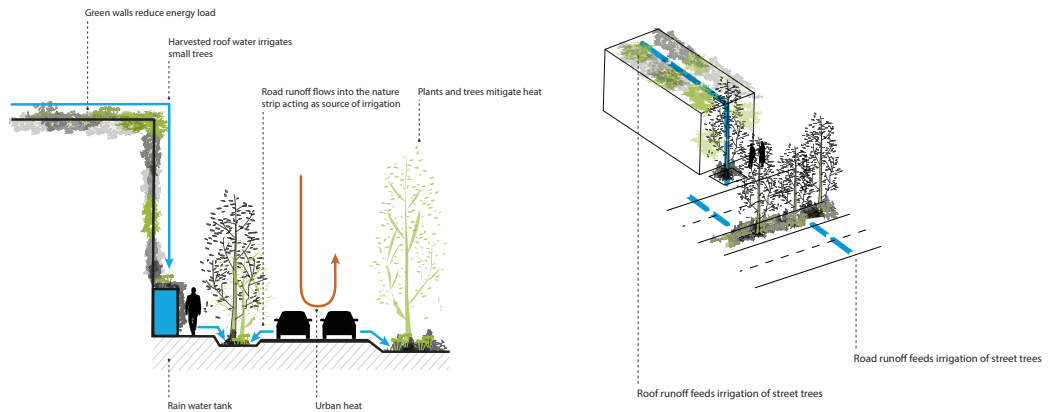


Figure 17 Green spines utilise trees, ground cover and green walls to generate a cooler environment and are sustained by stormwater runoff

Pop-up solutions for hot spots. Create moveable outdoor furniture that includes trees and other vegetation that provides shade. These temporary cool zones will showcase the Brisbane lifestyle of interacting between indoors and outdoors, and provide a sustainable cooling solution for spaces where permanent vegetation is not possible/practical (e.g. heritage listed buildings and forecourts).

An app can be created to allow visitors to record thermal comfort levels and request placement of these pop-up gardens. The furniture can then be moved across South Bank on hot days to provide “shade on demand” in response to events and localised visitor needs.

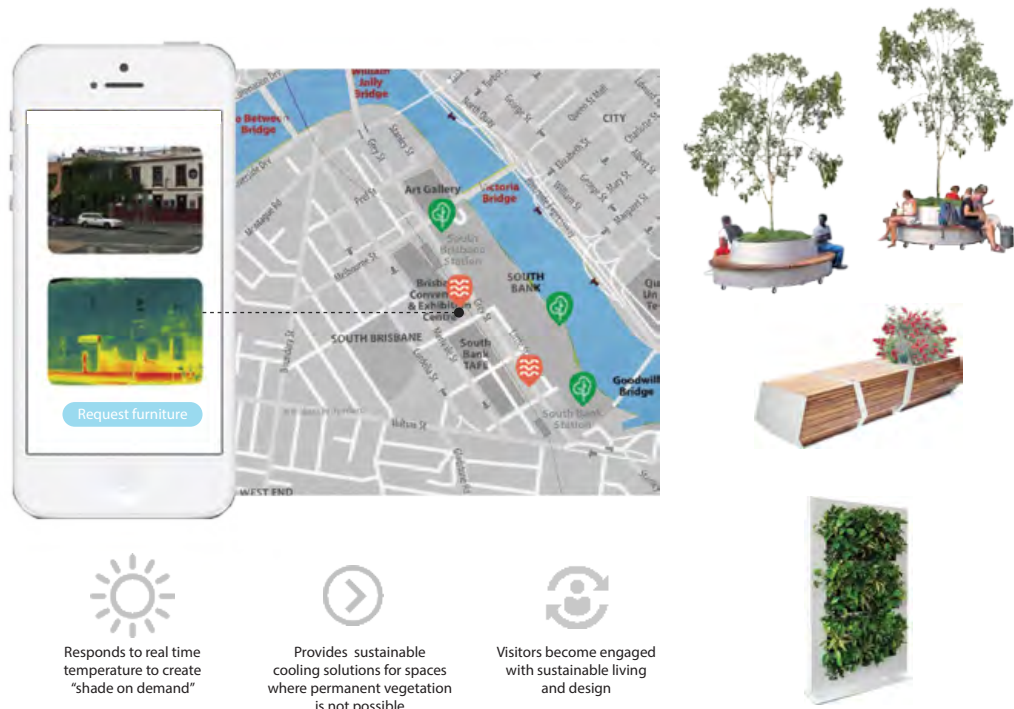


Figure 18 Pop-up cool zones use moveable green infrastructure to create temporary shade and block radiant heat to enhance visitor comfort and wellbeing during community events.



Responds to real time temperature to create "shade on demand"



Provides sustainable cooling solutions for spaces where permanent vegetation is not possible



Visitors become engaged with sustainable living and design



Figure 19 Green spines can connect existing open spaces, improve amenity, and reduce the impact of heat waves.



Implementation pathways



Invest now

Develop pop-up solutions for hot spots.

Develop an app to enable "on demand" installations of portable outdoor furniture.



Promising Project

Enhance the Grey Street upgrade - median strip raingarden.

Plan green spines along other linking streets.

Implement by inclusion in future precinct planning and streetscaping opportunities.



Future Possibility



Idea 6. Increase food waste recycling

At South Bank, 20% of all waste is food. Yet that same waste can be converted into fertiliser and nutrients (essential to soil health) for local parklands – providing a direct synergy between parklands and nearby cafes and restaurants.

There is an opportunity to increase the food waste recycling already in place for Brisbane Convention and Exhibition Centre with the food dehydrater used by City Parklands as part of soil production for South Bank and Roma Street Parklands. A smaller scale example is also underway: organics and food waste from the Shore Restaurant and Ship Inn are collected by the South Bank Parklands earth worm farm, and the vermicompost used on Parklands gardens.

Implementation pathways



Invest now

Audit waste streams to determine the volumes of organic waste.

Undertake a benefit cost analysis and opportunity analysis for inclusion in soil production or localised earthworm farms.

Develop the servicing model.



Promising Project

Design future on-site systems to showcase and compliment the Rain Bank system as an educational feature to enhance sustainability engagement and credentials.



Future Possibility



Importantly, these six ideas build on projects that already exist in South Bank, and which offer continued potential:

Case study	Sustainability achievement	Possible Next Achievements
Rain Bank	On site water harvesting from local sources. Acts as an educational facility.	Harness additional roof space to create additional on-site water storage. Provide education on other aspects of sustainability. Make sustainability more “readable” (accessible) for visitors.
Epicurious garden	Engages visitors in sustainable practices.	Create other interactive sustainability experiences for visitors.
Car park green roof	Adapts South Bank infrastructure to provide a green and active landscape.	Integrate green infrastructure into South Bank more comprehensively and strategically.
Food waste recycling at Brisbane Convention and Exhibition Centre Green waste recycling at Parklands	Demonstrates inter-business collaboration on sustainability projects. Reduces organic waste by transforming it into a resource.	Facilitate collaboration to enable further sustainability projects. Realises further value of the food wastes generated at South Bank.
South Bank Parklands e.g. Rainforest	Creates cooler areas for leisure and recreation on hot days.	Cool other areas of South Bank using connected green infrastructure.
Lighting upgrades to reduce energy consumption	Precinct-wide uptake of simple but effective actions.	Precinct-wide renewable energy opportunities.

Summary

South Bank aspires to be Australia's most sustainable business precinct, and has already developed an impressive record of sustainability projects and outcomes. A workshop with researchers and business from Business South Bank was held to:

- Define the next sustainability phase for South Bank.
- Develop precinct-scale projects.
- Enable collaboration.
- Pave the way for future opportunities like capitalising on changes in the economics of solar power.

The ideas developed will maintain the momentum of past and current projects by reframing sustainability in terms of outcomes, rather than actions. The ideas will:

- Make sustainability more readable for visitors. Achieving this can happen via concepts such as pop-up cool rooms, and complimenting the Rain Bank facility with other high profile innovations like on-site organic recycling. Doing so will enhance the sustainability experience for users.

Create an opportunity for collaborative projects, and enable greater participation from large and small businesses in South Bank. A simple but effective example is the engagement strategy for approaching Energex to co-invest in green power.

- Unlock the potential of precinct-wide projects. Examples like precinct-wide networks for water, chilled thermal, and energy leverage projects can provide additional sustainability benefits.
- Provide a plan to prepare South Bank for possible future changes in policy, incentives, and technology that could transform previously uneconomic projects into viable options.

To make these projects a reality, a sustainability master plan is recommended. A master plan provides a way to build common agreement on what sustainability success looks like. It also coordinates projects and acts as a prospectus for businesses that wish to get involved in sustainability.

Ideas relevant for progressing the sustainability master plan include:

Water Develop a precinct-scale water network to increase roof catchment area of the existing rainwater harvesting system(s), and provide better water security for South Bank.

Energy Set a target for a 20% energy/carbon reduction by 2020, mobilised by revisiting the business cases for rooftop solar in light of improved business fundamentals.

An engagement strategy to negotiate energy supplier co-investment in the broader uptake of solar power within South Bank.

Thermal Comfort Extend the landscape benefits of the Parklands into South Bank and beyond using “green spines” and “pop-up cool zones.”

Waste Harness the value of food waste by increasing its collection and recycling into compost.



References

Brown, R. R. and Keath, N. (2009) Urban water management in cities: historical, current and future regimes, *Water Science & Technology*, 59(5), pp. 847.

Climate Works Australia (2010). *Low Growth Plan for Australia – Report Summary*, March 2010.

Coutts, A., Tapper, N., Beringer, J., et al. (2013) *Project B3.1: Green Cities and Microclimate – Interim Report 2*, Melbourne, Australia: Cooperative Research Centre for Water Sensitive Cities.

Coutts, A., Loughnan, M., Tapper, N., White, E., Thom, J., Broadbent, A., Harris, R. (2014) *The impacts of WSUD solutions on human thermal comfort*, Melbourne, Australia: Cooperative Research Centre for Water Sensitive Cities.

Ensign (2013). *2012 Business South Bank Sustainability Review – Final Report*.

Fielding, K., Dean, A., Newton, F. (2016) *Community understanding of water terminology*. Melbourne, Australia: Cooperative Research Centre for Water Sensitive Cities.

Motazedian, A., Coutts, A. M., Tapper, N. J. (2016) *The microclimatic interaction of a small urban park with its surrounding urban environment: a case study of an urban park in Melbourne during heat events*. (Unpublished)

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About the CRCWSC

The Cooperative Research Centre for Water Sensitive Cities (CRCWSC) was established in July 2012 to help change the way we design, build, and manage our cities and towns by valuing the contribution water makes to economic development and growth, quality of life, and the ecosystems of which cities are a part.

The CRCWSC is an Australian research centre that brings together many disciplines, world-renowned subject matter experts, and industry thought leaders who want to revolutionise urban water management in Australia and overseas.

Research Synthesis

Research synthesis is key to successful research application and adoption.

A facilitated design process, Research Synthesis brings together the CRCWSC's many research areas and disciplines with government and private industry partners to develop practical "ideas" for addressing specific industry-based challenges.

Research synthesis is a highly effective tool for exploring collaboration and innovation. The open-minded environment of a research synthesis design workshop is founded on science, and no individual organisation leads or owns the conversation. This supports an unbiased dialogue that enables the discovery of new and creative ideas.

CRCWSC Research Synthesis

Discussion Paper | CRC for Water Sensitive Cities

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