CRC for
Water Sensitive Cities

Collaborative planning for the Fishermans Bend Urban Redevelopment

Location:
Melbourne, Victoria

Case Study — Prepared by Cooperative Research Centre for Water Sensitive Cities, May 2020

Australian Government
Department of Industry, Science, Energy and Resources
Business Cooperative Research Centres Program

Insight

Integrated water management requires partnerships that support collaboration, align cultures and build consensus. Sometimes, a catalyst is needed, such as creating a forum for sharing ideas, backed by enduring partnerships to bring these ideas to fruition.

Project description

Fishermans Bend is a 485 ha urban renewal project in inner Melbourne. Over the next 40 years, it will replace existing industrial uses with a mix of mid and high rise development, as well as an advanced manufacturing and engineering precinct. Eventually, it will be home for over 80,000 people, with another 80,000 people visiting daily for work.

This scale and profile presented a unique opportunity in building water sensitive cities, as the economies of scale help to support novel infrastructure approaches and 'best in class' approaches to water servicing and urban development. However, this scale also introduced complexity due to the number of stakeholders and breadth of challenges.

The site itself is relatively flat, impervious and close to sea level, and sits at the end of the lower Yarra River floodplain. Adjacent areas in the City of Port Phillip have legacy flooding issues. Fishermans Bend also sits alongside the Melbourne CBD and is well serviced by water and sewer services, albeit with infrastructure designed for historical industrial land uses. Most of the land is privately owned, so partnerships with the private sector are essential for achieving the vision for the area.

The CRC for Water Sensitive Cities (CRCWSC) was invited to support several of its industry partners—the Department of Environment, Land, Water and Planning (DELWP), Melbourne Water, South East Water, the City of Port Phillip and the City of Melbourne—in planning Fishermans Bend. This involvement occurred through a series of discrete engagements beginning in 2014, and a continuing invite to the Drainage Working Group that reports to the Fishermans Bend Taskforce Board.

The CRCWSC used this opportunity to refine its Research Synthesis process, which invites researchers and industry practitioners to work together to apply research insights to real-world projects.

Image credit: Realm Studios

What does this case study demonstrate?

Each case study has been selected to demonstrate specific solutions, benefits or enabling structures that support the creation of water sensitive cities.
This case study focuses on:

- Rainwater and stormwater harvesting
- Flood resilience
- Water sensitive precincts
- Alternative water supplies
- Leadership and influence
- Governance and policy

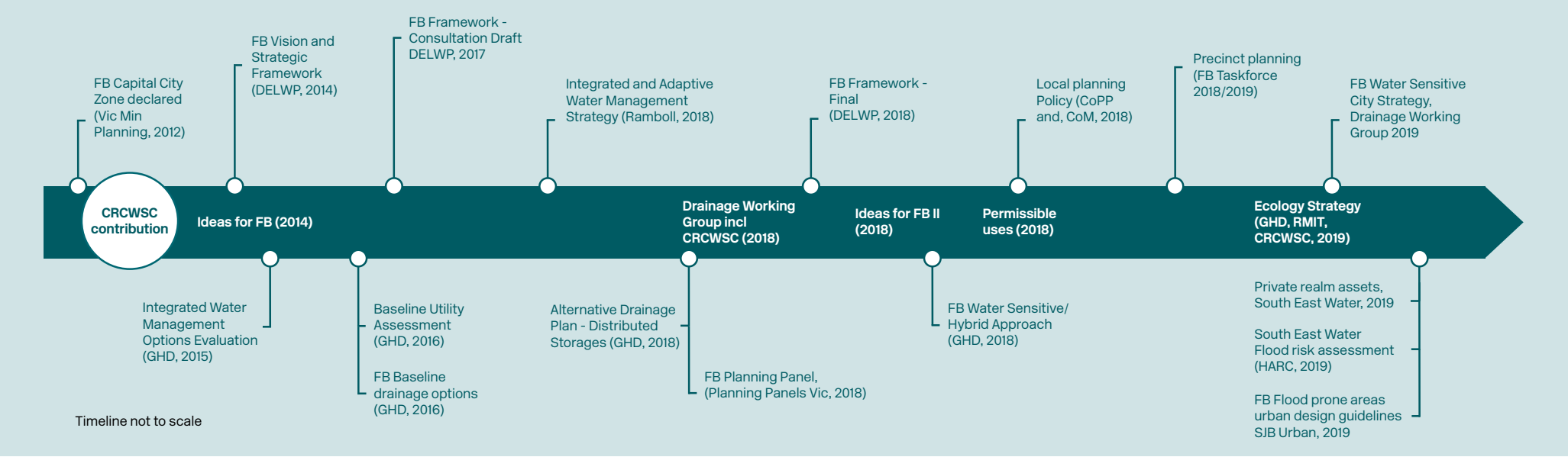


Figure 1. Timeline showing CRCWSC involvement and the development of key approaches and strategies.

The drivers

- **Green Star rating—**The vision for Fishermans Bend to become Australia's largest Green Star Community

- **Sustainability Goals in the Fishermans Bend Framework**

  - No hotter than inner Melbourne
  - Reduced nutrient discharges
  - Sewerage discharges reduced by 50%
  - Less than 100 litres of potable water used per person/day
  - Reduced storm and flood impacts, including sea level rise

- **Constrained site—**Development that responds to significant environmental constraints including high water table, high levels of ground contamination, tidal and storm surge issues and projected sea level rise issues

- **Exemplary urban design outcomes—**Desire to incorporate water in the landscape, and to facilitate an approach to finished floor levels in buildings that could support exemplary urban design outcomes

The innovations

The early identification of innovations that will define Fishermans Bend's water management success across multiple scales

Research synthesis process:

- **Independently led co-design process—**The CRCWSC hosted a co-design process that brought together researchers, government and industry stakeholders in three workshops to discuss emerging research and international best practice. This process developed a number of 'ideas' for Fishermans Bend which could be tested and refined by project stakeholders (see Ideas for Fishermans Bend, CRCWSC 2015). The collaboration and innovation fostered through this process has been a hallmark of water planning for Fishermans Bend, allowing options to be explored in an environment where no individual organisation led or owned the conversation. This collaborative process led to the development of the following initiatives across the site:

Whole of Fishermans Bend scale

- **Governance model**—A multi-stakeholder Steering Committee was established, comprising, Melbourne Water, South East Water, the City of Port Phillip, the City of Melbourne and the CRCWSC. A Drainage Working Group, established in 2018, reports to the Fishermans Bend Taskforce Board. This group of senior executives of key partner organisations prepared a water sensitive city strategy that informed infrastructure strategy, precinct planning and water related developer contributions for Fishermans Bend.

- **Research + industry—**Continuing partnerships with research organisations (e.g. CRCWSC) and expert consultants (e.g. GHD) provide technical and innovation support. Importantly, these experts worked closely together and were embedded with stakeholder planning teams during critical phases.

Precinct scale

- **Integrated water management strategy—**A strategy of 'making water locally' centres around a water recycling plant to provide Class A recycled water. Importantly, this plan could seed wider third pipe networks across the Melbourne CBD in the future.

- **Flood resilience—**A 'multiple-lines-of-defence' flood management strategy includes WSUD, planning and building controls, social resilience, upgraded pipes and pumps capacities, and a levee along the Yarra River. Flood resilience is achieved when these elements work in unison, rather than requiring each to provide flood protection in isolation.

- **Urban ecology strategy—**This strategy focuses on ecological values and ecosystem services in green corridors, public open space design and building design, to green, cool and naturalise Fishermans Bend.

Image credit: Realm Studios

Street scale

- **Hybrid drainage infrastructure**—A hybrid drainage infrastructure approach uses linear green swales and parks, and combines with existing underground drains, to temporarily store and convey flood water. The hybrid principle extends to the function of the levee and pumps to ensure that (1) the green swales are placed in areas where levee over-topping is more probable and (2) water stored in green swales is efficiently drained to the Yarra River.

Lot scale

- **Smart rainwater tanks**—Smart rainwater tanks allow for roofwater harvesting, while active discharge control ensures tanks are empty before an upcoming rain event.

- **Flood resilient design**—Flood resilient buildings located in flood prone areas employ design and materials that are more tolerant of lower level flooding and are an alternative to raising floor levels. This approach allows for better building activation and better streetscapes.

- **Third pipe plumbing**—All buildings will use alternative water sources (a mix of rainwater and recycled water) for washing machines, toilets and irrigation.

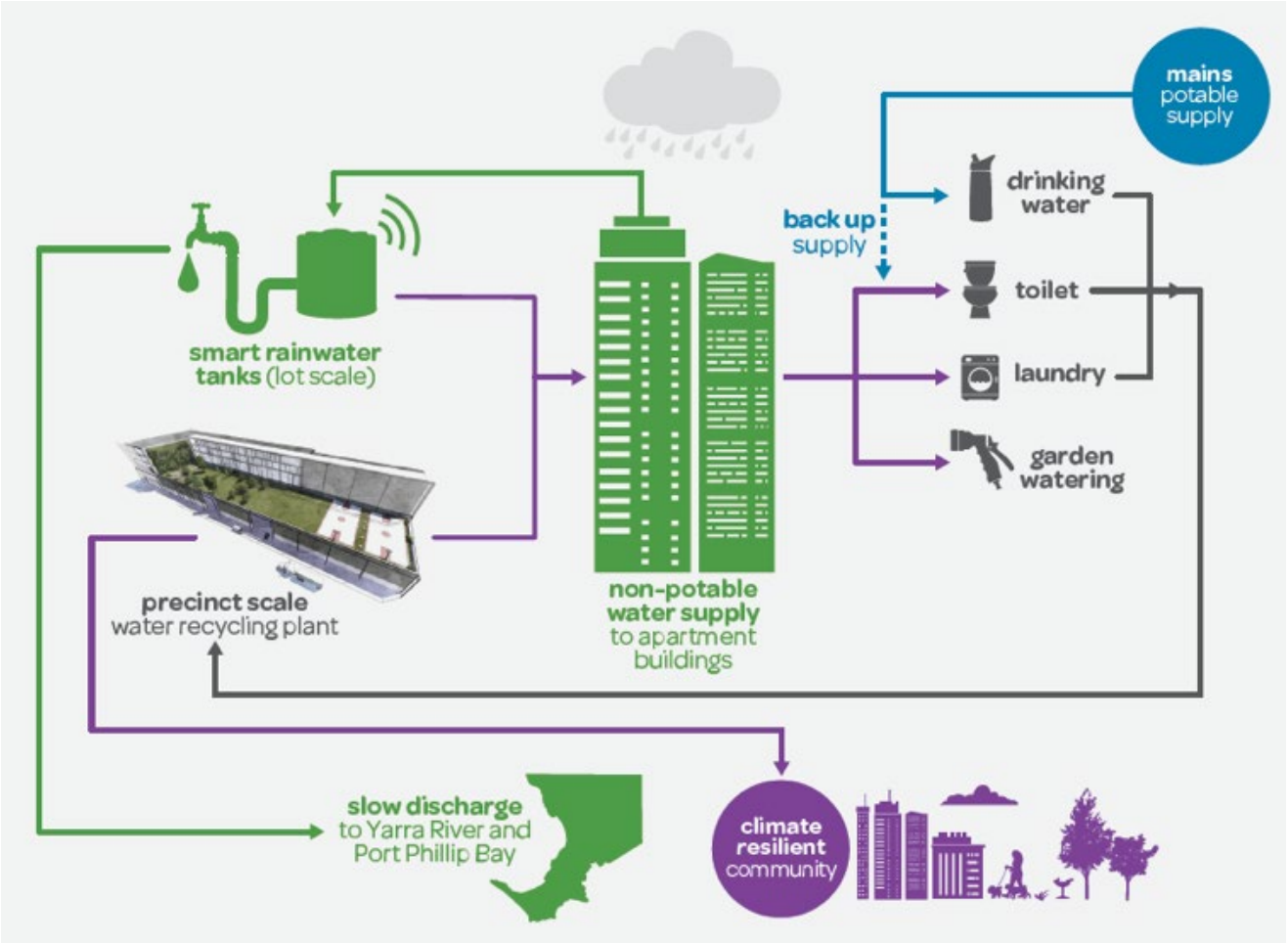


Figure 2. Key elements of the integrated water management strategy for Fishermans Bend (from South East Water Fishermans Bend Urban Renewal Integrated Water Management Strategy).

The outcomes

Cities providing ecosystem services	Cities as water supply catchments	Cities comprising water sensitive communities
• **Green infrastructure habitats**—Distributed green infrastructure such as green walls, roofs and public spaces, will create new micro and macro climates within the urban area, greatly increasing biodiversity and health of the overall urban/green space ecosystem. • **Water quality improvements**—Distributed treatment of stormwater throughout the development will improve the health of downstream environments and groundwater reservoirs. • **Urban ecology strategy**—This strategy focuses on ecological values and ecosystem services in green corridors, public open space design and building design, to green, cool and naturalise Fishermans Bend.	• **Smart, integrated water infrastructure—**More efficient water usage, sewer mining, rainwater tanks and third pipes will provide alternative water. These initiatives will also improve the quality of stormwater runoff, reduce water consumption and mitigate flooding risks. • **Integrated water management strategy**—This strategy of 'making water locally' centres around a water recycling plant to provide Class A recycled water via dual pipe infrastructure to all Fishermans Bend South East Water customers.	• **Collaborative co-design workshops**—Participants at the multiple research synthesis workshops shared knowledge and actively contributed to developing ideas. • **Design for the community**—Implementing this variety of sustainable innovations in public spaces will greatly increase the community's awareness of sustainability issues and increase their interest in looking after the development. • **Community are part of the solution**—Building social resilience is a key outcome of the flood management approach.

The lessons

The process of planning for water sensitive cities in complex situations benefits from:

- a neutral broker who can facilitate innovation and collaboration, in this case the CRCWSC and the Fishermans Bend Taskforce
- iterative feedback loops between researchers, consultants and industry to create, test and refine ideas
- engagement with broad stakeholder groups at key stages through the process
- considering water services and urban form together as the same problem and as linked options. It is important that this integrated approach is continued through implementation when business as usual approaches may be proposed.

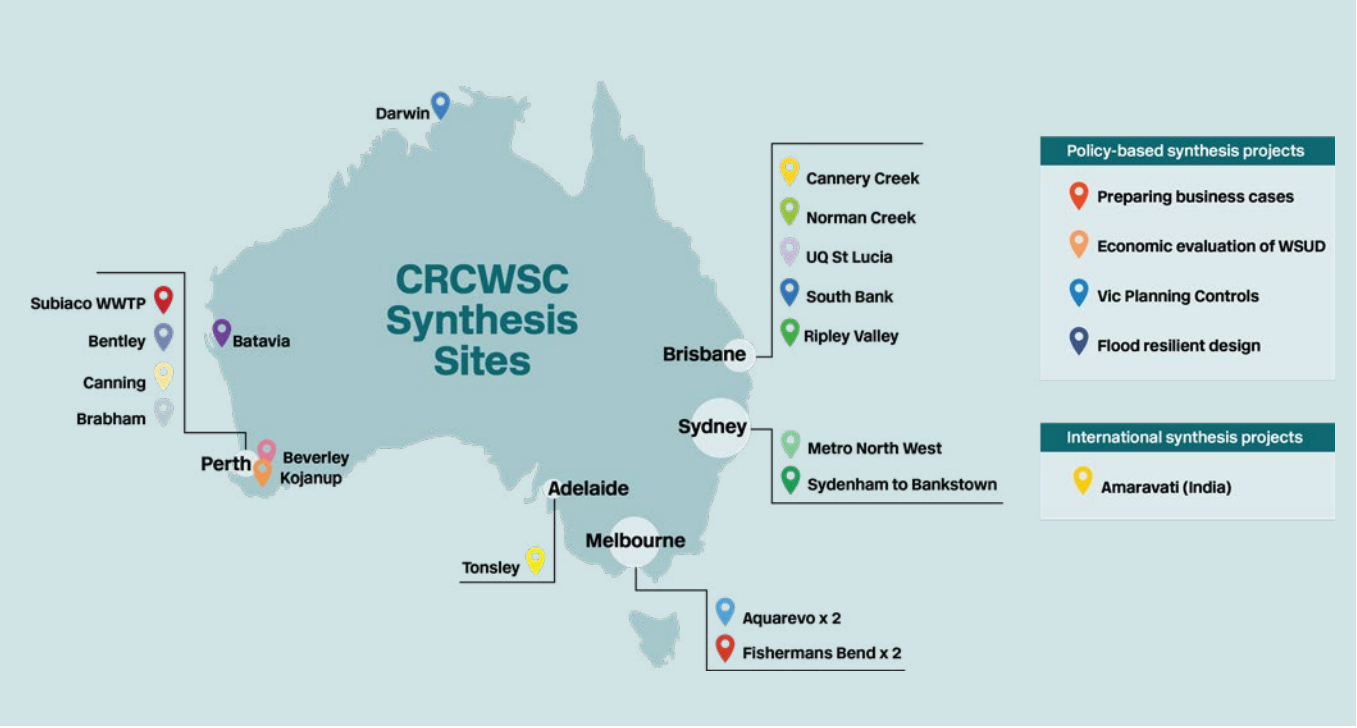
Business case

Costs	Benefits
Most continued input to developing water sensitive outcomes for Fishermans Bend has been in-kind time from technical staff from each agency. However, the following direct costs were also incurred: • South East Water funded the investigations and business case development for the proposed water treatment plant. • Melbourne Water funded the participation of the CRCWSC and engaged GHD throughout the planning process. It also funded SJB Urban to prepare design guidance for areas projected to be affected by sea level rise. • The City of Port Phillip and the City of Melbourne engaged Ramboll to prepare the Fishermans Bend integrated and innovative water management report. • DELWP provided grant funding to undertake a risk assessment of future climate change impacts (underway, by HARC Consultants). • Infrastructure costs and funding / financing mechanisms, as well as delivery responsibilities, are being investigated as part of developing an integrated infrastructure funding and finance strategy for Fishermans Bend. The strategy, which is due to be finalised in 2020, will be used to develop a broad business case for the preferred infrastructure outcome.	The collaborative process engaged all project stakeholders to agree on water sensitive city opportunities and to identify and test innovative ideas. This process has helped to create the water sensitive city strategy for Fishermans Bend, which will: • reduce potable water use • reduce discharges from stormwater and wastewater to Port Phillip Bay • reduce flood impacts • activate street frontages in flood prone areas • reduce the cost of drainage infrastructure • improve social resilience to flooding by introducing water in the landscape to make the community aware of stormwater in a controlled manner • set a precedent for urban renewal—local, national and global (natural solution to a natural problem) • help to define the character of the place by making water visible in the landscape • bring forward greening initiatives and water quality benefits, because they are directly linked to the drainage function • reduce reliance on pumps in a storm event by slowly releasing flood water from storage (increased resilience to pump failure) • reduce downstream flooding impacts in Port Melbourne.

Transferability

CRCWSC Research Synthesis Process

The CRCWSC Research Synthesis facilitated design process used at Fishermans Bend 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. This process can be applied at a range of scales and locations and has already been applied to many projects, including:



Fishermans Bend approach to water management

The scale of Fishermans Bend allows novel approaches to be tested for applications at different scales. Among these are the decentralised infrastructure and governance approaches that have wider applicability in other cities and precincts.

Two innovations hold particular promise in other urban renewals:

- Hybrid drainage was a cost-effective alternative to conventional drainage upgrades.
- An urban ecology strategy could expand the remit of urban water management.

The processes used for planning Fishermans Bend are also transferable in situations that require innovation and those with a complex water cycle.

Project collaborators

- Department of Environment, Land, Water and Planning
- Department of Jobs, Precincts and Regions, including the Fishermans Bend Taskforce
- Melbourne Water
- South East Water
- City of Melbourne
- City of Port Phillip
- Office of Victorian Government Architect
- EPA Victoria
- GHD
- Ramboll Environ
- Low Carbon Living CRC
- Ethos Urban
- SJB Urban
- HARC

Additional information

- Fishermans Bend Vision (Victorian Government 2015)
- Fishermans Bend Framework (Victorian Government 2018)
- Ideas for Fishermans Bend (CRCWSC 2015)
- Fishermans Bend Integrated and Innovative Water Management (Ramboll & Ethos Urban 2018)

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