water by design

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Healthy land & water

Integrated Water Planning

A Queensland context synthesis report

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Author Healthy Land and Water
Layout Georgia Glidden
Review Adrian Crocetti, Rachael Nasplezes, Suzi Moore

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Traditional Owner Acknowledgement

We acknowledge that the place we now live in has been nurtured by Australia's First Peoples for tens of thousands of years. We believe the spiritual, cultural and physical consciousness gained through this custodianship is vital to maintaining the future of our region.

Funding Acknowledgement

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INTRODUCTION

This report was sponsored by the Queensland Department of Environment and Science (DES) and is for discussion purposes only.

The report builds on many years of research into waterway science and practice and examines key issues of **Integrated Water Planning** for urban waterways. The purpose of this document is to summarise the history of Integrated Water Planning in Queensland, provide a snapshot of current industry practice, outline available resources and decision support tools, and propose a path forward to improve uptake of Integrated Water Planning across the state.

"The separation in the management of water assets and planning functions in Queensland presents various institutional barriers to achieving integrated planning, delivery of multiple benefits, and potential cost efficiencies.

In light of climate change, water scarcity and increasing water demand, it has been suggested that the inefficiencies of continuing to plan, design and manage parts of the water cycle and water-related values independently is no longer cost effective or responsible."

– Alluvium 2020

SUMMARY

WHERE WE ARE

This document provides a synthesis of Integrated Water Planning across Queensland. The aim of the report is to **advance the development of best practice Integrated Water Planning outcomes with industry and communities of practice in Queensland**. To address this complex topic, Healthy Land and Water have sought input from a diverse range of stakeholders and undertaken a comprehensive review of the literature. Through this analysis, the following key points have emerged:

- **Gaps** in the current stormwater management design objectives within the *State Planning Policy 2017* **could be addressed through government policy** to enable improved waterway management outcomes.
- **Integrated Water Planning is not new**. It has been occurring throughout Queensland in various forms for many years.
- **Current best practice examples provide a proof of concept and template for adaptation.** For example, Moreton Bay Regional Council have been using the Total Water Cycle Management Planning process for over a decade. Through this, they have acquired a unique understanding of their catchments and are able to quantifiably demonstrate the value of an integrated approach.
- There are at least six independent investigations into Integrated Water Planning currently underway in Queensland. There is an opportunity to align with this work and **capitalise on this momentum**.
- As demonstrated through the Queensland erosion and sediment control and urban stormwater management strategy, **the Queensland Government supports Integrated Water Planning as an important driver for waterway health**.
- An Integrated Water Planning approach is further **supported by a growing body of industry and research bodies** including Engineers Australia, Water Service Association of Australia, the Cooperative Research Centre for Water Sensitive Cities and Stormwater Queensland.
- Feedback from the *Blueprint for Improving Waterway Management (2020)* indicates that **integrated planning is a high priority for local governments.**
- Integrated Water Planning involves deconstructing silos. It is people-driven and requires a **flexible approach** that can be adapted to different scales and circumstances.
- Integrated Water Planning requires a level of **coordination** that can straddle local government borders and organisations.
- **Examples exist where Integrated Water Planning has been successfully implemented within state policy,** resulting in coordinated uptake of Integrated Water Planning from local governments and successful on ground delivery of various integrated water projects (e.g. Victoria).

MOVING FORWARD

It is **recommended** that the water industry continues to **explore Integrated Water Planning as a means to address critical vulnerabilities, solve complex water issues, improve waterway health outcomes and provide water security** across Queensland.

It is proposed that an adaptive management framework be used by local governments to gather intelligence, diagnose problems, identify priorities, craft solutions and support implementation to achieve positive outcomes for waterway health.

There are a number of ways to improve the uptake of Integrated Water Planning. Moving forward, local governments and utilities should be encouraged to build on existing efforts to integrate their water systems and identify key partnership programs across departments, organisations and borders. This could be achieved by establishing a formal advisory committee with key representative organisations.

There is opportunity for the Queensland Government, local governments, and utilities to foster leadership, understanding, financial support and accountability within the industry to create a supportive environment for change.

There is significant momentum building in Integrated Water Planning across Queensland.

NEXT STEPS

It is proposed that development of a set of guidelines will provide the necessary decision support tools for stakeholders to progress broadscale uptake of Integrated Water Planning. Preliminary work through the State of the Streams (Healthy Land and Water, 2017) outlined the key chapters of a waterway management guideline, which could be used as a way forward. This included the following key themes:

1 **Risk management**
Identification of key threats in the catchment (e.g. erosion, changes in hydrology, fertiliser and pesticides, invasive species).

2 **Opportunity management**
Identification of key opportunities in the catchment (e.g. rehabilitation potential, targeted rehabilitation of threatened species, maximising co-benefits, fostering stewardship).

3 **Strategic planning**
A review of the efficacy of current legislative, policy and planning mechanisms for the full spectrum of planning and development processes.

4 **Development application**
A review of the process and development code for waterways.

5 **Spatial analysis**
A guide for Geographic Information System (GIS) mapping of values, threats, opportunities and hotspots, including advice on typical layers, surrogates, rolling up layers and multi-criteria analysis.

6 **Works prioritisation**
A guide to assessing waterways and prioritising waterway management actions according to the framework of 'protect, correct, resurrect and neglect'.

7 **Maintenance operations and asset management**
A review of the Integrated Water Planning roles, responsibilities and resources, and a guide to scheduling inspections and maintenance, identifying issues and actions, and determining extent of service, type of service and level of service.

8 **Extension and engagement**
A guide to securing participation in extension programs, identifying priority issues and actions, implementing waterway plans and fostering stewardship.

9 **Environmental accounting**
A guide to managing ongoing expenditure on green assets, providing advice on typical costs for managing waterways and assessing the value of direct and intangible benefits with a view to maximising return on investment. It should also explore possible revenue streams for local governments and waterway managers.

10 **Monitoring and evaluation**
A guide to effective use of monitoring and evaluation programs for ecological health, environmental stewardship and economic productivity.

WHAT IS INTEGRATED WATER PLANNING?

The aim of Integrated Water Planning is to identify synergistic relationships between water supply, sewage and stormwater management to provide cost savings, improve water security and reduce pollution (Figure 1). It is a collaborative process to understand issues, identify solutions and create an agreed set of solutions.

An Integrated Water Planning approach, as outlined by the *Water Services Association of Australia Summary Paper (2020)*, is:

- A collaborative process that is owned by all stakeholders involved in the water cycle, from its planning to ongoing management.
- Customer and community outcomes driven.
- Takes a whole of water cycle approach to planning with all supply and demand options on the table.
- Takes into account all options related to water, wastewater and drainage services.
- Takes into account the environmental, cultural, social and economic dimensions of place.
- Includes strategic and statutory land use planning and water planning that are closely integrated.
- Supports a circular economy through maximising efficiency and working towards regenerative
- Is fit for purpose – can be suited to different scales (e.g. catchment, region, precinct) and con communities).
- Is ambitious and transformative in striving for the broader outcomes of the Sustainable Development Goals.

The concept of Integrated Water Planning is not new. It was first introduced into Queensland legislation in 2009 under the Environmental Protection (Water) Policy (EPP) (former Department of Environment and Heritage Protection) and was called Total Water Cycle Management Planning (Figure 2). Since that time, Healthy Land and Water, through its 'Water by Design' urban water capacity building program has consulted with the industry extensively and has been heavily involved in waterway management and planning research. The research and associated supporting resources and reports can be found here.

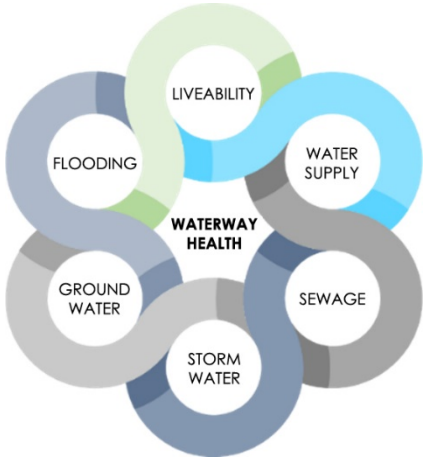


FIGURE 1 INTEGRATION OF THE WATER CYCLE

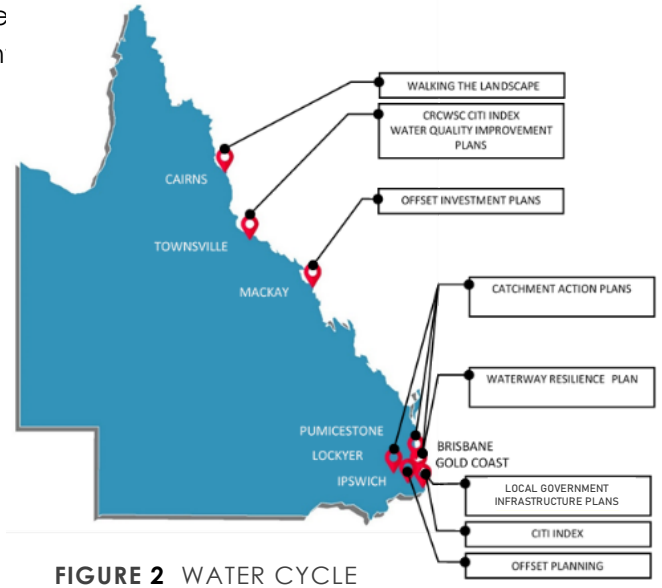


FIGURE 2 WATER CYCLE PLANNING ACROSS QUEENSLAND

WHY DO WE NEED INTEGRATED WATER PLANNING?

ECOLOGICAL RISK

Waterway values are impacted by many factors, both naturally occurring and resulting from human activity. Even in the absence of pressures from agricultural, industrial and urban development, deterioration of waterway values can occur through the introduction of invasive species and other natural processes such as floods and droughts.

The stormwater management design objectives within the *State Planning Policy* were created with the intent of reducing the amount of pollution entering our waterways from new developments. Although this is an essential measure to limit our environmental impact, the stormwater management design objectives typically only partially reduce pollution loads and do not consider the full ecological risk profile. The *State Planning Policy* is also only applicable to new developments and does not address legacy waterway impacts.

There are other regulations that also manage pollution (e.g. sewage treatment plant discharge). However, as seen in Figure 3, stormwater pollution is just one component of numerous potential threats to waterway health. Habitat loss, biodiversity decline, climate change impacts, urban expansion and other anthropogenic pressures are adding further stress to an already degraded environment

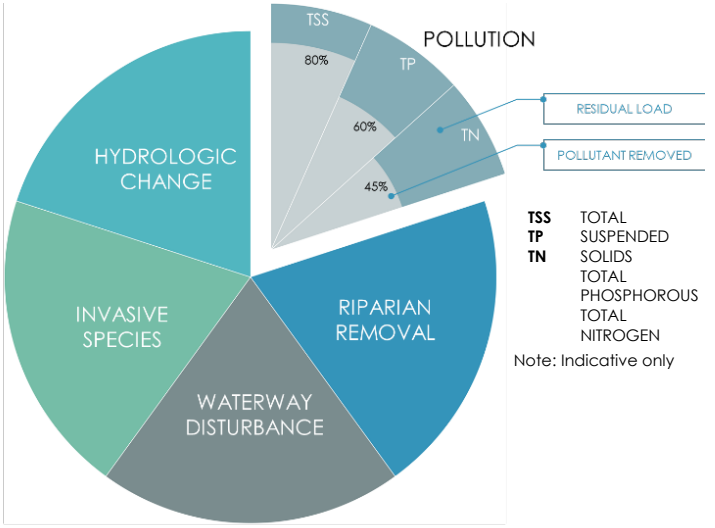
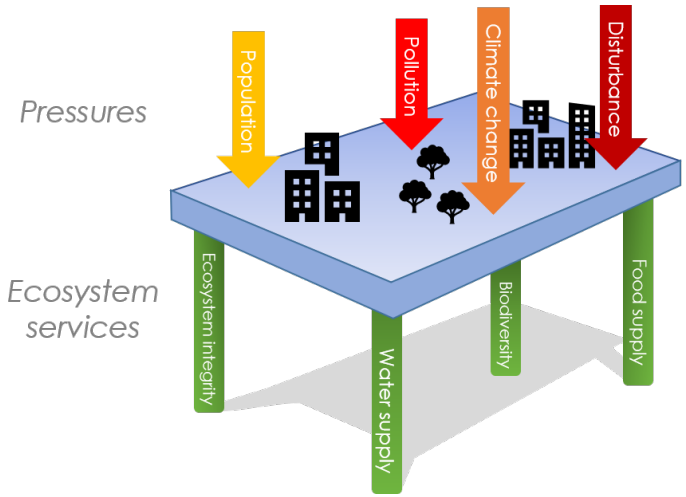


FIGURE 3 THREATS TO WATERWAY HEALTH



ECOSYSTEM CARRYING CAPACITY

The vulnerability of ecosystem services to certain pressures is an important factor in waterway management (Figure 4). Once certain thresholds are exceeded (e.g. nutrient concentration), waterways can rapidly deteriorate, resulting in negative environmental, social and economic outcomes (e.g. algal blooms resulting in fish kills). Although the stormwater management design objectives limit the impact of pollution on our waterways, they do not account for the carrying capacity and vulnerability thresholds of these systems.

The approach to managing waterway health needs to diversify and address the full ecological risk profile.

FIGURE 4 HOW MUCH PRESSURE CAN THE ECOSYSTEM TAKE?

INTEGRATED WATER PLANNING CHALLENGES & OPPORTUNITIES

The current stormwater management **design objectives are simple** in their construction. To improve waterway health, the *State Planning Policy* **requires new developments to minimise stormwater pollutant loads reaching the waterway**. For example, for very large councils, the objectives require reductions of 80% for Total Suspended Solids (TSS), 60% for Total Phosphorus (TP), 45% for Total Nitrogen (TN) and 90% for Gross Pollutants (GP). These objectives are based on the economic principle of diminishing return, with the aim of optimising pollutant load reduction without wasting additional resources.

This policy has resulted in a **widespread effort to mitigate stormwater pollution impacts** across Queensland with all new housing developments above a threshold of 2500m^2 (or equivalent six lots) across coastal Queensland, required to install pollution control devices such as bioretention basins and Gross Pollutant Traps (GPTs) to reduce the flow of damaging pollution.

Although significant progress has been made, there is still much left to do to improve waterway management practices.

CHALLENGES

Some limitations have been identified in the current stormwater management design objectives. After extensive consultation and research by Water by Design and Alluvium in 2018, Healthy Land and Water has identified that the narrow scope and lack of incentives are key barriers.
For example, in their current form, there is no incentive to:

- Reduce pollutant creation at its source through Low Impact Design (LID) within housing estates.
- Invest in Water Sensitive Urban Design (WSUD) integration and co-benefits, even when it makes sense economically.
- Address other waterway threats (e.g. riparian damage, invasive species), despite their potential to undo other efforts to stop waterway deterioration.

THE OPPORTUNITY

The current stormwater management design objectives are limited in what they can accomplish. Importantly, they cannot repair many years of legacy impact to our waterways. There is growing evidence that collaborative strategic planning approaches between local government and water utilities result in positive outcomes for water systems that address identified gaps in the current objectives. Integrated Water Planning therefore provides a mechanism to resource and implement cost-effect solutions. It enables local governments to undertake a holistic examination of their waterways and apply systems thinking to determine ecological carrying capacity and identify multiple benefit outcomes of waterway management interventions. These outputs can then be used to inform decision making around development, particularly for sensitive or at-risk areas.

TOTAL WATER CYCLE MANAGEMENT PLANNING

The history of Total Water Cycle Management Planning (Figure 5) began legislatively in Queensland in 2009, with all local governments with a population of at least 10,000 required to undertake the process.

In South East Queensland, this legislation coincided with the separation of water utilities from local government. The ensuing confusion over responsibilities and roles of these newly separated entities, coupled with the short timelines for implementation, resulted in the legislation being poorly received by local government. With limited guidance provided for regional areas and little investment or implementation support available, the uptake of Total Water Cycle Management Planning was low and this lack of buy-in and support led to the legislation being repealed in 2012.

Since this time, legislation has not been reinstated. Despite this, momentum has been building in Queensland, with many local governments undertaking various forms of Integrated Water Planning. There are currently numerous integrated water plans underway across the state, including:

- Unity Water, Sunshine Coast Council and Noosa Shire Council
- Logan City Council – Nutrient Offsets Scheme
- Ipswich City Council – Offset Scheme Review
- Moreton Bay Regional Council – Total Water Cycle Management Planning Review
- Cooperative Research Centre for Water Sensitive Cities – Integrated Research Project 3
- SEQWater – Water for SEQ Plan

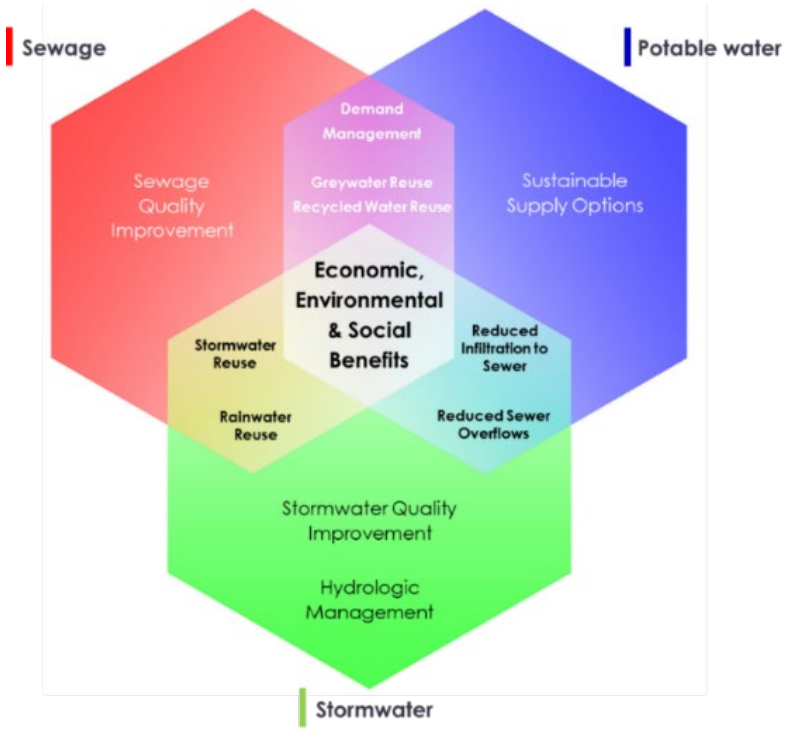


FIGURE 5 TOTAL WATER CYCLE PLANNING: (ADAPTED WBD 2009)

CASE STUDY: TOTAL WATER CYCLE MANAGEMENT PLAN - MORETON BAY REGIONAL COUNCIL

The Moreton Bay Regional Council commenced work on a **Total Water Cycle Management Plan** in 2010. This plan is the first stage of a coordinated response to managing water quality objectives for Moreton Bay and its associated rivers, creeks, and beaches. The plan incorporates detailed **modelling** to identify broad **catchment-specific solutions to deliver the highest water quality outcomes at the least cost to the community.** Healthy Land and Water conducted an interview with the plan's developers in 2020, to gain insights into the Total Water Cycle Management Plan process. Interviewees included Moreton Bay Regional Council (MBRC), Unity Water, Queensland Government Department of Environment and Science (DES) and Alluvium.

History

Developed during the final years of the millennium drought, the initial plan had a strong water security focus. However, its subsequent development took an increasingly holistic approach with a greater focus on water quality. The plan has undergone three major planning phases (2010, 2012 and 2013). These phases included identification of issues and drivers, solutions and infrastructure, costs and benefits, and implementation pathways and monitoring. The value of a collaborative approach is agreed to be critical to the plan's successful implementation.

Areas for improvement

Several areas for improvement have been identified through the adaptive process while refining the plan.

- Better collaboration between local government and utilities and state government departments allows for improved transparency, accountability and delegation of roles and responsibilities.
- A deeper understanding of asset condition and capabilities enables better planning for water reuse and management of pollutant sources in waterways.
- Improvements can be gained through enhanced integration of legislation (e.g. links between *Water Supply (Safety and Reliability) Act 2008* and *Environmental Protection (Water and Wetland Biodiversity) Policy 2019*).

New areas for research and inclusion

The incorporation of customer and community views and needs has been identified as an important area for inclusion. New 'no net decline' regulations for point sources (e.g. in the reef region) also offers new opportunities for integrated outcomes, including the recognition of the interplay of stormwater offsets and Integrated Water Planning.

What's needed for a state and national framework for Integrated Water Planning.

Decision support tools are required to enable an Integrated Water Planning approach, including planning schemes, education programs, capacity building and extension programs, and capital works schemes.

Should Integrated Water Planning be mandatory for the rest of the state?

The Moreton Bay Regional Council Total Water Cycle Management Plan required a level of investment that may not be achievable for smaller local governments. An Integrated Water Planning approach can promote strategic identification of opportunities and options of additional water supply sources, as needed.

BETTER STAKEHOLDER COORDINATION AND TRANSPARENCY

INCREASED UNDERSTANDING OF HOW GROWTH IMPACTS ON ENVIRONMENTAL DECLINE

IMPROVED ENVIRONMENTAL PROTECTION

PLAN SAVES MONEY AND LEADS TO IMPROVED INFRASTRUCTURE

EXISTING POLICY AND PLANNING LANDSCAPE

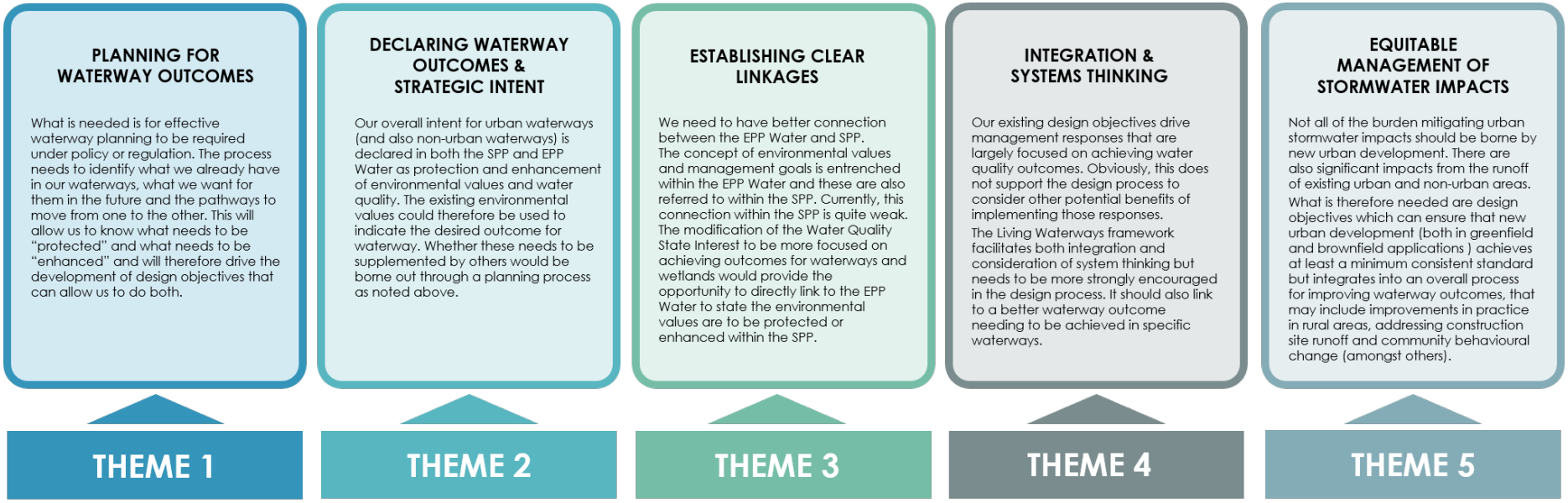
There are a range of existing policies and plans that highlight Integrated Water Planning as a proposed way forward to drive improved waterway health outcomes in Queensland.

REVIEW OF THE STORMWATER MANAGEMENT DESIGN OBJECTIVES

In 2018, Healthy Land and Water undertook a scientific review of the Stormwater Management Design Objectives within the Water Quality State Interest (Alluvium, 2018). The review found that there was a disconnect between the strategic intent of the *Environmental Protection (Water) Policy 2017* (EPP) to protect and enhance water values and waterway health outcomes. Integrated Water Planning was identified as a solution to establish the links between specified policy intent and waterway outcomes.

There is a disconnect between policy strategic intent and the outcomes being achieved in waterway health.

The review also identified five key themes to improve waterway management, which are detailed below (Extract 1):



EXTRACT 1 STORMWATER MANAGEMENT DESIGN OBJECTIVES DISCUSSION PAPER – KEY THEMES (ALLUVIUM 2018)

EROSION AND SEDIMENT CONTROL AND URBAN STORMWATER STRATEGY (IN DRAFT)

DEPARTMENT OF ENVIRONMENT AND SCIENCE

The Department of Environment and Science (DES) is in the process of preparing a state strategy for Erosion and Sediment Control (ESC) and Urban Stormwater (USW). While the strategy is still in draft status, DES have identified the following five key strategic priorities:

1. Integrated planning
2. Research and innovation
3. Skills and knowledge
4. Improved compliance
5. Continual improvement

The strategy outlines the objectives, outcomes and priority actions identified for each Strategic Priority. For Integrated Planning these are identified as:

Objectives: On ground interventions and planning instruments are targeted to deliver multiple benefits including water quality improvement.

Outcomes: Best available information supports the design of interventions. Innovation drives continuous improvement in methodologies for catchment repair. Strong and collaborative partnerships are developed to deliver on ground catchment repair interventions.

High Priority Actions: Locally relevant data informs the calculation of water quality. Identify better integration of stormwater and catchment management to inform investment planning and prioritisation. Ensure Traditional Owners and First Nations Peoples' values and views are represented in all future stormwater and catchment planning activities.

Extract 2 below outlines the list of component priority actions associated with the Integrated Planning Strategic Priorities:

1.1 **Local planning schemes are regularly updated** to ensure plans prepared as part of development applications (e.g. ESC, SMP) align with current state and regional regulatory and policy requirements, as well as other management planning instruments including water quality improvement plans, catchment management, waterway management and IWP.

1.2 **Collect locally relevant data** to inform the calculation of water quality risks from established and developing urban land uses.

1.3 **Incorporate local and context-specific requirements,** design objectives and solutions for environmental protection and liveability into regional stormwater and/or waterway management plans.

1.4 **Identify better integration** of stormwater and catchment management to inform investment planning and prioritisation, including alternative locally appropriate solutions.

1.5 **Establish demonstration sites** in leading local government areas of each climatic region to demonstrate how integrated stormwater and erosion and sediment control technologies perform under different conditions.

1.6 **Collect data to inform regionally specific guidelines** on operation, monitoring and maintenance conditions.

1.7 **The Living Waterways framework is adopted** and promoted as best practice by local governments as a recognised and recommended approach to designing for USW in development applications.

1.8 **Ensure Traditional Owner and First Nations Peoples' values and views are represented** in all future stormwater and catchment planning activities.

EXTRACT 2 DRAFT STRATEGY FOR INTEGRATED PLANNING

BLUEPRINT FOR IMPROVING WATERWAY MANAGEMENT

Healthy Land and Water released a blueprint for improving waterway management in 2020. The document continues the investigation into the *State Planning Policy* and stormwater management design objectives.

The blueprint was developed in consultation with key sectors of the stormwater industry including local government authorities, consultants, industry associations and water utilities.

It was sponsored by the Queensland Government Department of Environment and Science, and is for discussion purposes only.

Click for full document

The paper proposes 12 strategies across three themes to protect, maintain and enhance waterway values.

Four of the strategies discussed were specifically related to Integrated Water Planning, including:

- Strategic planning
- Pristine waterway protection
- Strategic offsets
- Water reuse

FIGURE 6 STRATEGIES TO PROTECT, MAINTAIN AND ENHANCE WATERWAY VALUES

BLUEPRINT FEEDBACK

To determine the relevance and use of the blueprint, Healthy Land and Water sought feedback from waterway managers from local governments in South East Queensland. Four local governments (Ipswich City Council, Brisbane City Council, Noosa Shire Council and Redland City Council) undertook a ranking exercise of each of the blueprint strategies, identifying strategies one, two, nine and twelve as high priorities (Figure 6). These strategies can be strategically delivered with enhanced outcomes using an Integrated Water Planning Approach.

Healthy Land and Water has subsequently received endorsement from steering committees to progress Integrated Water Planning as a priority strategic focus for delivery through the organisation's Water by Design urban water capacity building program.

WATER FOR SEQ PLAN

The Water for South East Queensland Plan (W4SEQ) aims to provide a regional context for integrated management of the region's water resources in the interests of future prosperity and liveability. Consultation with a broad stakeholder group is planned including state and local government, peak industry bodies, traditional owners and technical specialists. The outcomes of this initial consultation will guide the direction of the first W4SEQ and provide a view of the next iteration of the Plan to ensure that W4SEQ realises lasting and substantial benefits for the diverse communities and natural environment of SEQ. W4SEQ is being sponsored by the SEQ Water Service Providers: City of Gold Coast, Logan City Council, Redland City Council, Seqwater, Unitywater and Urban Utilities. The Water for SEQ **2020 Annual Report** details the initial vision and strategic directions for W4SEQ. The SEQ Water Service Providers look forward to the contributions of all stakeholders to establish a robust pathway for the preparation and implementation of this regional scale integrated water management plan.

Click for full document

"Integrated and collaborative water cycle management across South East Queensland ensures water and sewerage services are reliable, affordable, and sustainable both now and in the future. People trust an aligned water industry to deliver outcomes that are best for the region and support the health and wellbeing of people, enhance local waterways and catchments, manage uncertainties, and drive economic prosperity for the region. The benefits and costs of an integrated and regional approach to water management are realised, pursued and shared equitably between stakeholders."

STRATEGIC DIRECTION 1	STRATEGIC DIRECTION 2	STRATEGIC DIRECTION 3	STRATEGIC DIRECTION 4	STRATEGIC DIRECTION 5	STRATEGIC DIRECTION 6
People understand, value and feel connected to water.	Water drives a thriving, sustainable economy.	Collaboration across organisations and sectors drives integrated, regional water outcomes.	Water services (raw water, drinking water, sewerage, recycled water, stormwater) are delivered safely, affordably and sustainably across South East Queensland's diverse communities.	Water services support and enhance quality of lifestyle and health and wellbeing of people.	South East Queensland's catchments and ecosystems are healthy and enhanced by effective water management across jurisdictional boundaries.

EXTRACT 3 STRATEGIC DIRECTIONS (SOURCE: WATER FOR SEQ PLAN)

ENGINEERS AUSTRALIA QUEENSLAND WATER POLICY

In their most recent *Queensland Water Policy* update, Engineers Australia put forward a new holistic water cycle approach to water management with the introduction of the OneWater concept. Strategy number three in the document specifically addresses Total Water Cycle Management Planning and includes key recommendations for the Queensland Government.

The paper promotes an integrated planning and implementation approach to managing finite water resources for long-term resilience and reliability, aiming to meet both community and ecosystem needs through a 'One Water' approach.

It aims to protect communities from major threats whilst safeguarding economic and social wellbeing for future generations.

Key recommendations from the policy update include:

- Identify and reform policy barriers to Total Water Cycle Management Planning.
- Develop road maps for state and local governments and regional entities to adopt Total Water Cycle Management Planning.
- State government to provide leadership and direction on driving Total Water Cycle Management Planning outcomes.
- Determine and implement Total Water Cycle Management Planning business model and funding arrangements.
- Ensure that institutional, policy and regulatory arrangements and incentives are in place to drive integrated and collaborative approaches to Total Water Cycle Management Planning.
- Actively engage the community in the implementation of Total Water Cycle Management Planning.

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CASE STUDY: EXAMPLE FRAMEWORK - VICTORIA

The Victorian Government Department of Environment, Land, Water and Planning has established clear guidelines for Integrated Water Management in Victoria. Their policy document, *Integrated Water Management Framework for Victoria*, recommends the establishment of an Integrated Water Management forum to provide key opportunities for interorganisational collaboration and outlines roles and responsibilities. This approach has led to successful integrated outcomes within Victoria and could be used as a template for Integrated Water Planning in Queensland.

Table 1: Typical organisational accountabilities in urban water management.

Agency	Accountability
Victorian Government and Departments	Legislation Policy Regulation
Environment Protection Agency	Environmental regulation (including best practice guidelines and protection policies)
Essential Services Commission	Economic regulation
Water corporations	Water supply Wastewater man'agement (including sewerage and sewage treatment) and trade waste management Waterway and major drainage systems (Melbourne Water only)
Catchment management authorities	Waterway health Floodplain management Environmental water
Local government	Urban stormwater management Parks and gardens management Onsite domestic wastewater management Urban planning Building and planning approvals
Property owners, residents and businesses	Meeting terms and conditions of services provided Following permit conditions Onsite water management, e.g. rainwater, stormwater
Victorian Planning Authority	Urban growth structure planning for Melbourne and (where invited) regional Victoria
Developers	Construction of development scale water infrastructure

EXTRACT 4 INTERGRATED WATER MANAGEMENT ROLES AND RESPONSIBILITIES (SOURCE: INTEGRATED WATER MANAGEMENT FRAMEWORK FOR VICTORIA)

Click for full document

A FRAMEWORK FOR INTEGRATED WATER PLANNING

Integrated Water Planning frameworks should respond to the amount of risk and value present within the landscape. While low risk areas have a limited need for regulation, complex, high-risk areas have a need for comprehensive and nuanced planning.

Healthy Land and Water recognises that there are many planning instruments already in existence in Queensland and that many local governments are seeking a flexible and adaptive approach to Integrated Water Planning. To enable this approach to be mainstreamed across the State, a scaffold for local governments can be provided to utilise and adapt plans to their own specific and unique areas, whist also providing consistency in best practice outcomes. Ideally, Integrated Water Planning would cover all aspects of the water cycle, however for the purpose of satisfying *State Planning Policy* water quality state interest, Healthy Land and Water recommends that waterways and stormwater be covered at a minimum.

Healthy Land and Water recently developed an integrated water planning framework which represents current planning instruments in South East Queensland. The framework utilises components of both the adaptive management framework and the key principles of Queensland's erosion and sediment control and urban stormwater strategy (see full framework on Figure 9). Each element is expanded upon on the following pages.

The Integrated Water Planning framework can be built from various components and implemented in a staged approach (illustrated in Figure 7 and 8). Healthy Land and Water recommend that consideration be given to implementing an approved approach where an integrated water plan is a prerequisite for permitting local governments to set up a stormwater offsets scheme.

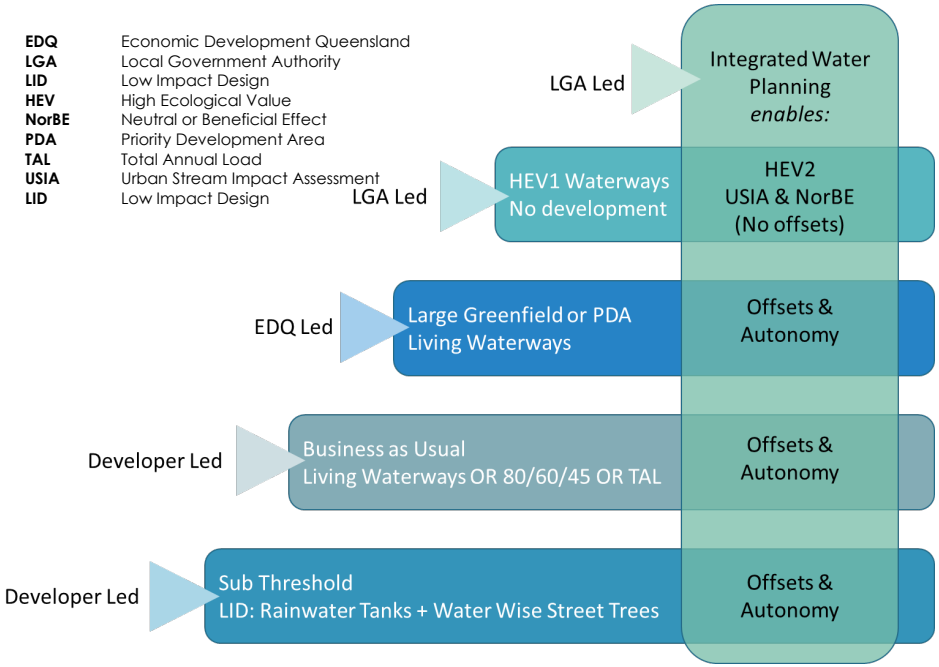


FIGURE 7 FLEXIBLE OPTIONS FOR INTEGRATED WATER PLANNING

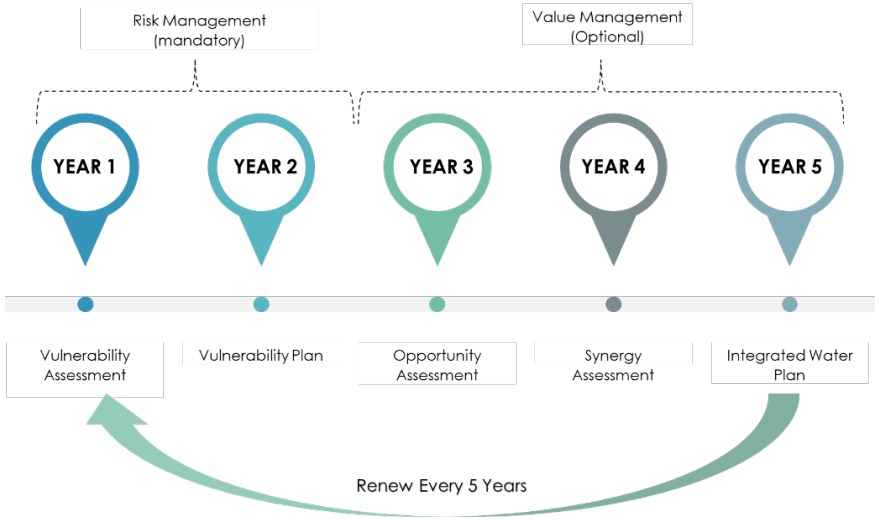
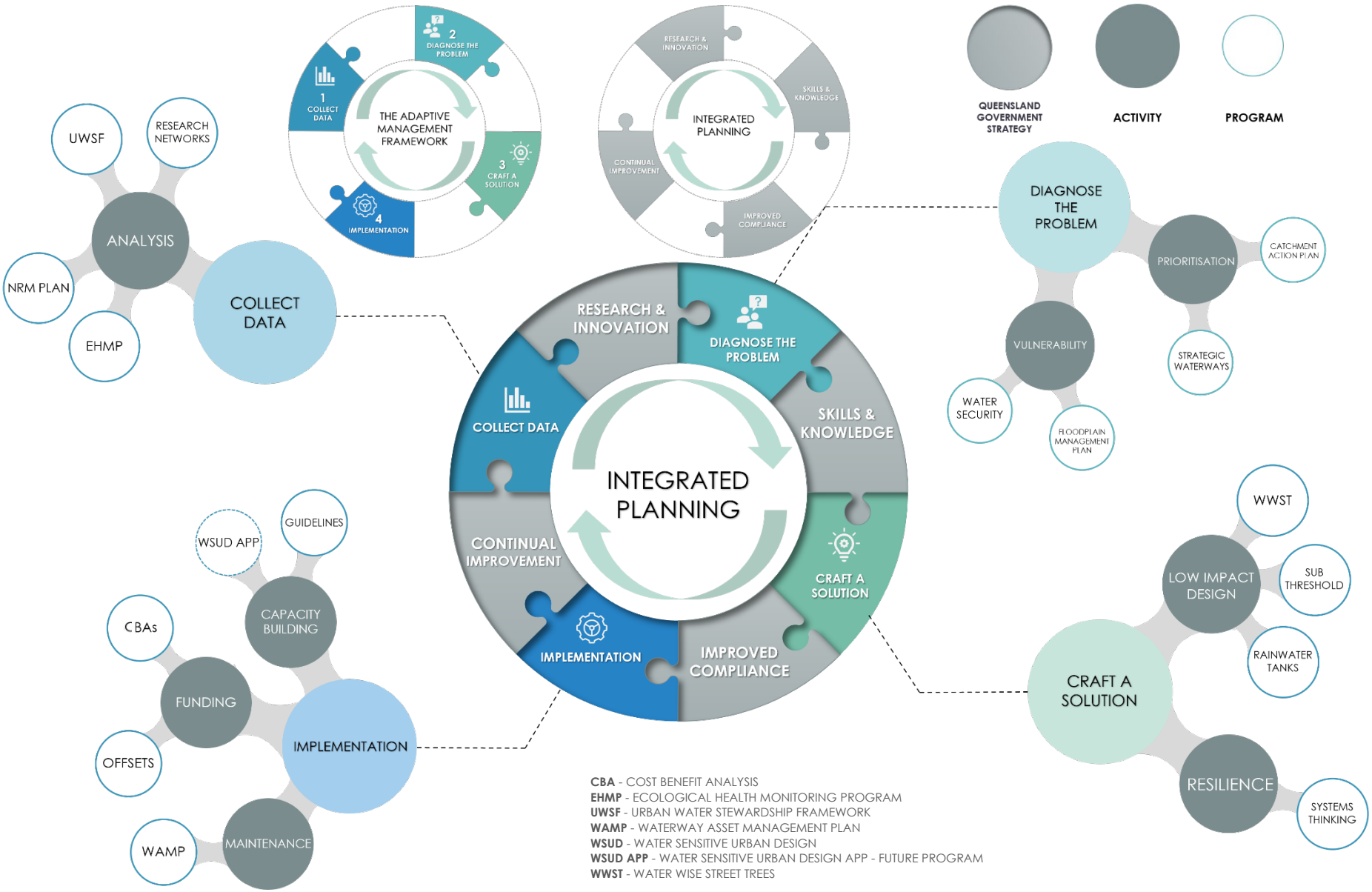
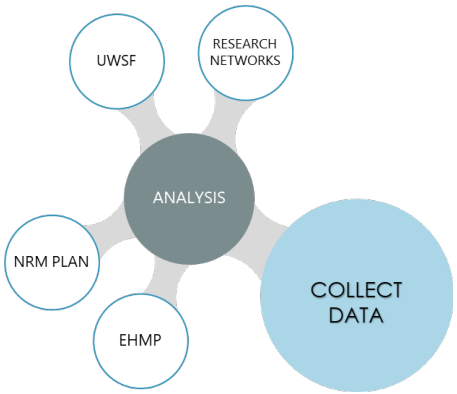


FIGURE 8 A STAGED APPROACH FOR INTEGRATED WATER PLANNING IMPLEMENTATION (YEAR 1 – YEAR 5)



CBA - COST BENEFIT ANALYSIS
EHMP - ECOLOGICAL HEALTH MONITORING PROGRAM
UWSF - URBAN WATER STEWARDSHIP FRAMEWORK
WAMP - WATERWAY ASSET MANAGEMENT PLAN
WSUD - WATER SENSITIVE URBAN DESIGN
WSUD APP - WATER SENSITIVE URBAN DESIGN APP - FUTURE PROGRAM
WWST - WATER WISE STREET TREES

FIGURE 9 A FRAMEWORK FOR INTEGRATED WATER PLANNING



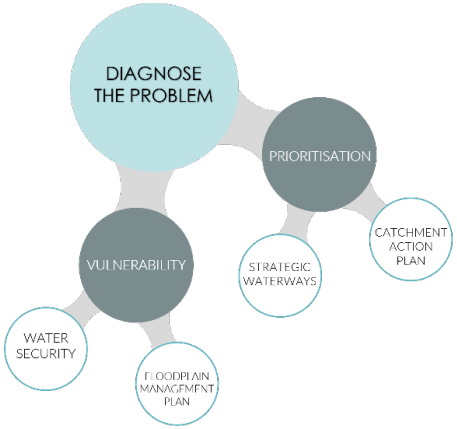
DATA COLLECTION

An Integrated Water Planning framework aims to link together existing planning instruments including:

- The Queensland Plan
- Regional Plans
- Natural Resource Management Plans
- Ecological Health Monitoring Programs (EHMP)
- Urban Water Stewardship Framework (UWSF)

The first step in the integrated cycle is to collect data on waterway health. There are many instruments currently in effect in Queensland which are delivering waterway health data. For example, Healthy Land and Water have been collecting water quality data in South East Queensland for over 20 years, forming the basis of the annual Report Card. The Report Card model has since been adapted to other regions across Queensland and has helped build a common understanding of waterway values and threats.

The Urban Water Stewardship Framework (UWSF) has recently been introduced into Queensland and seeks to evaluate stewardship behaviours that contribute to optimal waterway health by providing an A to D rating for each region. The review process helps highlight both areas that need improvement and those that are performing well. Risk based frameworks can also provide opportunities to assess catchment condition and help to create an inventory of the current state of the waterway, including hazards, values and needs.

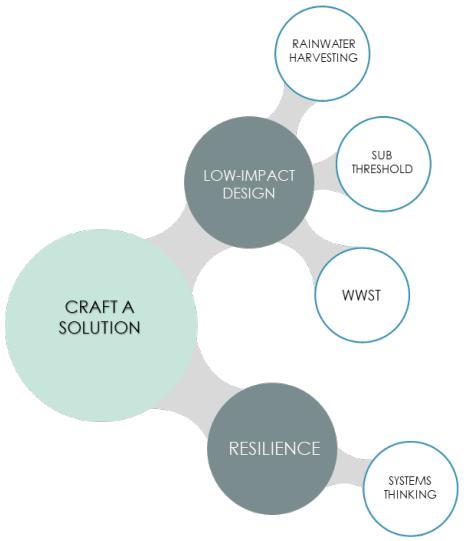


DIAGNOSE THE PROBLEM

The second phase of the integrated cycle consists of two parts: a vulnerability assessment and a prioritisation process. The first phase aims to identify the weak links in the waterway management system, including waterway values which are at risk from either chronic threats (e.g. ongoing pollution loads) or acute threats (e.g. floods and heatwaves).

Vulnerability analysis often uncovers a long list of threats that are impacting the waterway, which can be overwhelming and result in indecision and inactivity. Additionally, our ability to finance risk mitigation or waterway restoration projects is limited. We therefore need to prioritise cost effective actions that will have the most beneficial impact on waterway health.

A thorough assessment of the catchment and waterway is required to accurately determine its needs. Often catchments will require several different strategies to achieve the best outcome and return on investment.



CRAFT A SOLUTION

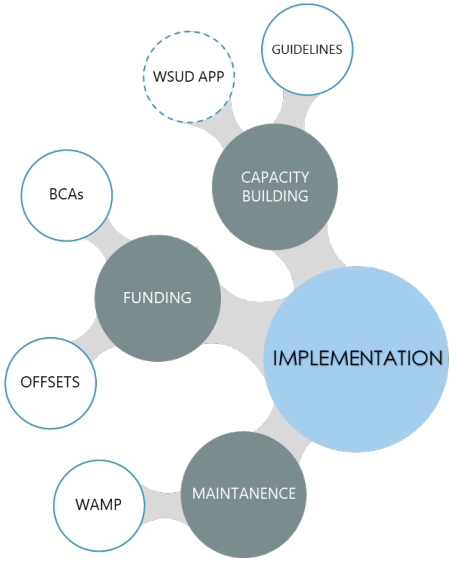
The current approach to providing Water Sensitive Urban Design (WSUD) relies on linear thinking. While this is efficient for achieving a quick result, additional threats and opportunities are often missed. Adopting a systems thinking approach enables a disciplined approach for examining problems more completely and accurately before acting, allowing managers to arrive at a broader set of options that can help achieve multiple benefits whilst achieving waterway health outcomes.

For example:

Linear thinking
stormwater management design objectives s ➔ Modelling to confirm treatment area (usually 1-1.5% of catchment) ➔ Install bioretention basin

Systems thinking
Develop objectives ➔ Design performance requirements ➔ Design constraints ➔ Consider alternatives ➔ Examine trade-offs ➔ Find result ➔ Iterate

With limited resources across the catchment, waterway categorisation and triage can be used to explore alternatives and focus resources on priorities.



IMPLEMENTATION

One of the leading explanations for the 'failure' of Water Sensitive Urban Design is the breakdown of the project implementation chain. This can occur due to poor planning, design, construction, compliance or asset maintenance. If one link in the chain is broken, it can lead to project failure. It is important to recognise that if projects are poorly executed, the ecological return on investment will be reduced.

To assist with Integrated Water Planning implementation, Healthy Land and Water recommends utilising a diverse range of supporting decision support products to improve understanding (e.g. guidelines), value payoff (e.g. Benefit Cost Analysis and Stormwater Offsets) and accountability tools (e.g. Waterway Asset Management Plans and WSUD compliance apps).

A SUPPORTIVE ENVIRONMENT FOR CHANGE

Integrated Water Planning will in many instances require a change from the status quo. Change in organisations and individuals can be difficult to orchestrate, however can be facilitated by creating a supportive environment through leadership, understanding, accountability and finance.

These elements are outlined in more detail below:

LEADERSHIP

LEADERSHIP AND BEHAVIOUR CHANGE
There are social factors that require better understanding and initiatives to enable and encourage leadership and action. Overcoming the potential resistance to move from the status quo, will be require a concerted effort to authorise and empower local governments to lead Integrated Water Planning.

ENABLING ENVIRONMENT
Specific Integrated Water Planning legislation may be needed to help address legacy issues as well as new development occurring in catchments.

COMMUNITY OF PRACTICE
Healthy Land and Water's Water by Design Community of Practice in North Queensland and South East Queensland can play an important role in facilitating collaboration between local governments in the region. This is especially important for Integrated Water Planning in South East Queensland as there are a greater number of stakeholders involved in stormwater, catchment management, sewerage and water supply.

EMPOWERING TRADITIONAL OWNERS FROM FIRST NATIONS
Healthy Land and Water advocate as a priority for Integrated Water Planning to incorporate First Nations' principles and aspirations for Country. These principles and aspirations are diverse and vary across the State and need to be understood and integrated on a case by case basis. The Queensland Government have developed the Gurra Gurra Framework to assist with engaging with First Nations organisations in Queensland. These principles can be utilised to provide direction when Local Government Authorities are developing integrated water plans. Another significant body of work developed by Natural Resource Management Regions Queensland, provides a set of principles and commitments for engaging with First Nations, providing an endorsed and clear framework for integrated landscape and water planning.

EXEMPLAR CASE STUDIES
Case studies can be used as a proof of concept and are powerful for demonstrating the benefits of an Integrated Water Planning approach to local governments. Some well-known examples include:

- White Gum – Water Services Association of Australia (WSAA) case study
- Redbank Plains Recreational Reserve – Wetland, Ipswich case study
- Moreton Bay Regional Council – Total Water Cycle Management Plan

FINANCE

FUNDING

While many local governments have expressed interest in Integrated Water Planning, some have raised concerns regarding the cost burden of undertaking an Integrated Water Planning approach. It is therefore important to demonstrate that the outcomes are likely to be financially beneficial to local governments. This could be demonstrated through cost benefit analysis, building the economic case for a state-wide Integrated Water Planning approach. There is potential for integrated water projects to leverage funding from offsite stormwater contributions (Refer case study Redbank Plains Recreational Reserve).

UNDERSTANDING

DATA COLLECTION

Data collection is a vital phase of the Integrated Water Planning approach. Existing frameworks can assist local governments to understand the nature of their catchments, with some examples including:

- Walking the Landscape - Department of Environment and Science
- Ecological Health Monitoring Program (EHMP) - Healthy Land and Water (for South East Queensland)
- Reef Report Carding regional frameworks and monitoring programs
- Urban Water Stewardship Framework (UWSF)

RESEARCH

The Cooperative Research Centre for Water Sensitive Cities has undertaken significant Integrated Water Planning research under the Integrated Research Project (IRP3) program. A list of recent tools and reports published by the Cooperative Research Centre for Water Sensitive Cities is provided in the references section.

GUIDELINES

Healthy Land and Water and the Water Services Association of Australia both have guidelines for Integrated Water Planning.

ACCOUNTABILITY

ROLES AND LIMITATIONS

There is an opportunity for the Queensland Government to enable leadership through sharing its vision for Integrated Water Planning and empowering each local government to tailor their vision in line with their specific needs (refer Extract 4).

MILESTONES AND COMPLIANCE

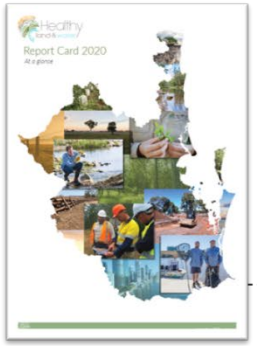
To ensure that there is progress, it is important to set key milestones for Integrated Water Planning development. Local government compliance can be established via Monitoring, Evaluation, Reporting and Improvement (MERI) reporting (refer Figure 8).

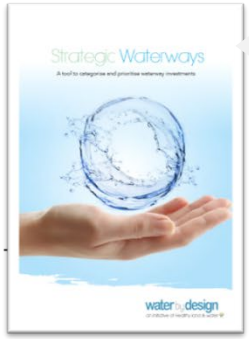
EXISTING SUPPORT MECHANISMS

Click on covers for full documents

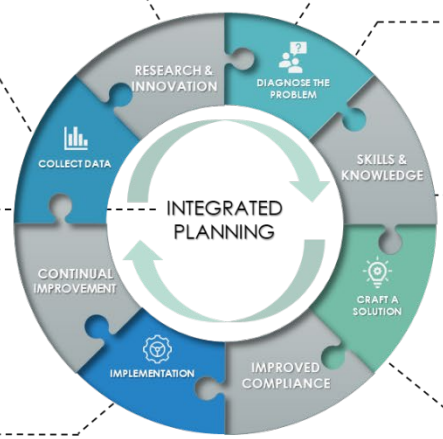
There are a variety of tools, guidelines and reports available to support the delivery of Integrated Water Planning projects.

The Cooperative Research Centre For Water Sensitive Cities Scenario Tool is a planning support tool that enables users to assess the evolution of urban infrastructure, water networks and population demographics over time.

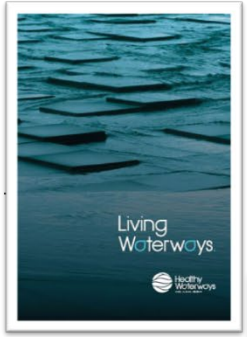


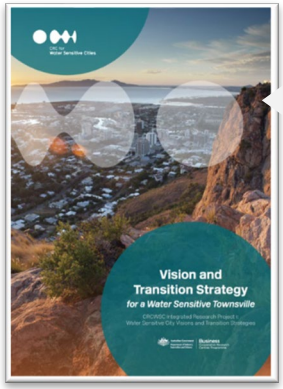


Strategic Waterways is a decision support tool developed by Healthy Land and Water, designed to assist Local Governments with understanding the risks and opportunities within their waterways and catchments and creating integrated water plans. This tool aims to benefit waterway health and support social and economic wellbeing by Identifying key water/waterway vulnerabilities and opportunities, finding synergies and allocating resources efficiently.

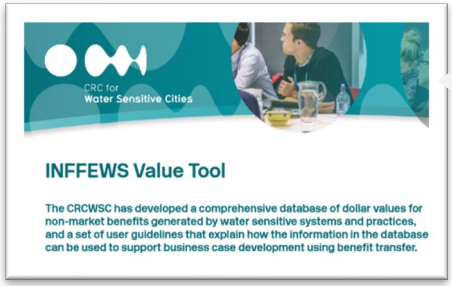


The Water by Design *Total Water Cycle Management Planning Guideline for South East Queensland* was published by Healthy Land and Water in 2010 under previous legislation to assist Local Government Authorities.



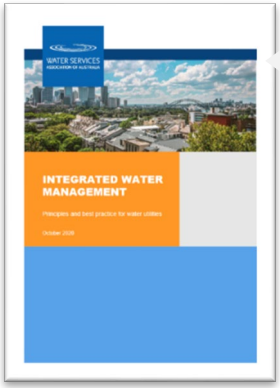


The Cooperative Research Centre For Water Sensitive Cities Citi Index was created to help benchmark cities on their journey towards becoming a Water Sensitive City. Townsville City Council and City of Gold Coast have participated in this process to develop integrated water plans.



The Cooperative Research Centre for Water Sensitive Cities have created an Investment Framework for the Economics of Water Sensitive cities (INFFEWS) which includes a Value and Benefit Cost Ratio (BCR) tool to assist with Integrated Water Planning.

The Cooperative Research Centre evaluated a range of projects and found benefit–cost ratios for Water Sensitive Urban Design (WSUD) projects can range from 1.2 to 4.0 return on investment.



The *Water Services Association of Australia Integrated Water Management Guide (2020)* details guiding principles and best practice outcomes of Integrated Water Planning, supported by case studies. This guide provides a framework for water utilities to navigate the Integrated Water Management planning process in a way that caters to their specific needs and circumstances

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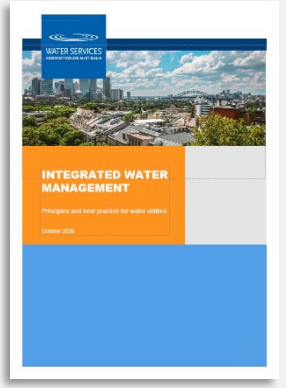
CASE STUDIES

CASE STUDY: INTEGRATED WATER MANAGEMENT WHITE GUM VALLEY, PERTH (EXTRACT)



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The mission critical Integrated Water Management outcomes for the project were:

- Outcome 1a - **Connection with water and water literacy** - Citizens actively participate in Integrated Water Management processes because they have adequate knowledge of water cycle, water sector and current water matters.
- Outcome 1b - **Shared ownership, management & responsibility** - Citizens are active participants in creating, operating and maintaining relevant water system and its infrastructure.
- Outcome 2c - **Constructive organisational culture** - Employees in all organisations are empowered and inspired to work in a collaborative and interdisciplinary manner to achieve Integrated Water Management outcomes.
- Outcome 3b - **Cross-sector institutional arrangements and processes** - Urban planning processes are coordinated and collaborative, considering all long-term planning options and where stakeholders have clearly defined roles and responsibilities.
- Outcome 3c - **Public engagement, participation and transparency** - Inclusive representation of different perspectives and meaningful involvement of citizens in decision-making.
- Outcome 6a - **Activating connected green - blue space** - The presence of many, distributed and well-connected green spaces and water assets. Green spaces can include formal or informal parkland, and public realm open space that is designed and maintained as a shared/accessible green landscape e.g. streetscapes
- Outcome 6b - **Infrastructure elements functioning as part of the urban water system** - Adequate urban space and built form functions as an integral part of the water system. For example, raingardens, rainwater and stormwater harvesting, flood storage and conveyance, and water sensitive landscaping (pervious surfaces, heat mitigation), green roofs and walls that capture and treat rainwater or greywater.
- Outcome 6c - **Urban heat mitigation** - Water systems are incorporated into the design of urban precincts in a way that reduce urban heat impacts through shading by trees and evapotranspiration (tree canopies, vegetation cover and soil moisture).

Case study source: Integrated water management: Principles and best practice for water utilities (Water Services Association of Victoria)

CASE STUDY: REDBANK PLAINS RECREATIONAL RESERVE – WETLAND, IPSWICH

Ipswich City Council was experiencing issues with flooding downstream of the Redbank Plains Recreational Reserve. To solve the issue, a combined stormwater detention (90,000m^3) and stormwater harvesting wetland (5300m^2) was constructed within the recreational reserve. The infrastructure converted the flooding threat into an alternative irrigation supply (up to 44ML/year) for local sports fields, potentially saving ratepayer funds.

The layout of the detention basin and wetland allowed for the creation of a new flat kick and throw area. It also allowed for irrigation of key playing fields, without which playing surfaces can become hot, dry, hard and virtually unusable during extended dry periods. The project included several vegetated swales as well as a heavily vegetated section of the harvesting pond, which helps filter stormwater runoff before it is discharged to the creek. The project was partially funded through stormwater offsets from a nearby commercial development. The wetland has become a feature within the recreational reserve. Dog walkers are often seen stopping to take pictures of birdlife from a nearby path.

This project is a signature example of sustainable infrastructure and development, covering all three pillars of sustainability:

Environment

- Water quality pollutant reductions, improving the health of neighbouring waterways
- Reduction in the demand for potable water
- Introducing ecosystems into previously uninhabited areas (native fish and crayfish have already established)
- By reusing spoil and using scrapers, avoided13,487 five-kilometre round trips for earthworks and the associated air pollution
- Improved education regarding waterway values through connecting people to the wetland area through pathways and signage

Economic

- A potential $160,000 annual reduction in potable water expense and a predicted $14 million saving over the design life of the asset (allowing for various capital, maintenance, and life cycle costs)
- Significant savings by reusing 100,000m^3 of spoil and using scrapers. With the reduction in haulage, dump fees and reduced import soil for the sports fields it is estimated $1.5 million has been saved in this exercise
- Increasing the value of neighbouring properties with large open space areas integrated into attractive open water bodies
- Savings by jointly delivering both this project and the road upgrade
- Estimated $350,000 saving on reduction in the number and size of road drainage required due to the diversion swale installed on the flood mitigation project

Social

- A new sports field constructed within the basin increasing the active lifestyles and health of Ipswich community
- Integrating the wetland into regional bikeways and footpaths
- Ensuring sporting fields will remain watered during dry times thus further encouraging sport participation
- Providing a place of appeal and beauty while educating the public on integrated water management issues
- Reducing flood damages and social impact of future flood events
- Increasing the reliance of the area as a whole

Images: Ipswich City Council

Fundamental to the success of this project was a high level of both internal and external collaboration and consultation undertaken throughout the entire life of the project life

Case study source: Redbank Plains Recreational Reserve - Wetland, Ipswich (Water by Design)

CONTACT US:

Healthy Land and Water
Ph: (07) 3177 9100
Email: info@hlw.org.au