

MBRC Total Water Cycle Management Implementation Plan

Final Report June 2013



MBRC Total Water Cycle Management Implementation Plan

Prepared For: Moreton Bay Regional Council

Prepared By: BMT WBM Pty Ltd (Member of the BMT group of companies)

Offices

*Brisbane
Denver
Mackay
Melbourne
Newcastle
Perth
Sydney
Vancouver*

DOCUMENT CONTROL SHEET

BMT WBM Pty Ltd BMT WBM Pty Ltd Level 8, 200 Creek Street Brisbane 4000 Queensland Australia PO Box 203 Spring Hill 4004 Tel: +61 7 3831 6744 Fax: + 61 7 3832 3627 ABN 54 010 830 421 www.bmtwbm.com.au	<table style="width: 100%; border: none;"> <tr> <td style="width: 30%;">Document :</td> <td>R.B20132.003.01.Implementation.d OCX</td> </tr> <tr> <td>Project Manager :</td> <td>Nicole Ramilo</td> </tr> </table> <hr/> <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;">Client :</td> <td>Moreton Bay Regional Council</td> </tr> <tr> <td>Client Contact:</td> <td>Elissa McConaghy</td> </tr> <tr> <td>Client Reference</td> <td></td> </tr> </table>	Document :	R.B20132.003.01.Implementation.d OCX	Project Manager :	Nicole Ramilo	Client :	Moreton Bay Regional Council	Client Contact:	Elissa McConaghy	Client Reference	
Document :	R.B20132.003.01.Implementation.d OCX										
Project Manager :	Nicole Ramilo										
Client :	Moreton Bay Regional Council										
Client Contact:	Elissa McConaghy										
Client Reference											

Title :	MBRC Total Water Cycle Management Implementation Plan
Author :	Nicole Ramilo
Synopsis :	This Total Water Cycle Management Implementation Plan sets out the strategies and actions to achieve MBRC's vision for the water cycle. It follows on from previous TWCM planning work including the development of a TWCM Strategy and detailed planning studies.

REVISION/CHECKING HISTORY

REVISION NUMBER	DATE OF ISSUE	CHECKED BY	ISSUED BY
0	11/06/2013	Brad Dalrymple	Nicole Ramilo
1	28/06/2013	Brad Dalrymple	Nicole Ramilo

DISTRIBUTION

DESTINATION	REVISION			
	0	1	2	3
MBRC	Pdf	Pdf		
BMT WBM File	Pdf	Pdf		
BMT WBM Library	Pdf	Pdf		

CONTENTS

Contents	i
List of Figures	ii
List of Tables	ii
1 BACKGROUND	1-1
2 IMPLEMENTATION PLANNING PROCESS	2-1
2.1 Visioning Workshop	2-1
2.2 Rural BMP Delivery Framework	2-2
2.3 Prioritisation Framework	2-3
2.4 Develop Program of Activities	2-5
2.5 Planning Scheme Recommendations	2-7
2.5.1 Overarching Recommendations for Implementing the TWCM Plan in the New Planning Scheme	2-8
2.5.1.1 <i>Strategic framework</i>	2-8
2.5.1.2 <i>Zone/place types</i>	2-9
2.5.1.3 <i>Codes</i>	2-10
2.5.1.4 <i>General observations</i>	2-10
2.5.2 Potential Response to TWCM Plan Solutions in the Planning Scheme	2-11
3 IMPLEMENTATION PLAN	3-1
4 MONITORING AND REVIEW PLAN	4-1
4.1 Monitor Implementation and Progress	4-1
4.1.1 Review Action Progress against Required Timeframes	4-1
4.1.2 Review Effectiveness of Actions in Addressing TWCM Issues	4-2
4.1.3 Report to Regulatory Agency	4-4
4.2 Review and Update TWCM Plan	4-4
5 REFERENCES	5-1

APPENDIX A: VISION WORKSHOP ATTENDEES	A-1
APPENDIX B: CONTRIBUTING FACTORS TO SOLUTION PRIORITISATION PROCESS	B-1
APPENDIX C: PRIORITISATION PROCESS RESULTS	C-1
APPENDIX D: MONITORING & REVIEW PLAN CHECKLISTS	D-1

LIST OF FIGURES

Figure 2-1	Schematic of Prioritisation Framework	2-4
------------	---------------------------------------	-----

LIST OF TABLES

Table 2-1	Potential Use of Planning Scheme to Implement TWCM Solutions	2-11
Table 3-1	MBRC TWCM Implementation Plan (2013/14- 2033/34)	3-2
Table 4-1	Summary of Tasks to Monitor and Report on Progress of TWCM Plan Implementation	4-1
Table 4-2	Summary of Key Catchment Issues	4-2
Table 4-3	Summary of Issue Performance Indicators	4-3
Table 4-4	Summary of Triggers for Updating TWCM Plans ¹	4-4

Background



1 BACKGROUND

Moreton Bay Regional Council (MBRC) completed detailed Total Water Cycle Management (TWCM) planning studies in 2012 (BMT WBM, 2012a). The detailed planning studies identified optimal catchment management solutions to address water cycle management issues based on environmental, economic and social considerations. As part of the next TWCM planning phase, implementation planning has been undertaken to help Council clearly set out the strategies and actions required to achieve the vision for the water cycle.

This report documents MBRC's TWCM Implementation Plan, and the key processes undertaken to develop it.

Implementation Planning Process



2 IMPLEMENTATION PLANNING PROCESS

The process undertaken to develop MBRC's TWCM Implementation Plan is outlined below:

- **Facilitate a Visioning Workshop:** A stakeholder workshop was facilitated to identify a shared vision for TWCM and guide cooperation between stakeholding organisations.
- **Identify a Rural Best Management Practice (BMP) Delivery Framework:** Facilitation of a series of meetings and workshops was undertaken to identify pathways to delivery and on ground implementation of rural BMPs.
- **Develop a Prioritisation Framework:** A prioritisation framework was developed that can be used to assist in scheduling the implementation of recommended TWCM catchment works/solutions.
- **Develop a Program of Activities:** The prioritisation framework was applied to develop a program of infrastructure works and programs to be delivered over a 20 year planning period.
- **Recommend Planning Scheme Provisions:** Recommendations for new planning scheme content have been made that focus on delivery of the preferred solutions identified in the TWCM Plan.

Key details of the implementation planning process are further described in the following section.

2.1 Visioning Workshop

A visioning workshop with key stakeholders was held on Friday 1 March 2013. The purpose of this workshop was to identify a shared vision for TWCM in the Moreton Bay Region so that there is clear:

- Justification to support the adoption of the associated infrastructure plan by Council
- Common purpose to guide cooperation between stakeholding organisations.

A list of the stakeholders who attended the workshop can be found in Appendix A.

The draft shared vision for TWCM that was developed during the workshop is shown in Box 2-1.

Note that in the workshop there was not time to develop a consensus on the exact wording of this vision, and participants generally thought further refinement was needed, however there was broad agreement on the general content and nature of the vision statement and no significant reservations.

Further details on the outcomes and process of the visioning workshop are documented in the *Moreton Bay Regional Council Total Water Cycle Management Visioning Workshop – Summary Report* (BMT WBM 2013a).

Box 2-1 Draft Shared Vision for TWCM in the Moreton Bay Region

“We value water and seek to protect and improve the health and resilience of natural and built environments by managing water in an integrated and cost-effective manner to manage growth in our Region.”

2.2 Rural BMP Delivery Framework

Rural lands in the Moreton Bay Regional Council jurisdiction cover approximately 86% of the Council area and are formed of key uses such as horticultural activities, cattle grazing, rural residences, and green space zones. Given this large coverage, it is important that Council understand how their interaction with these rural uses can facilitate better outcomes for the community, the local economy and the environment. In many cases, the implementation of specific activities or best management practices may help in alleviating overall impacts.

As part of the implementation planning phase, a series of meetings and workshops was facilitated to identify pathways to delivery and “on-the-ground” implementation of rural BMPs. Key stakeholders attended the workshop from MBRC, Unitywater, the Department of Agriculture Fisheries and Forestry, SEQWater, Pine Rivers Catchment Association and SEQ Catchments.

From this study, a list of actions and suggested processes has been developed to assist Council in facilitating rural BMP implementation, based on expert knowledge, discussion and stakeholder interactions. The processes and actions from this study are provided as indicative approaches, and have been included in the overall TWCM Implementation Plan. Further work, however, will be required in this area to ensure that the process of implementation is well coordinated across the region and across the range of agencies, landholders and other stakeholders to ensure delivery.

For further information about the Rural BMP implementation framework study and findings, refer to the supporting report, *Rural Best Management Practices in Moreton Bay Regional Council - An Implementation Framework* (BMT WBM, 2013b).



2.3 Prioritisation Framework

As part of the implementation planning, it was identified that a prioritisation framework should be developed to assist in scheduling the implementation of recommended TWCM catchment works / solutions into a program of activities (i.e. implementation plan).

The process undertaken to develop the prioritisation framework is briefly described below:

- **Develop Key Criteria and Framework:** BMT WBM initially developed draft criteria and a framework with which to prioritise catchment works. This was undertaken in close consultation with Council and Unitywater staff. In developing the framework, it was identified that the number of assessment criteria be kept to a minimum and that the assessment process be relatively straight forward, so that it may be easily applied and used for future reviews by Council.
- **Review the Framework:** A meeting with key stakeholders (Council and Unitywater) was then held to review the criteria and agree on assigned weightings to each criteria to be used in the prioritisation assessment process. The outcome of this meeting was a consensus on the criteria and framework to be used and the weighting of the criteria.
- **Documenting the Framework:** Following review of the framework, the framework was finalised in the format of an excel spreadsheet and supporting report which further outlines the development of the prioritisation framework, the framework itself and how it can be applied by Council in the future to assess and prioritise solutions.

A schematic of the prioritisation framework is shown in Figure 2-1. For further information about the prioritisation framework and criteria used, refer to the supporting report, *TWCM Prioritisation Framework* (BMT WBM, 2013c).



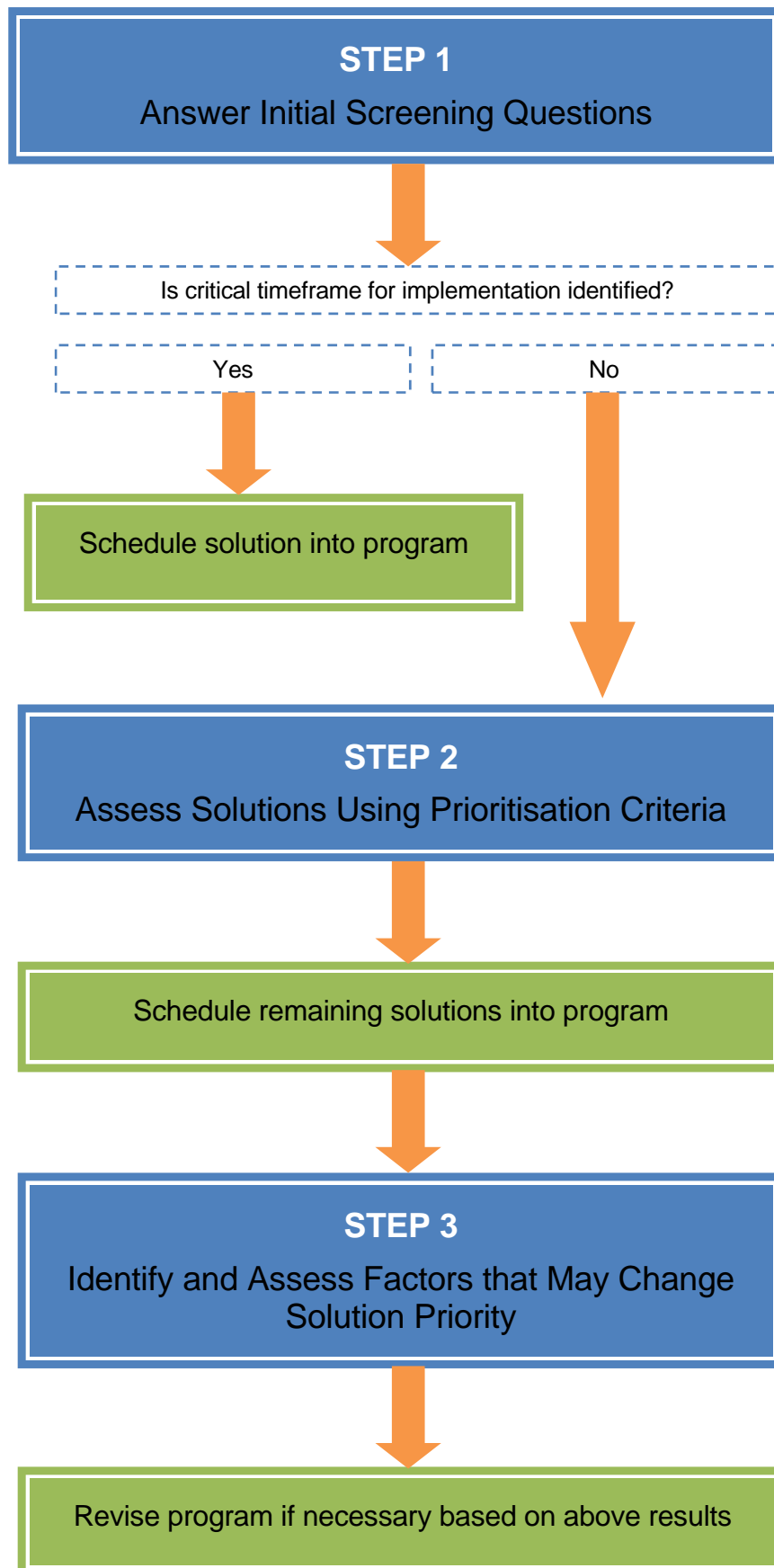


Figure 2-1 Schematic of Prioritisation Framework

2.4 Develop Program of Activities

To assist in developing the program of activities for the Implementation plan, the prioritisation framework outlined above was applied to:

- Prioritise catchments (to prioritise the development of Healthy Waters Management Plans); and
- Prioritise TWCM actions to be implemented within and across all catchments.

The prioritisation framework was applied to the preferred solutions recommended by the TWCM detailed planning study (BMT WBM, 2012) using the study's detailed planning results to quantify prioritisation criteria. The prioritisation framework was also applied using results obtained from the following information sources as part of this study:

- Council's Urban Growth Model (updates to current and future catchment population pressures)
- Current (2012) Ecological Health Monitoring Program (EHMP) Report Card Grades
- Additional detailed catchment planning studies for TWCM, including:
 - *MBRC Capital Works Program Opportunities Water Quality Infrastructure, Local Scale Retrofit Opportunities Site Identification and Prioritisation* (MBRC, August 2011);
 - *MBRC Capital Works Program Opportunities Water Quality Infrastructure, Regional Constructed Wetlands Site planning and Concept Feasibility* (MBRC, June 2011);
 - *MBRC Capital Works Program Opportunities Water Quality Network, Riparian Corridor Protection, Rehabilitation and Re-vegetation* (MBRC, November 2012)
- Input provided by MBRC on other contributing factors that may affect the action priority rating (Step 3 of the Prioritisation Framework). These factors will primarily be related to a change in situation since initial planning studies were undertaken. Appendix B details these factors. The assessment of these factors did not affect the priority of actions, however they should be considered in future studies (e.g. during development of Healthy Waters Management Plans) and reviews of the TWCM Plan.

In addition to the solutions included in the TWCM Plan, high priority actions recommended in Council's study *Towards a Water Sensitive Urban Design Future – Final Draft* (BMT WBM, 2012b) were also integrated into the first five years of program activities.

The prioritisation process was undertaken in close consultation with Council and Unitywater, to ensure the program reflected budget, timing and resource requirements. Consultation with Council also assisted in the identification of specific priority projects for revegetation works in the key catchments identified.

The overall results of the prioritisation process (used to develop the program of activities for the Implementation Plan) are included in Appendix C.



2.5 Planning Scheme Recommendations

Buckley Vann were engaged as part of the implementation planning process to make recommendations for new planning scheme content that focus on delivery of the preferred solutions identified in the TWCM Plan. The following section outlines initial recommendations on how the role the new planning scheme for Moreton Bay Region can assist in implementing the TWCM Plan solutions.

In considering the role of the planning scheme, it is important to be clear about its jurisdiction. Ultimately, stakeholders will want the TWCM Plan implemented in a way that is most likely to lead to improved outcomes on the ground. This study's focus is on what the planning scheme can do most effectively, avoiding unrealistic requirements or imposing demands that could make the development assessment system more cumbersome (especially where this would be without real on-the-ground value).

The new planning scheme will identify a strategic plan for future growth and development in the region which should support Council's community and corporate plans. In particular, the planning scheme will deal with land use and infrastructure intentions, and will include a priority infrastructure plan).

The planning scheme's primary jurisdiction is in regulating new development in a way that supports those strategic outcomes. It can establish the need for development approvals and set relevant performance requirements for new development. Indeed, any requirements Council has for new development must be dealt with in the planning scheme to have the force of law.

The planning scheme does this within the confines and decision making rules established by the Sustainable Planning Act (SPA). It cannot act retrospectively (it cannot impose new rules on existing lawful uses) and it cannot make development happen (it will largely respond to proposals made by others).

It also works together with other statutory requirements, including the Environment Protection Act, the Vegetation Management Act, the Nature Conservation Act, the Building Regulations and others. It does not need to (and should avoid) duplicating the effect of other instruments.

The new scheme is likely to be prepared within a risk-tolerant framework, with a view to creating an efficient development assessment system. It will also be in a performance-based format. This means that:

- It will not prohibit development (other than as mandated by the state government); and
- Particular expectations of new development will be set out in the form of "performance outcomes", with any relevant standards presented as "acceptable outcomes". The latter represent one (but not the only) means of complying with the particular performance outcome.

The study's recommendations are mindful of this overarching context.

2.5.1 Overarching Recommendations for Implementing the TWCM Plan in the New Planning Scheme

2.5.1.1 Strategic framework

Council has prepared and is advertising a draft strategic framework document which will provide the foundation for the balance of the planning scheme. In a statutory sense, it forms the back stop for the planning scheme: it provides the overarching intent and direction, but may also provide the basis with approving development even where there is a conflict with other, more detailed parts of the scheme.

At present, the draft strategic framework is structured into four major sections:

- i. A strategic intent statement – which provides an overview;
- ii. Theme based strategic outcomes – including a specific water management theme;
- iii. Planning areas based strategic outcomes – dividing the region into 5 areas (but not catchment based); and
- iv. Place type strategic outcomes – identifying various neighbourhood types or varying intensities.

The strategic framework is likely to evolve as the scheme is further developed. Accordingly, the following suggestions identify opportunities to tighten or clarify how the strategic framework deals with water related issues.

At present, water related statements are made in a number of different places under a number of different headings. Most statements are at a very high, in-principle level. As a “place holder”, the water cycle management theme section extensively cross refers to the TWCM Plan.

It will be important to clarify and more explicitly state the intended water related outcomes within the strategic framework, and to focus on what that will likely mean for new development (bearing in mind the role of the strategic framework in development assessment). The strategic framework could go further to provide particular guidance for different catchments or places (based on the priorities and issues identified through the TWCM Plan).

Reducing some of the overlaps between different sections dealing with water issues (or at least ensuring a strong level of consistency in what is being said) would also be desirable.

The current water vision and water strategy (being separately developed by Council) will provide the basis for the highest level outcomes to be identified in the strategic framework. Alignment in the language with these other documents would be desirable.

Beyond this, the catchment based issues and solutions identified in the TWCM Plan that are relevant to how new development is managed, provide the basis for more specific outcomes that could be incorporated in the strategic framework. These could possibly be teased out in the core planning areas and place types.

Subject to the eventual water strategy document, the strategic framework should set directions for key elements of water related policy as summarised below. These should focus on development related risks and the expected development related outcomes. The key elements would be:

- Water quality
- Water supply catchment management (closely related to water quality generally, but worth specific mention)
- Waterways and wetlands protection (integrating ecological, hydrological, landscape, and water quality functions)
- Water conservation/demand management
- Flooding and floodplain management (possibly integrating flood risk issues and protection of hydrological regimes)

As well as dealing with these elements at a principle level, these directions should set up the framework for why higher or different levels of performance may be expected in certain catchments or for certain types of development (for example, differing expectations for rural residential development generally, areas transitioning from rural residential to urban, greenfield development, and urban redevelopment, catchments where “no worsening” versus general load targets, areas where recycling and stormwater harvesting are expected).

These strategic provisions should provide a clear “line of sight” to particular land use, urban design and subdivision intentions in zones, and WSUD-based operational works code provisions. It is important that the strategic framework statements are drafted in a way that is cognisant of the performance Council will really be expecting of development. For example, if ultimately Council does not intend to apply a standard of “no worsening” or “no impact” on water quality, the strategic framework should avoid using those kinds of statements and use language that is more aligned with what Council actually intends.

2.5.1.2 Zone/place types

Council is likely to organise zones to reflect and give effect to the various place types identified in the draft strategic framework. The zone provisions are proposed to be largely form-based and deal in an integrated way with a range of uses expected to establish within a particular areas.

Any particular intentions for particular locations, use types or development forms could be dealt with here. For example:

- The TWCM Plan indicates some expectations for particular major greenfield areas such as Caboolture and Caboolture West and Hays Inlet regarding stormwater harvesting and recycled water schemes that may not be applicable elsewhere;
- There may be appropriate lot sizes in a particular catchment for rural residential development based on waste water issues; and
- The potential to identify “no go” areas requiring protection, use types to avoid in certain catchments, and the like.

Zone codes will need to be drafted in a way that manages overlap and duplication with other codes (such as those discussed further below). They should be consistent but avoid directly overlapping, in order to avoid potential for conflict or misinterpretation.

There should also be a clear “line of sight” between these zone based intentions and the policy directions articulated in the strategic framework.

2.5.1.3 Codes

The TWCM Plan solutions point directly to the need to establish appropriate performance standards for new development, particularly greenfield development.

Consistent with the TWCM philosophy, we suggest an integrated approach for dealing with water related requirements (as opposed to a series of standalone stormwater, works and other codes).

The concept of water sensitive urban design requires that the management of the water cycle be an integral part of the design, construction and operation of development and infrastructure. Desirably, water related requirements would therefore be integrated with general works and engineering standards, (eg integration of standards for drainage, water supply/conservation/demand management, waste water/sewerage/on site requirements, street cross sections, landscaping, erosion and sediment control, earthworks, pavement design, acid sulphate soil management etc).

Even if these aspects are separated into different codes in the planning scheme, consistent standards that appropriately manage the water cycle ought to be woven through all. This does not mean duplicating requirements in different codes, but does mean that the performance outcomes (and associated acceptable solutions) are not at odds.

These code provisions would, in particular, need to identify the particular requirements (that may vary across different catchments) for water quality /pollutant load targets, differentiating what is meant by “no worsening” under the scenario 3 solutions. Likewise, the provisions will need to draw out reuse/recycling expectations for certain greenfield areas, and the extent to which and how WSUD approaches may apply to different development types (eg greenfield versus urban redevelopment).

TWCM Plan solutions regarding the revegetation of waterways require a specific planting program implemented outside the planning scheme. However, it can be supported by the planning scheme through the proposed green infrastructure code/provisions, dealing with protection of waterways and wetlands). The TWCM Plan focus on waterways is primarily related to water quality protection. However the broader code provisions may also deal with the broader ecological and hydrological functions of waterway corridors.

The ROL code will also have an important role to play in implementing the solutions, while managing overlaps with zone and works/water codes. Generally the ROL/zone code can deal with overall conceptual level design/layout and integration of networks while the works/water codes could deal with detailed operational works and construction standards.

Like the zone provisions, there should be a clear “line of sight” between the purpose of these codes and the policy directions articulated in the strategic framework.

2.5.1.4 General observations

It is important to articulate specifically what is meant by (and the components of) terms like WSUD, TWCM and even “best practice” to ensure policy intentions are unambiguous, and are not open to misinterpretation or time damage. In other words, concepts like WSUD ought to be “unpacked” as

specific performance outcome statements rather than referring more obliquely to development “complying with WSUD or WSUD principles”.

Traditionally, works and engineering standards (including WSUD / water related standards) have been set out within a development manual or other separate document. Detailed standards may still continue to be housed in the “integrated design manual” that Council is now developing. However, it is important to keep in mind that the “heads of power” to apply these standards need to sit within the planning scheme codes. In the main, the standards will need to be seen as acceptable outcomes for particular performance outcomes contained within the planning scheme codes. As acceptable outcomes, they do not represent the only way in which to comply with the relevant performance outcomes.

From 1 July 2013 South East Queensland will also have one consolidated set of technical standards for the design and construction of water, sewerage and non-drinking water infrastructure. These standards have been developed by Water Services Association of Australia in partnership with the major water and wastewater service providers, and will be contained in the SEQ Water Supply and Sewerage Design and Construction Code. The code is compliant with Chapter 4A of the *South East Queensland Water (Distribution and Retail Restructuring) Act 2009* and will replace the wide range of requirements that previously applied. In accordance with Section 755D of the *Sustainable Planning Act 2009*, where there is an inconsistency, the Code will prevail over any provisions within a Council’s planning scheme that currently specify water services infrastructure outcomes.

2.5.2 Potential Response to TWCM Plan Solutions in the Planning Scheme

The table below outlines the identified TWCM Plan solutions and the potential for the planning scheme to assist in their implementation. Section 3 presents an overview of the relevant components in the planning scheme.

Table 2-1 Potential Use of Planning Scheme to Implement TWCM Solutions

ID	Solution Description	Planning scheme response
Scenario 1: Low Intensity Solutions - Redcliffe; Caboolture West		
1	Future development /redevelopment meets 80/60/45% load reduction for TSS/TP/TN	<p>It is desirable to make these water quality objectives explicit in the planning scheme to give it effect. It can be identified as a performance outcome in the relevant code, either:</p> <ul style="list-style-type: none"> • in a stand alone “healthy waters” code dealing particularly with water quality; <p>OR</p> <ul style="list-style-type: none"> • as part of an “ integrated water management” code dealing with all water cycle aspects; <p>OR</p> <ul style="list-style-type: none"> • as part of an overall “integrated works” code, dealing with water as well as other development infrastructure and operational works aspects. <p>As this outcome is connected to the use of broader WSUD approaches (as well as erosion and sediment control, mentioned later), a more integrated approach is preferred. Separate performance outcomes may be needed for related considerations such as acid sulphate soils and stormwater quantity objectives and the like.</p> <p>The newly released draft single state planning policies expects that the new planning scheme will include these and other stormwater quality objectives as well as the quantity objectives (as identified in the Urban Stormwater Quality Planning Guidelines 2010). We agree that they should be made explicit in the relevant planning scheme code to ensure development</p>

ID	Solution Description	Planning scheme response
		<p>expectations/requirements are clear and the requirements can be defended by Council.</p> <p>Refer also to the response to related solution 12 below.</p>
2	Future development meets QDC alternative water supply target	<p>This does not appear to need a response in the planning scheme.</p> <p>Instead, it will require the minister's approval to apply the Queensland Development Code's MP4.2 (rainwater tanks and other supplementary water supply systems for class 1 buildings) or 4.3 (supplementary water sources – commercial buildings) in MBRC.</p> <p>Planning scheme content would only be required if Council wishes to go over and above QDC requirements. If this is the case, additional water related requirements may need to be incorporated in a "house code" or other use based code for relevant development types (best as self assessable provisions).</p> <p>If there are no use codes being contemplated, these provisions could be contained in an integrated works code or integrated water management cycle code (as suggested in 1 above). Alternatively, they could be contained in zone codes.</p>
Scenario 2: Medium Intensity Solutions - All other catchments the scenario 1 solutions apply plus:		
3	Increased implementation / enforcement of erosion and sediment control management practices	<p>This needs to be addressed in the planning scheme codes, in the same way as the water quality objectives under solution 1 must be dealt with.</p> <p>The protection of water quality through erosion and sediment control should be dealt with in a performance outcome in the planning scheme, either:</p> <ul style="list-style-type: none"> • in a stand alone "healthy waters" code dealing particularly with water quality; <p>OR</p> <ul style="list-style-type: none"> • as part of an "integrated water management" code dealing with all water cycle aspects; <p>OR</p> <ul style="list-style-type: none"> • as part of an overall "integrated works" code. <p>It is a good example of where Council may take an integrated approach to dealing with water quality related standards: it should be dealt with together with other provisions dealing with water quality.</p> <p>Traditionally, erosion and sediment control has been dealt with in separate development manual documents, but it does need a "heads of power" to be established in the planning scheme in the form of a performance outcome within a relevant code.</p> <p>Detailed standards that form an "acceptable outcome" for the particular performance outcome can still be contained within the development manual, as long as that document is formally adopted as a planning scheme policy.</p>
4	Waterway riparian revegetation of 3 rd & 4 th order streams	<p>Under the TWCMP, this solution is primarily about Council's proactive investment in revegetation rather than a requirement for new development. In any event, the scheme's jurisdiction is limited to reasonable and relevant actions when new development is proposed, and so cannot be expected to be the primary means of implementing this solution.</p> <p>However, it can play its part in reinforcing the solution by seeking to protect waterways from new development and where relevant, asking for revegetation of degraded parts.</p> <p>This might be done by establishing performance outcomes which seek to ensure that development does not degrade bank stability or otherwise interfere with the ecological, landscape and hydrological functions of waterways, and protects water quality. These may be incorporated in the</p>

ID	Solution Description	Planning scheme response
		proposed green infrastructure network code / provisions (or in a separate waterways and wetlands code / provisions). Acceptable outcomes under such a performance outcome may indicate appropriate buffer widths. For example, buffer widths relating to protection of stream health in 3 rd or 4 th order streams require between 30 – 50m at least in order to provide sufficient structure and resilience to provide benefit, however this may impact upon recreational or open space planning outcomes. For this reason, multi-use corridor approaches may be better at this scale.
5	Rural BMP for grazing land – fencing and revegetation of 1st & 2nd order streams	<p>These solutions are reliant on the development of best practice approaches which will have most chance of success if implemented <u>outside</u> the planning scheme. As noted above, the scheme's jurisdiction is limited to reasonable and relevant actions when <u>new</u> development is proposed. In most cases grazing and horticultural uses will be existing lawful uses and will not be newly establishing. Even when they are new, it will be difficult to determine whether they constitute a "material change" in use, in order to qualify as development under SPA (where there have been past farming activities, or a change from one farming activity to another can be difficult to quantify in this regard).</p> <p>If council is inclined to pursue regulation of farming activities through the planning scheme, it may be possible to make these activities at least self assessable, subject to code provisions requiring setbacks, fencing etc. These could be incorporated in the rural place type zone code (or, alternatively, the relevant use code).</p> <p>The reality may well be however, that such provisions would have limited practical effect.</p>
6	Rural BMP for horticultural land - implementation of filter/buffer strips	
7	Prevention of illegal stormwater inflow connections to sewer	<p>The planning scheme won't have a direct role in implementing this solution.</p> <p>However, it should identify the appropriate performance outcomes (and relevant acceptable outcomes) for stormwater discharge for new (lawful) development. This should be done as part of a healthy waters code/integrated water cycle management code/integrated works code (as described in solution 1 above).</p>
8	Recycled water supplied to land / agricultural users	<p>The planning scheme potentially has a role in requiring new development to incorporate (non trunk) infrastructure standards to facilitate the collection/distribution of recycled water (dual reticulation etc). This could be incorporated in a as part of an integrated water cycle management code/integrated works code (as described in previous solutions).</p> <p>In particular, performance outcomes should be identified for developing greenfield areas where broad scale use of recycled water is more likely to be achieved (such as the Caboolture West area), or in particular catchments where substantive new development may occur (such as Lower Pine or Hays Inlet). This may also need to be addressed in relevant zone codes or an ROL code.</p> <p>However, recycled water supply infrastructure will mostly need to be dealt with as trunk infrastructure identified and costed in the PIP, or as a straight capital investment by Council / Unitywater that is not recouped through infrastructure charges.</p> <p>It is understood that, at this stage Council's thinking on how it might approach recycled water is still evolving. If there is no current commitment to a specific approach, it may be desirable to draft the relevant planning scheme provisions more broadly to leave some flexibility to explore future responses. In this case, the relevant performance outcomes may talk more generally about optimising water conservation or demand management in new development. Notes or guidance material might encourage applicants to investigate a range of solutions.</p>
9	Recycled water supplied to urban users	
10	Education & /or capacity building and investment	The planning scheme won't have a direct role in implementing this solution.

ID	Solution Description	Planning scheme response
	in incentive schemes	Outside the planning scheme itself, it is desirable to encourage cultural and market change – so that developers/applicants are voluntarily adopting good design solutions.
Scenario 3: High Intensity - Upper Pine; Hays Inlet; Burpengary Creek		
11	WSUD retrofit to existing urban areas	The planning scheme won't have a direct role in implementing this solution. This solution would be implemented by Council (e.g. through urban renewal /revitalisation works, construction of regional treatment wetlands).
12	Future greenfield development WSUD measures achieve 'no worsening'	<p>Similar to solution 1, it is desirable to make these 'no worsening' water quality objectives clear and explicit in the planning scheme for relevant catchments to give it effect. It can be identified as a performance outcome in the relevant code, either:</p> <ul style="list-style-type: none"> • in a stand alone "healthy waters" code dealing particularly with water quality; <p>OR</p> <ul style="list-style-type: none"> • as part of an "integrated water management" code dealing with all water cycle aspects; <p>OR</p> <ul style="list-style-type: none"> • as part of an overall "integrated works" code, dealing with water as well as other development infrastructure and operational works aspects. <p>It is important to articulate what is meant by (and the components of) WSUD, to make these provisions unambiguous and not open to "time damage".</p> <p>Again, these are best dealt with in an integrated way together with other site design /operational works requirements, in an integrated water management or integrated works code. However, they should also be touched on in the ROL code or relevant zone code.</p> <p>Some care is needed to ensure the ROL code and the integrated water or works code are complementary and not duplicating or conflicting. Generally the ROL/zone code can deal with overall conceptual level design/layout and integration of networks while the works/water codes could deal with detailed design and construction standards.</p>
14	Large-scale stormwater harvesting for non-potable use (greenfield sites)	<p>The planning scheme potentially has a role in requiring new development to incorporate large scale harvesting. This could be incorporated as a performance outcome in an integrated water cycle management code/integrated works code (as described in previous solutions).</p> <p>In particular, performance outcomes should be identified for developing greenfield areas where broad scale harvesting and re-use is more likely to be achieved (such as the Caboolture West area), or in particular catchments where substantive new development may occur (such as Lower Pine or Hays Inlet). This may also need to be addressed in relevant zone codes or an ROL code.</p> <p>It is understood that, at this stage Council's thinking on reuse of water is still evolving. If there is no current commitment to a specific approach, it may be desirable to draft the relevant planning scheme provisions more broadly to leave some flexibility to explore future responses. In this case, the relevant performance outcomes may talk more generally about optimising water conservation or demand management in new development. Notes or guidance material might encourage applicants to investigate a range of solutions.</p>
13	Recycled water supplied to urban users (dual reticulation and POS irrigation)	Refer to response to solutions 8 and 9 above

Implementation Plan



3 IMPLEMENTATION PLAN

The Implementation Plan presented in Table 3-1 below identifies the prioritised program of actions required to address the key water cycle management issues within the Moreton Bay region over a 20 year planning period. Highlighted actions include those actions that are already underway or planned for. The key water cycle management planning issues were identified during the strategy and detailed planning phases of the TWCM Planning project (BMT WBM, 2010; BMT WBM, 2012a) and relate to the following:

- Waterway health / water quality;
- Environmentally sensitive areas (waters of high ecological value);
- Population growth pressures;
- Potable water supply;
- Sewage treatment plant capacities (including design and licence constraints); and
- Flooding.

By addressing these issues, the implementation plan works towards achieving the draft long term vision for TWCM (refer to Box 2-1) and the long term strategic outcomes identified in Council's draft Water Strategy, namely: *"Our Waterways and catchments are managed to maintain and enhance healthy ecosystems that support the livelihoods and past times for residents and visitors of the Moreton Bay Region."*

The responsible group for implementing each action has been identified, along with other key groups / stakeholders who should be involved and / or consulted during the implementation process. A timeframe for the action to be completed and a capital and operational cost estimate for undertaking the action has also been included. Further details to assist with the implementation of actions have also been provided to Council in electronic format, including Project Initiation Documents (PIDs) for most projects identified within the first five years, and a detailed implementation program.

Table 3-1 MBRC TWCM Implementation Plan (2013/14- 2033/34)

ID	Solution	Action Description	Total CAPEX	OPEX (establishment)	OPEX (Annual)	Catchment	Primary Responsibility	Supporting Implementation	Timeframe for Completion
R1	Rural Best Management Practices	Primary Activity: Develop Program Logic Framework for Rural BMP Implementation - including coordination of rural land management activities within one responsibility area within MBRC		\$25,000		Stanley, Pumicestone, Upper Pine, Sideling, Burpengary, Caboolture, Lower Pine	MBRC Strategic Planning	Department of Agriculture, Fisheries and Forestry (DAFF)	2013/14
R2	Rural Best Management Practices	Foundational Activity: Investigate Market Based Approaches - Offsets, Supply/Demand, Transactional Opportunities		\$30,000		Stanley, Pumicestone, Upper Pine, Sideling, Burpengary, Caboolture, Lower Pine	MBRC Strategic Planning	DEHP, Unitywater	2013/14
R3	Rural Best Management Practices	Foundational Activity: Assess Compliance of on-site STPs in Peri-Urban Areas		\$50,000		Stanley, Pumicestone, Upper Pine, Sideling, Burpengary, Caboolture, Lower Pine	MBRC Environmental Planning and Compliance	MBRC Strategic Planning	2013/14
R4	Rural Best Management Practices	Foundational Activity: Develop coordinated engagement approaches in peri-urban (e.g. horse owners) and Non-viable agribusiness areas (e.g. small scale grazing) for focussing of voluntary BMP implementation.		\$30,000		Stanley, Pumicestone, Upper Pine, Sideling, Burpengary, Caboolture, Lower Pine	SEQ Catchments	MBRC Strategic Planning, DAFF	2013/14
R5	Rural Best Management Practices	Foundational Activity: Identify and document key gully rehabilitation and bank stabilisation areas across the MBRC rural lands.		\$50,000		Stanley, Pumicestone, Upper Pine, Sideling, Burpengary, Caboolture, Lower Pine	MBRC Environmental Planning and Compliance	MBRC Strategic Planning	2013/14
R6	Rural Best Management Practices	Management Activity: Investigate practicality of focussed implementation of the Grazing land management '1234' practice framework		\$30,000		Stanley, Pumicestone, Upper Pine, Sideling, Burpengary, Caboolture, Lower Pine	DAFF	MBRC Strategic Planning	2013/14
R7	Rural Best Management Practices	Management Activity: Determine suitability of planning controls for management of rural land minimum lot sizes to protect for future rural production.		\$20,000		Stanley, Pumicestone, Upper Pine, Sideling, Burpengary, Caboolture, Lower Pine	MBRC Strategic Planning		2013/14
R8	Rural Best Management Practices	Management Activity: Coordinate the ongoing land purchase and implementation of conservation agreements with other rural BMP approaches (such as gully rehab and bank stabilisation)		\$40,000		Stanley, Pumicestone, Upper Pine, Sideling, Burpengary, Caboolture, Lower Pine	MBRC Environmental Planning and Compliance	MBRC Strategic Planning	2013/14
C14	Update planning scheme to include provisions for assisting to implement TWCM actions	Consider Buckley Vann's recommendations for new planning scheme content that focus on delivery of the preferred solutions identified in the TWCM Plan.	N/A project to be delivered internally			ALL	MBRC Strategic Planning		2013/14
C15 (i)	Increased Enforcement of Erosion & Sediment Control	Implement proactive program to promote improved implementation, education and enforcement (using PINs) of E&SC measures on construction sites. Program should include regular training of staff in E&SC. This program is currently underway and is expected to be implemented by Environmental Health Officers in 2013/2014. Note Development Control Officers to continue current E&SC inspection program also.	resources allocated already	resources allocated already	resources allocated already	ALL	MBRC Environmental Health	MBRC Environmental Planning and Compliance	2013/14
C15 (ii)	Increased Enforcement of Erosion & Sediment Control	Develop a policy framework for Erosion & Sediment Control to assist implementing an effective E&SC program. Tasks include: 1. Vision for E&SC 2. Policy Guidelines 3. KPIs for Implementing into Council projects 4. Develop a Corporate Policy and/or Directive for implementation across the organisation 5. Pilot projects and industry liaison.	N/A project to be delivered internally			ALL	MBRC Strategic Planning	MBRC Environmental Planning and Compliance	2013/14

ID	Solution	Action Description	Total CAPEX	OPEX (establishment)	OPEX (Annual)	Catchment	Primary Responsibility	Supporting Implementation	Timeframe for Completion
C1	Healthy Water Management Plan - Caboolture (includes Cab West)	Develop a HWMP for Caboolture River, including Caboolture West Development. The HWMP shall further investigate the feasibility of proposed WSUD retrofit solutions (regional and local), providing concept design details. It shall also investigate and detail how future 'no worsening' pollutant load targets may be achieved. Refer to HWMP Brief for further details of scope.		\$200,000		Caboolture River & CIGA	MBRC Strategic Planning		2013/14
UW11	Recycled Water to Agriculture /Land Disposal	Cost effectiveness of solution to be investigated in 2013 with the Wamuran Irrigation Scheme Concept Study and Feasibility Assessment to be completed.				Caboolture River	Unitywater	MBRC	Currently being investigated to be completed by end 2013 calendar year
UW1	Upgrade WTP Infrastructure, Caboolture	Future of WTP needs to be resolved by 2014 to inform CIGA Masterplanning. SEQwater to lead this. Indicative cost of an Ozone/Activated Carbon plant bolt on to existing to manage poor water quality is \$30M for 15 ML/day plant	\$15,000,000			Caboolture River	SEQ Water	Unitywater	2013/14 ¹
UW13	Recycled Water	Water and Sewerage Master planning to occur in 2013/14, and will consider options in the TWCM Plan including Open space irrigation. Needs to ensure zero discharge of effluent to Caboolture River.				CIGA	Unitywater	MBRC, QWC	2013/14
UW7	New STP Infrastructure, CIGA	Concept Planning for a new STP needs to be completed and costed by 2014 to inform Master Planning for the area. Initial load to go to South Caboolture. Will be dependent on outcomes of Treatment Services Strategy Feasibility Assessment to be undertaken in 2013/2014. Note that another option is currently under evaluation too, a sewer main from CIGA to Burp East. Low estimates were developed by Cardno for developers in 2009.	Approx \$60,000,000 based on treatment within CIGA			CIGA	Unitywater	MBRC	2013/14
UW2	New WTP Infrastructure, CIGA	Concept Planning for a new connection to the NPI and Reservoir needs to be completed and costed by 2014 to inform Master Planning for the area. Underway now.	\$5,000,000			CIGA	Unitywater	SEQ Water	2013-2017
UW4	Upgrade WTP Infrastructure, Upper Pine River	Dayboro borefield capacity issue. Pipeline from Petrie to Dayboro under consideration by SEQWater along with other drought response options.	\$5,000,000			Upper Pine River	SEQ Water	Unitywater	2013/14
UW9	Upgrade STP Infrastructure, Lower Pine River	Brendale STP Analysis and Planning Work to be initiated in 2013/2014 to inform whether upgrade is required with diversion to QUU. Now projected for 2022. Alternative of diversion to Murrumba/Redcliffe to be considered in the Treatment Services Strategy. Cost estimate from Planning Report by Rod Lehmann in 2010.	\$60,000,000			Lower Pine River	Unitywater	Queensland Urban Utilities	Planning initiated in 2013/14, diversion required by 2022
UW3	Upgrade WTP Infrastructure, Lower Pine Rivers	Planning study to investigate capacity issues identified from Clear Mountain to Samford and propose options for resolution.	\$250,000			Lower Pine River	Unitywater	SEQ Water	2014/15
UW8	Upgrade STP Infrastructure, Hays Inlet	Detailed design to undertake minor STP augmentation works at Redcliffe STP by 2015. Note business plan to be prepared by end of 2013. Will increase capacity from 57,000 to 70,000 EP and ensure nitrogen consistently complies with licence conditions.	\$40,000,000			Hays Inlet	Unitywater		2014/15
UW14	Recycled Water	Further detailed feasibility studies be undertaken for the Brendale Recycling Scheme (large users and POS). Note: Provision of recycled water to the northern growth corridor for irrigation of Public Open Space is a current licence requirement for Murrumba STP, however Unitywater are currently renegotiating licence to remove the recycling requirements and give UW more discretion about how to meet its licence requirements.	\$500,000			Lower Pine River	Unitywater	MBRC	2014/15
C2	WSUD Retrofit Lower Pine - High Priority	Regional WetlandLPR_CW05, Pine Rivers Park Strathpine	\$1,089,000	\$49,500	\$24,750	Lower Pine River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2014/15
C3	WSUD Retrofit Caboolture, High Priority	Local Wetland CAB_WR20c, Kate Mcgrath's Koala Park	\$595,000	\$17,000	\$8,500	Caboolture River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2014/15 - 2015/16

ID	Solution	Action Description	Total CAPEX	OPEX (establishment)	OPEX (Annual)	Catchment	Primary Responsibility	Supporting Implementation	Timeframe for Completion
C4	MBRC WSUD Implementation Strategy - High Priority Actions	Collate costs associated with the acquisition (e.g. design, construction, and establishment – if MBRC constructed), and maintenance of existing MBRC-owned stormwater quality management assets. Note: Item included as a priority action as it will inform Business Case Action		\$18,000		ALL	MBRC Drainage Waterways & Coastal Planning	MBRC Strategic Planning, MBRC Project Management & Construction	2014/15
C5	MBRC WSUD Implementation Strategy - High Priority Actions	Develop a business case which weighs up the costs and benefits of managing receiving water quality within urban and rural regions of the Moreton Bay local government area. The business case should provide guidance on how to balance competing interests for funding.		\$109,000		ALL	MBRC Strategic Planning		2014/15
C6	MBRC WSUD Implementation Strategy - High Priority Actions	Undertake an audit of identified WSUD assets owned by MBRC, identify maintenance /rectification requirements and develop inspection and maintenance protocols, schedules and work orders for each WSUD asset. Incorporate results into Hansen.		\$169,000		ALL	MBRC Strategic Planning		2014/15
C7	MBRC WSUD Implementation Strategy - High Priority Actions	Develop a group responsible for 'WSUD Asset Management' (made up of existing officers from various existing departments), who will be responsible for the ongoing management of stormwater quality assets. A training course/field trip should be undertaken to assist maintenance staff understand how WSUD systems function, maintenance and rectification requirements. As a priority, this group should identify the resourcing requirements for current and future WSUD assets, and ensure that processes are in place to effectively undertake maintenance works.		\$41,000		ALL	MBRC Strategic Planning		2014/15
C8	MBRC WSUD Implementation Strategy - High Priority Actions	Develop a broad and overarching vision document for a water sensitive MBRC which considers how liveability in the region can be improved by managing the total water cycle in a more holistic manner.		N/A project to be delivered internally		ALL	MBRC Strategic Planning		2014/15
C9	MBRC WSUD Implementation Strategy - High Priority Actions	Identify and up skill a network of WSUD 'champions' across relevant departments. These 'champions' should promote WSUD in their departments and ensure actions in the WSUD Implementation strategy are implemented. The champions group should meet regularly to discuss progress of the strategy, technical issues and to decide what information should be progressed to the WSUD leaders group.		\$17,000	\$14,000	ALL	MBRC Strategic Planning		2014/15 - 2033/34
C10	MBRC WSUD Implementation Strategy - High Priority Actions	Formalising a high-level internal panel to consider strategic waterways management issues and act as a water management advisors group for Councillors. Develop a reporting and feedback loop from this group to Councillors and Council officers to inform and encourage input. An internal e-news or similar may be a suitable tool to inform and gain feedback. Suggest this group / reps from this group also meets with other external stakeholders to discuss TWCM implementation (group initiated during TWCM Visioning).		\$35,000	Time for ongoing meetings	ALL	MBRC Strategic Planning		2014/15 - 2015/16
C11	MBRC WSUD Implementation Strategy - High Priority Actions	Employ a suitably qualified person responsible for the coordination of the actions identified in TWCM Plan & WSUD Implementation Strategy Action matrix and project management of each action.		\$207,000	\$207,000	ALL	MBRC Strategic Planning		2014/15
C12	MBRC WSUD Implementation Strategy - High Priority Actions	Maintain (or establish) partnerships with developers and consultants and facilitate education initiatives based around MBRCs WSUD/IWM requirements, strategies, targets/objectives, processes etc. Means to achieve this action include: holding regular meetings with developers (already occurring), hosting an half yearly developer/Council forum on WSUD; holding site tours to demonstration sites; and hosting an annual MBRC awards ceremony celebrating best practice WSUD and erosion and sediment control (breakfast, lunch or dinner awards ceremony). Note (budget includes consultancy cost to facilitate forum and cost of promoting/hosting awards ceremony).		\$43,000	\$30,000	ALL	MBRC Strategic Planning		2014/15 - 2033/34

ID	Solution	Action Description	Total CAPEX	OPEX (establishment)	OPEX (Annual)	Catchment	Primary Responsibility	Supporting Implementation	Timeframe for Completion
C13	MBRC WSUD Implementation Strategy - High Priority Actions	Develop/provide/facilitate regular WSUD-related training courses/events for Councillors and staff with representatives from multiple departments (to maximise integration between departments). The priority training events will be for Councillors as well as maintenance and rectification training for relevant staff.		\$55,000	\$45,000	ALL	MBRC Strategic Planning		2014/15 - 2033/34
C16	Waterway Revegetation / Rehabilitation	Bellmere Bel Air Estate Park Rehabilitation Revegetation	\$58,000			Caboolture River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2014/15 - 2015/16
C17	Waterway Revegetation / Rehabilitation	Clear Mountain Richards Park Revegetation and Rehabilitation	\$155,000			Lower Pine River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2014/15 - 2018/19
C18	Waterway Revegetation / Rehabilitation	Elimbah Heights Reserve Rehabilitation Revegetation	\$87,000			Pumicestone	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2014/15 - 2016/17
C19	Waterway Revegetation / Rehabilitation	Ferny Hills Hall Reserve Revegetation (Linkwood Court to Millwood Court)	\$190,000			Brisbane Coastal	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2014/15 - 2018/19
C20	Waterway Revegetation / Rehabilitation	Petrie North Pine Country Park Merv Ewart Reserve Rehabilitation Revegetation	\$575,000			Lower Pine River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2014/15 - 2017/18
C21	Waterway Revegetation / Rehabilitation	Petrie Tweedale Reserve Embankment Rehabilitation	\$45,000			Lower Pine River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2014/15
C22	Waterway Revegetation / Rehabilitation	Wights Mountain Richards Road Revegetation Rehabilitation	\$1,843,000			Lower Pine River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2014/15 - 2018/19
C23	Waterway Revegetation / Rehabilitation	Wights Mountain Harold Brown Park Revegetation Rehabilitation	\$334,000			Lower Pine River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2014/15 - 2017/18
UW5	Upgrade STP Infrastructure, Redcliffe	Marine Outfall Investigation to inform Treatment Services Strategy Feasibility Assessment	\$200,000,000			Redcliffe	Unitywater		2015/16
C31	Healthy Water Management Plan - Hays	Develop a HWMP for Hays Catchment. The HWMP shall further investigate the feasibility of proposed WSUD retrofit solutions (regional and local), providing concept design details. It shall also investigate and detail how future 'no worsening' pollutant load targets may be achieved. Refer to HWMP Brief for further details of scope.		\$200,000		Hays Inlet	MBRC Strategic Planning		2015/16
C32	Healthy Water Management Plan - Lower Pine	Develop a HWMP for Lower Pine Rivers Catchment. The HWMP shall further investigate the feasibility of proposed WSUD retrofit solutions (regional and local), providing concept design details. It shall also investigate and detail how future 'no worsening' pollutant load targets may be achieved. Refer to HWMP Brief for further details of scope.		\$200,000		Lower Pine River	MBRC Strategic Planning		2015/16
C24	Waterway Revegetation / Rehabilitation	Ferny Hills Hall Reserve Revegetation (Millwood Court to Woodhill Road)	\$190,000			Brisbane Coastal	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2015/16 - 2019/20
C25	Waterway Revegetation / Rehabilitation	Samford Valley, Greenwood Crescent Park Rehabilitation Revegetation	\$180,000			Lower Pine River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2015/16 - 2017/18
C33	WSUD Retrofit Caboolture, High Priority	Local Wetland CAB_WR13, Blubell Street Park, Caboolture	\$887,500	\$30,000	\$15,000	Caboolture River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2015/16 - 2016/17
C34	WSUD Retrofit Hays - High Priority	HAY_WR05, Reg Crouch Park	\$384,000	\$10,000	\$5,000	Hays Inlet	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2015/16 - 2016/17
C35	WSUD Retrofit Lower Pine - High Priority	Local Wetland LPR_WR07, Alleena Park	\$891,000	\$30,000	\$15,000	Lower Pine River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2015/16 - 2016/17
C36	Management of On Site Sewage Facilities	Develop and implement a program to proactively monitor condition and maintenance of on-site sewage facilities, which may be a significant source of pollution in some catchments. HWMP to investigate further.		\$322,000	\$322,000	ALL	MBRC Environmental Planning and Compliance	MBRC Strategic Planning	2015/16
C37	Healthy Water Management Plan - Burpengary	Develop a HWMP for Burpengary Creek Catchment. The HWMP shall further investigate the feasibility of proposed WSUD retrofit solutions (regional and local), providing concept design details. Refer to HWMP Brief for further details of scope.		\$150,000		Burpengary Creek	MBRC Strategic Planning		2016/17

ID	Solution	Action Description	Total CAPEX	OPEX (establish- ment)	OPEX (Annual)	Catchment	Primary Responsibility	Supporting Implementation	Timeframe for Completion
C38	Healthy Water Management Plan - Upper Pine	Develop a HWMP for Upper Pine River Catchment. The HWMP shall further investigate the feasibility of proposed WSUD retrofit solutions (regional and local), providing concept design details. Refer to HWMP Brief for further details of scope.		\$150,000		Upper Pine River	MBRC Strategic Planning		2016/17
C39	WSUD Retrofit Caboolture, High Priority	Regional Wetland CAB_CW05 Sheepstation Creek Park Morayfield	\$1,155,000	\$55,000	\$27,500	Caboolture River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2016/17 - 2017/18
C40	WSUD Retrofit Burpengary - High Priority	Regional Wetland BUR_CW02, Burpengary Sportsgrounds (Burpengary Greenlinks)	\$1,680,000	\$80,000	\$40,000	Burpengary Creek	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2016/17 - 2017/18
C41	WSUD Retrofit Hays - High Priority	HAY_WR15, Lipscombe Road Park (South), Deception Bay	\$450,000	\$12,000	\$6,000	Hays Inlet	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2016/17 - 2017/18
C42	WSUD Retrofit Caboolture, High Priority	Local Wetland CAB_WR02, Pinegrove St Park	\$854,000	\$28,000	\$14,000	Caboolture River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2016/17 - 2017/18
C43	Healthy Water Management Plan - Pumicestone	Develop a HWMP for Pumicestone Catchment. The HWMP shall further investigate the feasibility of proposed WSUD retrofit solutions (regional and local), providing concept design details. Refer to HWMP Brief for further details of scope.		\$130,000		Pumicestone Passage	MBRC Strategic Planning		2017/18
C44	WSUD Retrofit Hays - High Priority	HAY_WR07, Glasshouse Circuit Park, Kallangur	\$425,000	\$11,500	\$5,600	Hays Inlet	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2017/18 - 2018/19
C45	WSUD Retrofit Burpengary - High Priority	Local Wetland BUR_WR03, Narangba Sports Centre, Narangba	\$529,036	\$14,500	\$7,500	Burpengary Creek	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2017/18 - 2018/19
C46	WSUD Retrofit Hays - High Priority	HAY_WR06, Reg Crouch Park	\$261,000	\$6,500	\$3,300	Hays Inlet	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2017/18 - 2018/19
C47	WSUD Retrofit Lower Pine - High Priority	Local Wetland LPR_WR05, Brownwell Street Park, Warner	\$256,000	\$6,500	\$3,000	Lower Pine River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2017/18 - 2018/19
C48	WSUD Retrofit Lower Pine - High Priority	Local Wetland LPR_WR18, Branch Creek Road Park	\$386,000	\$10,000	\$5,000	Lower Pine River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2017/18 - 2018/19
C27	Waterway Revegetation / Rehabilitation, Lower Pine	Implement Revegetation / Rehabilitation Works based on future prioritisation (e.g. using HWMP studies)	\$20,118,000			Lower Pine River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2018/19 - 2033/34
C49	Healthy Water Management Plan - Sideling	Develop a HWMP for Sideling Creek Catchment. Refer to HWMP Brief for further details of scope.		\$130,000		Sideling Creek	MBRC Strategic Planning		2018/19
C50	Healthy Water Management Plan- Stanley	Develop a HWMP for Stanley River Catchment. Refer to HWMP Brief for further details of scope.		\$130,000		Stanley River	MBRC Strategic Planning		2018/19
C51	Healthy Water Management Plan - Brisbane Coastal	Develop a HWMP for Brisbane Coastal Catchment. Refer to HWMP Brief for further details of scope.		\$100,000		Brisbane Coastal	MBRC Strategic Planning		2018/19
C52	WSUD Retrofit Caboolture, High Priority	Local Wetland CAB_WR12, Lynfield Dr Park	\$992,500	\$37,500	\$19,000	Caboolture River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2018/19 - 2019/20
C53	WSUD Retrofit Caboolture, High Priority	Local Wetland CAB_WR21, Beech Drive Park	\$1,121,000	\$53,500	\$26,500	Caboolture River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2018/19 - 2019/20
C54	WSUD Retrofit Burpengary - High Priority	Regional Wetland BUR_CW06, Claverton Drive Park & Reserve Burpengary	\$990,000	\$22,500	\$11,500	Burpengary Creek	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2018/19 - 2019/20
C55	WSUD Retrofit Burpengary - High Priority	Local Wetland BUR_WR06a, Fernando Street	\$1,040,000	\$44,000	\$22,000	Burpengary Creek	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2018/19 - 2019/20
C56	WSUD Retrofit Burpengary - High Priority	Local Wetland BUR_WR01, Crendon Street	\$696,000	\$20,500	\$10,500	Burpengary Creek	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2018/19 - 2019/20
C57	WSUD Retrofit Lower Pine - High Priority	Regional Wetland LPR_CW07, Henry Road Griffin	\$3,938,000	\$188,000	\$94,000	Lower Pine River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2018/19 - 2019/20
C58	WSUD Retrofit Lower Pine - High Priority	Local Wetland LPR_WR09, Gary Fulton Park	\$1,155,000	\$55,000	\$27,500	Lower Pine River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2018/19 - 2019/20
C59	WSUD Retrofit Lower Pine - High Priority	Local Wetland LPR_WR21, Versace Avenue Drainage Reserve	\$672,000	\$20,000	\$10,000	Lower Pine River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2018/19 - 2019/20

ID	Solution	Action Description	Total CAPEX	OPEX (establishment)	OPEX (Annual)	Catchment	Primary Responsibility	Supporting Implementation	Timeframe for Completion
C60	Healthy Water Management Plan - Bribie	Develop a HWMP for Bribie Island Catchment. Refer to HWMP Brief for further details of scope.		\$100,000		Bribie	MBRC Strategic Planning		2019/20
C61	Healthy Water Management Plan - Redcliffe	Develop a HWMP for Redcliffe Catchment. Refer to HWMP Brief for further details of scope.		\$100,000		Redcliffe	MBRC Strategic Planning		2019/20
C26	Waterway Revegetation / Rehabilitation, Caboolture	Implement Revegetation / Rehabilitation Works based on future prioritisation (e.g. using HWMP studies)	\$1,487,000			Caboolture River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2019/20 - 2023/24
C62	WSUD Retrofit Burpengary - High Priority	Local Wetland BUR_WR12, Matterhorn Dr Park, Narangba	\$1,444,000	\$27,500	\$14,000	Burpengary Creek	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2019/20 - 2023/24
C63	WSUD Retrofit Lower Pine - High Priority	Local Wetland LPR_WR20, Karrajong Drive Park 2, Warner	\$528,000	\$14,500	\$7,000	Lower Pine River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2019/20 - 2023/24
C64	WSUD Retrofit Caboolture, High Priority	Regional Wetland CAB_CW04, King Street Caboolture	\$4,515,000	\$215,000	\$107,500	Caboolture River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2019/20 - 2023/24
C65	WSUD Retrofit Caboolture, High Priority	Regional Wetland CAB_CW06, Buchanans Road Morayfield	\$1,575,000	\$75,000	\$37,500	Caboolture River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2019/20 - 2023/24
C66	WSUD Retrofit Upper Pine - High Priority	Regional Wetland UPR_CW01, Tullamore Park Dayboro	\$946,000	\$21,500	\$10,750	Upper Pine River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2019/20 - 2023/24
C67	WSUD Retrofit Hays - High Priority	HAY_WR09, Penson Park	\$2,021,000	\$96,000	\$48,000	Hays Inlet	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2019/20 - 2023/24
UW12	Recycled Water	Further detailed feasibility studies should be undertaken for the following schemes: <ul style="list-style-type: none">• Redcliffe Reuse Scheme• Ray Frawley Fields These investigations will be dependent on outcomes of Redcliffe STP business case (completion by end 2013), which will evaluate whether improvements to Effluent Quality could be more cost effective.	\$200,000			Hays Inlet	Unitywater	MBRC	2020/2022
UW6	Upgrade STP Infrastructure, Caboolture	Detailed Planning Study to undertake STP Upgrade works at Burpengary and Caboolture STP. Note this will be dependent on outcomes of Treatment Services Strategy Feasibility Assessment to be undertaken in 2013/2014.	\$30,000,000			Caboolture River	Unitywater		2022/23
C28	Waterway Revegetation / Rehabilitation, Burpengary	Implement Revegetation / Rehabilitation Works based on future prioritisation (e.g. using HWMP studies)	\$1,800,000			Burpengary Creek	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2024/25 - 2028/29
C29	Waterway Revegetation / Rehabilitation, Upper Pine	Implement Revegetation / Rehabilitation Works based on future prioritisation (e.g. using HWMP studies)	\$3,600,000			Upper Pine	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2024/25 - 2033/34
C68	WSUD Retrofit Caboolture, High Priority	Regional Wetland CAB_CW11, Darley Road Park Caboolture	\$1,260,000	\$60,000	\$30,000	Caboolture River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2024/25 - 2028/29
C69	WSUD Retrofit Lower Pine - High Priority	Regional Wetland LPR_CW02, Piggott Reserve Strathpine	\$440,000	\$10,000	\$5,000	Lower Pine River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2024/25 - 2028/29
C70	WSUD Retrofit Lower Pine - High Priority	Regional Wetland LPR_CW03, Normanby Way Strathpine	\$6,720,000	\$320,000	\$160,000	Lower Pine River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2024/25 - 2028/29
C71	WSUD Retrofit Caboolture	CAB_CW07, Vistentin Road Morayfield	\$1,470,000	\$70,000	\$35,000	Caboolture River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2024/25 - 2028/29
C72	WSUD Retrofit Caboolture	CAB_CW12, Caboolture River Road Caboolture	\$1,575,000	\$75,000	\$37,500	Caboolture River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2024/25 - 2028/29
C73	WSUD Retrofit Lower Pine	LPR_CW01, Scouts Crossing Road Park Brendale	\$2,205,000	\$105,000	\$52,500	Lower Pine River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2024/25 - 2028/29
C74	WSUD Retrofit Lower Pine	LPR_CW04, Learmonth Street Strathpine	\$1,365,000	\$65,000	\$32,500	Lower Pine River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2024/25 - 2028/29
C75	WSUD Retrofit Lower Pine	LPR_CW06, Bells Pocket Rd Strathpine	\$1,617,000	\$77,000	\$38,500	Lower Pine River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2024/25 - 2028/29
C76	WSUD Retrofit Lower Pine	LPR_CW09, Wantima Golf	\$1,144,000	\$26,000	\$13,000	Lower Pine River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2024/25 - 2028/29

ID	Solution	Action Description	Total CAPEX	OPEX (establishment)	OPEX (Annual)	Catchment	Primary Responsibility	Supporting Implementation	Timeframe for Completion
C77	WSUD Retrofit Lower Pine	LPR_CW11, Narrabeen Road Park Albany Creek	\$1,785,000	\$85,000	\$42,500	Lower River Pine	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2024/25 - 2028/29
C78	WSUD Retrofit Lower Pine	LPR_CW12, Pine Valley Drive Petrie	\$1,890,000	\$90,000	\$45,000	Lower River Pine	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2024/25 - 2028/29
C79	WSUD Retrofit Caboolture	CAB_CW01, Childs Road Caboolture	\$6,090,000	\$290,000	\$145,000	Caboolture River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2024/25 - 2028/29
C30	Waterway Revegetation / Rehabilitation, Stanley	Implement Revegetation / Rehabilitation Works based on future prioritisation (e.g. using HWMP studies)	\$450,000			Stanley River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2029/30 - 2033/34
C80	WSUD Retrofit Caboolture	CAB_CW03, Beerburrum Road Caboolture	\$3,780,000	\$180,000	\$90,000	Caboolture River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2029/30 - 2033/34
C81	WSUD Retrofit Caboolture	CAB_CW08, Buchanan Road / Weier Road Morayfield	\$2,090,000	\$47,500	\$23,750	Caboolture River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2029/30 - 2033/34
C82	WSUD Retrofit Caboolture	CAB_CW13, Cobb Rd Burpengary	\$462,000	\$10,500	\$5,250	Caboolture River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2029/30 - 2033/34
C83	WSUD Retrofit Burpengary	BUR_CW03, Old Bay Road Burpengary	\$1,870,000	\$42,500	\$21,250	Burpengary Creek	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2029/30 - 2033/34
C84	WSUD Retrofit Burpengary	BUR_CW04, Bassett Road Burpengary	\$2,205,000	\$105,000	\$52,500	Burpengary Creek	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2029/30 - 2033/34
C85	WSUD Retrofit Lower Pine	LPR_CW10, Leitchs Rd Brendale	\$1,320,000	\$30,000	\$15,000	Lower River Pine	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2029/30 - 2033/34
C86	WSUD Retrofit Caboolture	CAB_CW02, Limburg Ave Caboolture	\$2,835,000	\$135,000	\$67,500	Caboolture River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2029/30 - 2033/34
C87	WSUD Retrofit Caboolture	CAB_CW10, Coach Rd East Burpengary	\$2,068,000	\$47,000	\$23,500	Caboolture River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2029/30 - 2033/34
C88	WSUD Retrofit Caboolture	CAB_CW16, Buckley Road Burpengary	\$6,720,000	\$320,000	\$160,000	Caboolture River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2029/30 - 2033/34
C89	WSUD Retrofit Burpengary	BUR_CW01, Moorina Road Morayfield	\$3,465,000	\$165,000	\$82,500	Burpengary Creek	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2029/30 - 2033/34
C90	WSUD Retrofit Burpengary	BUR_CW05, Old Gympie Road Burpengary	\$1,166,000	\$26,500	\$13,250	Burpengary Creek	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2029/30 - 2033/34
C91	WSUD Retrofit Caboolture	CAB_CW17, Wade Road Bellmere	\$1,575,000	\$75,000	\$37,500	Caboolture River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2029/30 - 2033/34
C92	WSUD Retrofit Caboolture	CAB_CW18, Keates Court Wamuran	\$1,155,000	\$55,000	\$27,500	Caboolture River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2029/30 - 2033/34
C93	WSUD Retrofit Caboolture	CAB_CW19, Wade Road Bellmere	\$1,995,000	\$95,000	\$47,500	Caboolture River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2029/30 - 2033/34
C94	WSUD Retrofit Caboolture	CAB_CW20, Wade Road Bellmere	\$1,785,000	\$85,000	\$42,500	Caboolture River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2029/30 - 2033/34
C95	WSUD Retrofit Caboolture	CAB_CW14, Lindsay Road Sportsground & adjoining private	\$1,050,000	\$50,000	\$25,000	Caboolture River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2029/30 - 2033/34
C96	WSUD Retrofit Caboolture	CAB_CW15, Williamson Road Burpengary	\$1,760,000	\$40,000	\$20,000	Caboolture River	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2029/30 - 2033/34
C97	WSUD Retrofit Lower Pine	LPR_CW08, Old North Road Strathpine	\$1,428,000	\$68,000	\$34,000	Lower River Pine	MBRC Drainage Waterways & Coastal Planning	MBRC Project Management & Construction	2029/30 - 2033/34
UW10	Upgrade STP Infrastructure, Upper Pine River	Detailed Planning Study to undertake STP Upgrade works Dayboro STP by 2031.	\$5,000,000			Upper River Pine	Unitywater		2030/31
SUBTOTAL ALL WORKS (MBRC Works only)			\$128,878,000	\$6,922,000	\$2,668,900				
SUBTOTAL Revegetation/Rehabilitation Works			\$31,112,000						
SUBTOTAL Rural BMP Works (MBRC work only)			\$215,000						

¹ Resolution required by 2014, however Infrastructure not needed until Caboolture West develops

Blue shading Indicates action is currently planned for / being undertaken

Monitoring and Review Plan



4 MONITORING AND REVIEW PLAN

Under Section 17 of the *Environmental Protection (Water) Policy 2009* (EPP Water), it is a legislative requirement to:

- Publish the TWCM Plan on its website after its been certified and endorsed;
- Report on the TWCM Plan's implementation to the regulatory agency (Department of Environment and Heritage Protection) within four years of being published; and
- Review and update the TWCM Plan within five years of being published.

Although legislation requires the review and update of TWCM Plans every five years, circumstances may arise that trigger a review prior to this time. A reporting framework that can be applied by Council to guide the monitoring and review process of the TWCM Implementation Plan is described below.

4.1 Monitor Implementation and Progress

To effectively monitor and report on the progress of the TWCM Plan's implementation, Council should undertake the following tasks summarised in Table 4-1. These tasks are described in more detail in the following sections.

Table 4-1 Summary of Tasks to Monitor and Report on Progress of TWCM Plan Implementation

Monitoring Task	Frequency	Responsibility	Checklist / Toolkit
Review Action Progress against required timeframes	Annual	TWCM Coordinator	Appendix D Table D-1
Review effectiveness of actions in addressing TWCM issues	Every four years	TWCM Coordinator & group responsible for implementation	Appendix D Table D-2
Report to regulatory agency	Every four years	TWCM Coordinator	Table D-1, Table D2

4.1.1 Review Action Progress against Required Timeframes

Council's TWCM / WSUD Coordination Officer (elected in Action C11) is responsible for reviewing the progress of TWCM Actions against required timeframes, as documented in the TWCM Implementation Plan. This should be undertaken on an annual basis to check that actions are being delivered in a timely manner. Results should be reported back to the "Water Management Advisors Group" (Action C10) within Council. To assist Council to undertake this task, a checklist has been developed and is included in Appendix D, Table D - 1.

4.1.2 Review Effectiveness of Actions in Addressing TWCM Issues

Council's TWCM / WSUD Coordination Officer will be responsible for overseeing that a review is undertaken to assess the effectiveness of actions in addressing TWCM issues. This review is to be undertaken every four (4) years, in accordance with legislative requirements, and will be carried out by officers nominated by the TWCM / WSUD Coordination Officer.

A summary of the key TWCM planning issues identified in each catchment is presented in Table 4-2. To evaluate whether the recommended actions/solution sets are adequately addressing the issues identified in each catchment, performance indicators have been established. The performance indicators are outlined in Table 4-3. A checklist to record results of the performance assessment has been included in Appendix D, Table D - 2.

The results of the detailed review should be reported to the "Water Management Advisors Group", with any issues highlighted. TWCM Planning is an ongoing process requiring refinement and it may be that performance indicators highlight the need for significant changes in approach to adequately address the issues identified. The results and any recommendations for changes should be discussed by the "Water Management Advisors Group". Findings should also be used in the five year review of the TWCM Plan (refer to Section 4.2).

Table 4-2 Summary of Key Catchment Issues













Catchment	Water Cycle Management Issue					
	Water Quality / Waterway Health	Environmentally Sensitive Areas	Population Growth	Water Supply	STP Capacity	Flooding
						
Bribie	✓	✓				
Brisbane Coastal	✓					
Burpengary	✓		✓		✓	✓
Caboolture	✓	✓	✓		✓	✓
Hays Inlet	✓	✓	✓		✓	✓
Lower Pine	✓	✓	✓	✓	✓	✓
Pumicestone	✓	✓	✓			
Redcliffe	✓	✓	✓		✓	✓
Sideling	✓					
Stanley	✓		✓	✓	✓	
Upper Pine	✓			✓	✓	

Table 4-3 Summary of Issue Performance Indicators

Issue		Performance Indicator
	Water Quality/ Waterway Health	Has water quality in receiving waters been maintained or improved? (Check using available water quality monitoring results and EHMP report card results, or by comparison of modelled catchment pollutant loads with no worsening pollutant load targets ¹)
		Is EHMP Report Card Grade 'C' or above?
		Does water quality comply with EPP Water quality objectives or meet with sustainable load targets ¹ ?
		Has water quality in drinking water catchments been adequately protected from development pressures?
		Have management solutions improved public amenity and recreational values?
	Environmentally Sensitive Areas	Has water quality been maintained in High Ecological Value receiving waters? (review Council / EHMP water quality monitoring data)
	Population Growth	Have new developments complied with best practice load reduction targets? (80/60/45% annual load reduction in TSS/TP/TN)
		Have erosion and sediment control measures been effectively implemented on construction sites?
		Have recycled water schemes been implemented in new developments (wastewater or stormwater)?
		Have recycled water schemes been accepted by the community?
	Potable Water Supply	Are water supply sources secure?
		Has the use of alternative water sources increased?
		Is water demand less than known sustainable storage yields?
		Are level of service objectives satisfied?
	Sewage Treatment Plant	Are licence and legislative requirements being met?
		Is the design capacity sufficient as previously predicted?
		Are level of service objectives satisfied?
	Flooding	Have HWMP identified flooding issues and management solutions to address these issues?
		Have recommended management solutions been implemented or programed for works?
	All	Have the management solutions performed as expected in terms of potable water savings and water quality treatment performance?
		Has the forecast of capital costs for various proposed management options been realistic?
		Has the forecast of operational costs for various proposed management options been realistic?

¹ Existing modelling framework established during the detailed planning phase should be used for this assessment (BMT WBM, 2012a).

4.1.3 Report to Regulatory Agency

Within four years of being published, the EPP Water requires a monitoring report on the TWCM Plan's implementation be submitted to the regulatory agency (Department of Environment and Heritage Protection). A concise monitoring report should be prepared that includes the results of the monitoring activities and assessment undertaken in Section 4.1.1 and Section 4.1.2.

4.2 Review and Update TWCM Plan

It is a legislative requirement that the TWCM Plan be reviewed and updated at minimum every five (5) years, as the TWCM planning process requires iterations and refinements over time. Circumstances may also arise that trigger the need for a review prior to this time. The EPP Water includes provisions for the regulatory authority to request an update to the TWCM Plan be undertaken at any time in response to such triggers. Table 4-4 identifies the triggers that will prompt a review of the TWCM Plan.

Table 4-4 Summary of Triggers for Updating TWCM Plans¹

Item	Trigger for Review of TWCM Plan
1	Significant decline or "Fail" in Ecological Health Monitoring Program (EHMP) report card grades
2	Deterioration in surface or ground water quality demonstrated by monitoring results
3	Deterioration in the potable water supply shown by environmental monitoring
4	Changes in Council priorities that impact on TWCM
5	Outcomes of any detailed TWCM Planning studies
6	Increases in proposed population growth or significant changes in land use
7	Significant new capital expenditure on water cycle assets, replacement of aging assets, improvements to meet more stringent compliance standards or capacity augmentations
8	Potential threats to water supply security
9	Revision of related plans such as Unitywater's Water Netserv Plan
10	Significant barrier identified to implementing recommended solutions that would result in legislative requirements such as 'no worsening' in water quality not being met.

¹ Based on information contained in TWCM Planning Guidelines for SEQ (WBD, 2010)

The review of the plan should be coordinated by Council's TWCM / WSUD Coordination Officer in collaboration with Unitywater. If possible, it should be aligned to coincide with review of Unitywater's Netserv Plan. The review of the plan should be undertaken in accordance with the *Total Water Cycle Management Planning Guidelines for South East Queensland* (WBD, 2010). For simplicity, it is recommended that the assessment be similar to the initial planning approach, so that original information / workings / models may be used as a basis for assessing revised information. The review should also take into consideration the effectiveness of past actions in addressing TWCM issues and any recommendations made to improve the TWCM / implementation approach (refer to Section 4.1.2).

References



5 REFERENCES

BMT WBM (2010) *Total Water Cycle Management Strategy for Moreton Bay Regional Council*. Prepared for MBRC.

BMT WBM (2012a) *Total Water Cycle Management Plan for Moreton Bay Regional Council*. Prepared for MBRC.

BMT WBM (2012b) *Towards a Water Sensitive Urban Design Future – Final Draft*. Prepared for MBRC.

BMT WBM (2013a) *Moreton Bay Regional Council Total Water Cycle Management Visioning Workshop – Summary Report*. Prepared for MBRC.

BMT WBM (2013b) *Rural Best Management Practices in Moreton Bay Regional Council - An Implementation Framework*. Prepared for MBRC

BMT WBM (2013c) *TWCM Prioritisation Framework*. Prepared for MBRC.

Water by Design (WBD) (2010). *Total Water Cycle Management Planning Guidelines for South East Queensland*.

Appendices



APPENDIX A: VISION WORKSHOP ATTENDEES

Organisation	Name
Moreton Bay Regional Council	Paul Gleeson Elissa McConaghy Steve Roso Glen Millar
UnityWater	Andrew Sloan
Department of Energy and Water Supply (DEWS)	Patricia Hurikino
Seqwater	Shion Yee
SEQ Catchments	Paul McDonald
Department of Environment and Heritage Protection (DEHP)	Stephen Fisher
Department of State Development and Infrastructure Planning (DoSDIP)	Garth Nolan (apology)
Department of Agriculture, Fisheries and Forestry (DAFF)	Ian Layden (apology)
Queensland Competition Authority (QCA)	Will Copeman
BMT WBM	Nicole Ramilo Tony Weber (apology)
Bligh Tanner	Alan Hoban (Facilitator)

APPENDIX B: CONTRIBUTING FACTORS TO SOLUTION PRIORITISATION PROCESS

Contributing Factors ¹	Catchment	Implications
Caboolture West Development	Caboolture	<ul style="list-style-type: none"> Estimated 50,000 population in TWCM Planning, now likely to be 65,000 with changes anticipated to management solutions that will require further planning studies to address As area now recognised in SEQ Regional Plan, it needs to be included in the HWMP for Caboolture Overall, further driver for developing Caboolture HWMP as a priority
Burpengary / Morayfield Development	<ul style="list-style-type: none"> Burpengary Caboolture 	<ul style="list-style-type: none"> Estimated 30,000 population Implications for stormwater and receiving water quality Implications for STP upgrade works & receiving water quality - Caboolture River discharge Particular implications for Caboolture catchment where future no worsening water quality objectives are not achieved Overall, further driver for developing Caboolture and Burpengary HWMPs, and investigating recycled water to agriculture scheme
Moreton Bay Rail Development	<ul style="list-style-type: none"> Lower Pine Hays 	<ul style="list-style-type: none"> Population planned to increase 22,000 by 2031 PLUS employment Particular implications for water quality in Lower Pine and Hays catchment where future no worsening water quality objectives are not achieved Overall, further driver for developing Lower Pine and Hays HWMP as priorities
Narangba Development	<ul style="list-style-type: none"> Burpengary Hays Sideling 	<ul style="list-style-type: none"> Estimated population 14,500 Implications for stormwater and receiving water quality Implications for STP upgrade works & receiving water quality - Caboolture River discharge Particular implications for Caboolture and Hays catchment where no worsening water quality objectives are not achieved Overall, further driver for developing Caboolture and Hays HWMPs as priorities. Also supports scheduled development of Burpengary HWMP.
Burpengary East Development	Burpengary	<ul style="list-style-type: none"> Estimated population 6,000 Estimated 2,100 dwellings Implications for stormwater and receiving water quality Implications for STP upgrade works & receiving water quality - Caboolture River discharge Particular implications for Caboolture catchment where no worsening water quality objectives not achieved Overall, further driver for developing Caboolture HWMP as a priority, as well as scheduled development of Burpengary HWMP.
Elimbah East Development	Pumicestone	<ul style="list-style-type: none"> Industrial development - potential for impacts to water quality Overall, additional driver for Pumicestone Passage catchment HWMP
Joyner South Development	Lower Pine	<ul style="list-style-type: none"> Potential implications on water quality, particularly as Lower Pine does not meet no worsening targets Overall, further driver for developing Lower Pine HWMP as priority
Amcor	Lower Pine	<ul style="list-style-type: none"> Potential improvements to water quality as reduced effluent. However reduced re-use also. Overall, further driver for developing Lower Pine HWMP

¹ Not included in detailed TWCM Planning Studies

APPENDIX C: PRIORITISATION PROCESS RESULTS

Table C - 1 Summary of Results for Prioritisation Process Performance Matrixes

Solution	Catchment	Score	Delivery Mechanism
WSUD Retrofit	Caboolture River	72	Infrastructure works
WSUD Retrofit	Hays Inlet	67	Infrastructure works
Recycled Water to Agriculture /Land Disposal	Caboolture River	65	Infrastructure works
Rural BMP for Horticulture - Filter strips	Caboolture River	59	Program
Increased Enforcement of Erosion & Sediment Control	Hays Inlet	55	Program
Recycled Water	Hays Inlet	55	Infrastructure works
Recycled Water	CIGA	50	Infrastructure works
WSUD Retrofit	Burpengary Creek	50	Infrastructure works
Waterway Riparian Reveg (3rd & 4th order streams)	Hays Inlet	49	Program
Waterway Riparian Reveg (3rd & 4th order streams)	Caboolture River	46	Program
Rural BMP for Grazing - Reveg 1st & 2nd order streams	Caboolture River	46	Program
Increased Enforcement of Erosion & Sediment Control	Caboolture River	45	Program
WSUD Retrofit	Lower Pine River	44	Infrastructure works
Rural BMP for Horticulture - Filter strips	Pumicestone Passage	41	Program
Rural BMP for Horticulture - Filter strips	Upper Pine River	38	Program
Rural BMP for Horticulture - Filter strips	Lower Pine River	38	Program
Recycled Water	Lower Pine River	37	Infrastructure works
Rural BMP for Grazing - Reveg 1st & 2nd order streams	Burpengary Creek	35	Program
Waterway Riparian Reveg (3rd & 4th order streams)	Burpengary Creek	35	Program
Increased Enforcement of Erosion & Sediment Control	Burpengary Creek	35	Program
Rural BMP for Horticulture - Filter strips	Sideling Creek	35	Program
WSUD Retrofit	Upper Pine River	34	Infrastructure works
Increased Enforcement of Erosion & Sediment Control	Brisbane Coastal	33	Program
Rural BMP for Grazing - Reveg 1st & 2nd order streams	Pumicestone Passage	28	Program
Waterway Riparian Reveg (3rd & 4th order streams)	Pumicestone Passage	28	Program
Increased Enforcement of Erosion & Sediment Control	Pumicestone Passage	27	Program
Increased Enforcement of Erosion & Sediment Control	Bribie Island	27	Program
Rural BMP for Grazing - Reveg 1st & 2nd order streams	Upper Pine River	25	Program
Rural BMP for Grazing - Reveg 1st & 2nd order streams	Lower Pine River	23	Program
Waterway Riparian Reveg (3rd & 4th order streams)	Lower Pine River	23	Program
Increased Enforcement of Erosion & Sediment Control	Lower Pine River	23	Program
Waterway Riparian Reveg (3rd & 4th order streams)	Upper Pine River	22	Program
Rural BMP for Grazing - Reveg 1st & 2nd order streams	Sideling Creek	22	Program
Rural BMP for Horticulture - Filter strips	Stanley River	22	Program
Waterway Riparian Reveg (3rd & 4th order streams)	Sideling Creek	22	Program
Increased Enforcement of Erosion & Sediment Control	Upper Pine River	22	Program
Recycled Water to Agriculture /Land Disposal	Stanley River	20	Infrastructure works
Rural BMP for Grazing - Reveg 1st & 2nd order streams	Stanley River	10	Program
Waterway Riparian Reveg (3rd & 4th order streams)	Stanley River	9	Program
Increased Enforcement of Erosion & Sediment Control	Stanley River	9	Program
Healthy Water Management Plan	Caboolture River & CIGA	332	Program
Healthy Water Management Plan	Hays Inlet	227	Program
Healthy Water Management Plan	Lower Pine	189	Program
Healthy Water Management Plan	Burpengary Creek	156	Program
Healthy Water Management Plan	Upper Pine River	142	Program
Healthy Water Management Plan	Pumicestone Passage	124	Program
Healthy Water Management Plan	Sideling Creek	79	Program
Healthy Water Management Plan	Stanley River	70	Program
Healthy Water Management Plan	CIGA (with Cab)	50	Program
Healthy Water Management Plan	Brisbane Coastal	33	Program
Healthy Water Management Plan	Bribie	27	Program
Healthy Water Management Plan	Redcliffe	0	Program

Note: Individual solution performance matrixes have been provided separately to Council in a digital spreadsheet format

APPENDIX D: MONITORING & REVIEW PLAN CHECKLISTS

Table D - 1 Action Progress Review Checklist

[illegible]

Table D - 2 Action Performance Review Checklist

Catchment:					
Date of Review:					
Reviewer:					
Issue	Performance Indicator	Is Performance Indicator Achieved?			Reference to Supporting Calculations / Documents
		Yes	No	Comments ¹	
Waterway Health	Has water quality in receiving waters been maintained or improved? (Check using available water quality monitoring results and EHMP report card results, or by comparison of modelled catchment pollutant loads with no worsening pollutant load targets ²)				
	Is EHMP Report Card Grade 'C' or above?				
	Does water quality comply with EPP Water quality objectives or meet with sustainable load targets ² ?				
	Has water quality in drinking water catchments been adequately protected from development pressures?				
	Have management solutions improved public amenity and recreational values?				
Environmentally Sensitive Areas	Has water quality been maintained in High Ecological Value receiving waters? (review Council / EHMP water quality monitoring data)				
Population Growth	Have new developments complied with best practice load reduction targets? (80/60/45% annual load reduction in TSS/TP/TN)				
	Have erosion and sediment control measures been effectively implemented on construction sites?				
	Have recycled water schemes been implemented in new developments (wastewater or stormwater)?				
	Have recycled water schemes been accepted by the community?				
Potable Water Supply	Are water supply sources secure?				
	Has the use of alternative water sources increased?				
	Is water demand less than known sustainable storage yields?				
	Are level of service objectives satisfied?				

Catchment:					
Date of Review:					
Reviewer:					
Issue	Performance Indicator	Is Performance Indicator Achieved?			Reference to Supporting Calculations / Documents
		Yes	No	Comments ¹	
Sewage Treatment Plant	Are licence and legislative requirements being met?				
	Is the design capacity sufficient as previously predicted?				
	Are level of service objectives satisfied?				
Flooding	Have HWMP identified flooding issues and management solutions to address these issues?				
	Have recommended management solutions been implemented or programed for works?				
All	Have the management solutions performed as expected in terms of potable water savings and water quality treatment performance?				
	Has the forecast of capital costs for various proposed management options been realistic?				
	Has the forecast of operational costs for various proposed management options been realistic?				
Recommendations to improve TWCM / implementation approach					
Issue	Recommendation				

¹ Comments may include reasons why criteria was not achieved, details of criteria partly achieved, or 'Not Applicable' if the issue / criteria is not applicable to the catchment.

² Existing modelling framework established during the detailed planning phase should be used for this assessment (BMT WBM, 2012a).



BMT WBM Brisbane	Level 8, 200 Creek Street Brisbane 4000 PO Box 203 Spring Hill QLD 4004 Tel +61 7 3831 6744 Fax +61 7 3832 3627 Email bmtwbm@bmtwbm.com.au Web www.bmtwbm.com.au
BMT WBM Denver	8200 S. Akron Street, Unit 120 Centennial Denver Colorado 80112 USA Tel +1 303 792 9814 Fax +1 303 792 9742 Email denver@bmtwbm.com Web www.bmtwbm.com.au
BMT WBM Mackay	Suite 1, 138 Wood Street Mackay 4740 PO Box 4447 Mackay QLD 4740 Tel +61 7 4953 5144 Fax +61 7 4953 5132 Email mackay@bmtwbm.com.au Web www.bmtwbm.com.au
BMT WBM Melbourne	Level 5, 99 King Street Melbourne 3000 PO Box 604 Collins Street West VIC 8007 Tel +61 3 8620 6100 Fax +61 3 8620 6105 Email melbourne@bmtwbm.com.au Web www.bmtwbm.com.au
BMT WBM Newcastle	126 Belford Street Broadmeadow 2292 PO Box 266 Broadmeadow NSW 2292 Tel +61 2 4940 8882 Fax +61 2 4940 8887 Email newcastle@bmtwbm.com.au Web www.bmtwbm.com.au
BMT WBM Perth	Suite 6, 29 Hood Street Subiaco 6008 Tel +61 8 9328 2029 Fax +61 8 9484 7588 Email perth@bmtwbm.com.au Web www.bmtwbm.com.au
BMT WBM Sydney	Level 1, 256-258 Norton Street Leichhardt 2040 PO Box 194 Leichhardt NSW 2040 Tel +61 2 9713 4836 Fax +61 2 9713 4890 Email sydney@bmtwbm.com.au Web www.bmtwbm.com.au
BMT WBM Vancouver	401 611 Alexander Street Vancouver British Columbia V6A 1E1 Canada Tel +1 604 683 5777 Fax +1 604 608 3232 Email vancouver@bmtwbm.com Web www.bmtwbm.com.au