Sustainable Total Water Cycle Management Strategy

Volume II

Prepared by

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For

Hornsby Shire Council

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PO Box 123
Broadway, NSW, 2007

Sustainable Total Water Cycle Management Strategy

Volume 2

Draft

For Hornsby Shire Council

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QUALITY ASSURANCE SYSTEM

Project Director's Approval of Final Report

I certify that I have:

Read the comments of the primary Reviewer(s) ❑ **Yes** ❑ **No**

Read the comments of the secondary Reviewer(s) ❑ **Yes** ❑ **No**

I agree that this report reaches the standard set by the Institute for Sustainable Futures, University of Technology, Sydney.

Signed

Institute for Sustainable Futures

ACKNOWLEDGEMENTS

The authors of the report would like to thank the following people and organisations:

The Water Catchments Team at Hornsby Shire Council, especially Ross McPherson (Manager) and Neil Keraunos, for their enthusiasm and drive during the project.

The Statement of Joint Intent Committee, including Cllr Wendy McMurdo (Hornsby Shire Council), David Booth (community representative), Shane Barter (Stormwater Trust, DEC), Owen Carson (SWC), Maree Abood (DIPNR).

The Hawkesbury Nepean Catchment Management Authority, especially Bob Wilson, Mary Howard, Jenny Smith, and Steve Nicholls.

Hornsby Shire Council Managers who participated in the stakeholder consultation process.

The Cooperative Research Centre for Catchment Hydrology for their E2 modelling contributions.

Colleagues at ISF including Simon Fane, Sally Campbell, and Harriet Westcott, for their contributions to different stages of the project.

REPORT VOLUMES

VOLUME I: PROJECT SUMMARY

VOLUME II: SUSTAINABLE TOTAL WATER CYCLE MANAGEMENT STRATEGY

VOLUME III: TOTAL WATER CYCLE MANAGEMENT MODELLING

VOLUME IV: PROJECT PROCESS REPORT

INTRODUCTION TO VOLUME II

This volume is the first of the two core outputs of this project – the Hornsby Shire Council Sustainable Total Water Cycle Management Strategy. It contains two sections: an introduction to the Strategy and the Strategy document.

Section 1 is the introduction to the Strategy. It includes a brief description of the Hornsby Shire area; background existing conditions based upon Council's monitoring program; core criteria behind Strategy development; and the Strategy format. This section aims to provide a broad background to the purpose and drivers of the strategy, the project criteria addressed in the Strategy (and a framework for understanding the criteria) and guidance on engaging in and understanding the structure of the Strategy.

Section 2 is the Strategy document. The Strategy includes a vision with goals for the sustainable management of the total water cycle and objectives for Council Divisions to meet those goals. Based upon the goals for the total water cycle, the Strategy outlines for each user (i.e. Council Division) a set of strategies, outcomes, actions, responsibilities, timeframes and indicative costs, to enable them to meet their water cycle objectives.

The Strategy closely interacts with the modelling package developed in this project and documented in volume III, and was developed following the processes documented in volume IV.

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ABBREVIATIONS

ANZECC	Australia and New Zealand Environment and Conservation Council
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
BASIX	Building Sustainability Index
CRC	Cooperative research Centre
CRR	Catchment Remediation Rate
DCP	Development Control Plan
DEC	Department of Environment and Conservation
DIPNR	Department of Infrastructure, Planning, and Natural Resources
E2	
EPA	Environmental Protection Authority (now part of DEC)
EUM	end use model
HSC	Hornsby Shire Council
HN CMA	Hawkesbury Nepean Catchment Management Authority
HN LGAG	Hawkesbury Nepean Local Government Advisory Group
ICLEI	International Council for Local Environmental Initiatives
ISO	International Organisation for Standardisation
LEP	Local Environment Plan
LGA	Local Government Area
NPWS	National Parks and Wildlife Service (now part of DEC)
SKM	Sinclair Knight Merz
SOJI	Statement of Joint Intent
STP	sewage treatment plant
SWC	Sydney Water Corporation
TNS	The Natural Step
UTS	University of Technology Sydney
WSUD	water sensitive urban design

1 SECTION 1: STRATEGY INTRODUCTION

The success of the Berowra Creek Water Quality Management Strategy in Hornsby Shire in eliminating algal blooms and enhancing water quality in Berowra Creek, and the acknowledgement of the need for a broader approach to the water cycle, inspired this project on sustainable management for the total water cycle for Hornsby Shire Council. The work of the Statement of Joint Intent (SOJI) Committee (acting as steering group) and the project team comprising the Council Water Catchments Team, the Institute for Sustainable Futures, and Sinclair Knight Merz, resulted in this strategic planning actions instrument known as the Hornsby Shire Council Sustainable Total Water Cycle Management Strategy.

1.1 The Bushland Shire area

The Shire of Hornsby is the second largest Local Government Area (LGA) in the Sydney region. The Shire, located to the north of Sydney, takes in land from Epping north to Wisemans Ferry and Brooklyn. The Hornsby LGA supports the needs of 150,000 residents over an area of 50,990 hectares.

The Shire includes four catchments. The Berowra Creek Catchment is bounded on the south by Castle Hill Road, to the west by Old Northern Road, to the north by the Canoelands Ridge and to the east by the Pacific Highway. All of the Berowra Creek Catchment is within the jurisdiction of Hornsby Shire Council.

This catchment contains significant bushland areas which include Marramarra National Park, Muogamarra Nature Reserve and the Berowra Valley Regional Park. Landuses in this catchment include: bushland, rural, developed, urban, light industrial and commercial. Most urban and industrial activities occur in the eastern and southern regions of the Catchment.

In order to address poor water quality across Hornsby Shire, Council has embarked upon a program to remediate degraded waterways and reduce stormwater pollutants. All these works are funded by a special environmental rate or Catchment Remediation Rate (CRR), which is levied at 5% of Council's Ordinary Rate Shire-wide.

Seven local government authorities have jurisdiction over the Lane Cove River Catchment. Only the upper reaches of the Lane Cove River Catchment are within Hornsby Shire. This catchment is dominated by developed urban landuses and some commercial areas, as well as bushland areas such as the Lane Cove National Park.

Within the Cowan Creek Catchment there are four Local Government Areas. The western boundary, defined by the Pacific Highway, lies within Hornsby Shire. Land uses in the southern part of this area include extensive light industrial areas, large commercial shopping centres and developed urban areas. Kuring-gai Chase National Park also covers a large part of the catchment.

The Hawkesbury River Catchment within Hornsby Shire is divided into two areas which include the Wisemans Ferry/Maroota region as well as the Brooklyn area. These areas drain directly to the Hawkesbury River. Landuses in this area include small farming ventures, market gardening, residential, marinas, boat ramps, aquaculture and fishing (commercial and recreational).

1.2 Existing Conditions

Hornsby Shire Council's water quality monitoring program has been in progress since October 1994. During 2002-2003, 36 sites were monitored on a monthly basis, of these sites,

17 sites were monitored twice a month. Sites selected for monitoring are representative of the major catchment and landuse types or are located to address specific water quality issues.

1.2.1 Physical and Chemical Monitoring

At each site physical measurements including pH, temperature, conductivity, dissolved oxygen and turbidity are recorded in situ. In addition, water samples are collected for laboratory analysis for suspended solids, faecal coliforms, total phosphorus, oxidised nitrogen, ammonia and total nitrogen. At Fishponds Waterhole and at selected estuarine sites, samples are collected for chlorophyll-a analysis and soluble reactive phosphorus. Samples for algal identification and cell counts are also collected at Berowra Waters and Calabash bay, where problematic algal species are known to occur. General observations recorded at each site include flow, weather conditions, presence of oily films, frothing, algae or nuisance organisms, odour and the colour/appearance of the water column. All samples are collected according to strict quality control procedures which assures the integrity of the results obtained. Data obtained from monitoring is then utilised to ascertain trends through time including spatial and temporal changes.

Areas of highest water quality were associated with the least disturbed catchments. Areas where the water quality was impacted or consistently degraded received impacts from either stormwater, high flows, periodic pollution incidents, sewer overflows or effluent discharges. All urban and industrial areas contribute the highest concentrations of contamination via stormwater runoff. The industrial areas at Thornleigh, Mount Kuring-gai and Hornsby continue to have poor water quality with high concentrations of suspended solids, nitrogen and faecal coliforms. Pollution from on-site disposal or pumpout of effluent is evident within the rural areas. Within the estuarine areas, high levels of nitrogen and chlorophyll-a at the ferry crossing and at Calabash Point are of major concern.

1.2.2 Biological Monitoring

Consultants for Council have completed the first year of a three year Macroinvertebrate and Diatom Monitoring Program. The program involved the sampling of 18 sites along creeks within the Shire in Spring 2002 (November) and Autumn 2003 (April). The sampling sites were located downstream of various land use types including; urban, rural, rural/urban and industrial. Macroinvertebrate and diatom sampling, in situ water quality readings, and habitat assessments were undertaken at each site. Water quality samples for chemical analysis were also collected at each site for Council.

A total of 4436 macroinvertebrate specimens from over one hundred taxa were collected during the program. The habitat assessments indicated that while creek substrate generally provided habitat considered suitable for macroinvertebrates and diatoms most of the sites were experiencing various levels of disturbance to the water quality and riparian zones. Generally, community diversity varied according to the predominant land use above each site. Communities at industrial and highly impacted urban sites were characterised by low species diversity, whereas communities at rural sites were highly diverse. The program to date indicates that the creeks in the catchment are being influenced by general land use patterns, but rather than these being related specifically to direct upstream or adjacent land uses, the sites appear to be being influenced at a catchment level. The ongoing nature of this program will allow for trends to be further analysed with more data in consultation with Council.

1.3 Strategy Development

The development of this Strategy incorporates a quantitative water cycle modelling package, including an E2 model (water and environment), and an end-use model (EUM) and options model (water and people). These models will reside with the Water Catchments Team at Council and will provide the capability to critically analyse particular management actions, and forecast consequences.

The models and Strategy are valuable tools for projecting the consequences of actions in response to development pressure. Hornsby Shire is required to house an additional 10590 people between January 2004 and June 2010 – an increase of 6.97%. The existing conditions outlined above indicate the implications of increased and changing land use on the water cycle, in terms of water quality, ecosystem health, and water consumption. Consequently, this impending development pressure in Hornsby Shire is of key importance for the Strategy.

Core to the development of the Strategy and modelling package were a set of project criteria formulated by the Council Water Catchments Team. The project criteria were designed to shape the Strategy by covering a diverse range of key total water cycle management issues, including concepts, tools, actions, principles, and metrics. This diversity required a structure to position criteria relative to each other, and to understand the diversity of ways of dealing with topics.

The framework developed by Robert (2000) known as The Natural Step (TNS) framework proved particularly useful in this instance because it provided a method for understanding how the multitude of concepts and tools (i.e. the project criteria) behind sustainable total water cycle management are placed relatively to each other and to the outcome.

The TNS framework (Robert 2000; Robert et al 2002) uses a hierarchical structure to explain key concepts and metrics for strategic planning and sustainability. At the top there are principles for how a system is constituted (ecological and social principles), which have principles for a favourable outcome for the system (sustainability). To reach this outcome there are principles for the process used (sustainable development). Problems will act as a barrier to achieving the outcome, which are addressed by a program of activities. The activities are followed by metrics (i.e. concepts for measuring and monitoring activities), which should be strategically used to measure alignment of activities with the principles for sustainability. Using the TNS framework, the criteria and Strategy are explained in more detail below.

1.3.1 Ecological principles

The TNS framework outlines key principles to describe the ecosphere such as principles of matter conservation, laws of thermodynamics, principles of biogeochemical cycles, and systematic shifts of the physical parameters of the biosphere. These are complex, challenging principles, which in essence mean that when we consider the total water cycle and formulate a sustainable strategy for it, we should consider the principles that describe how the biosphere is constituted i.e. the ecological principles.

For example, the hydrological regime of a catchment is characterised by the complex interaction of a range of factors including climate, geology, geomorphology, groundwater, evaporation and transpiration, terrestrial and aquatic ecosystems. The hydrological regime of a catchment is a key factor in determining the water quality characteristics of the catchment and in the availability and functioning of aquatic habitats, the riparian zone and associated ecosystems.

In Hornsby Shire, **hydrology** and **geomorphology** are central to the ecosphere, and the unique local hydrology - such as tributaries, creeks, estuaries, and river processes - and how it interacts with the geomorphology – such as the Hawkesbury Sandstone in the region - needs consideration in the context of the water cycle. For example, the Hawkesbury Sandstone and Wianamatta shales have varying water holding capacity and erosion potentials.

Like geomorphology, the **role of vegetation** in the water cycle is a key local consideration in the Bushland Shire. The extent of forest coverage and the topography of slopes and ridges will influence the volume of surface flows.

Strategically, Council should have concern about these principles when moving towards sustainability, but cannot control or influence these fundamental ecological principles. In the Strategy, actions for these principles reflect the ability of Council to play a role, for example, *undertake a review of the role of vegetation in the water cycle to understand its value as an asset contributing to sustainable total water cycle management.* Importantly, remaining mindful about the principles behind the ecosphere, is necessary in determining the different ways that society can damage it, which leads us to the next stage of the framework.

1.3.2 Sustainability principles

Principles for describing a favourable outcome are a little easier to define and understand than principles for the constitution of the system itself (i.e. the ecosphere). This stage has four system conditions for sustainability in the system – three conditions which can impact on the system and one overall societal driver for the other three conditions:

I. not increasing concentrations of substances extracted from the earth's crust

II. not increasing concentrations of substances produced by society

III. no physical impoverishment by over-harvesting or other forms of ecosystem manipulation, and

IV. resources are used fairly and efficiently in order to meet basic human needs

These system conditions are sustainability principles that if violated create stress on the ecological and social systems.

A number of our project criteria are system conditions for a sustainable total water cycle and some can be related to more than one system condition. The relevant criteria include:

- **water quality and pollutant sources,** and **cumulative impacts** (I & II)
- **aquatic ecosystem health** (I, II, & III)
- **water quantity, environmental flows, groundwater recharge and aquifer use,** and **intercatchment transfers** (III), and
- **flood protection,** and **Agenda 21** (IV).

At this level Council has concern about these concepts and in some instances an opportunity to influence them. To illustrate this stage in the Strategy we can highlight some examples where the Council is able to influence system conditions. Actions in the Strategy to *identify and map groundwater dependent ecosystems; investigate effects of pulses on Berowra Creek; identify areas of high, medium, and low aquatic ecological significance, including groundwater dependent ecosystems*, provide an indication of how Council can implement the Strategy using sustainability principles.

1.3.3 Sustainable Development

This stage of the framework sets out principles for a process to meet the principles for sustainability, i.e. principles for the transition towards sustainability. These include:

- appropriate substitution (i.e. replacing activities that are not compatible with the system conditions, with activities that are);
- flexible platforms to *technically* link short term with long term (i.e. ensuring that each step is a flexible platform for future activities in line with the system conditions);
- choose 'low hanging fruit' to *economically* link the short term with long term (i.e. providing a fast enough return on investment); and

- the precautionary principle, particularly when there is doubt whether activities comply with system conditions.

The project criteria at this stage of the framework include **extraction, potable water sources, usage, conservation, pricing and reuse, demand management, trade offs, ecological sustainable development principles, water sensitive urban design community values, capacity, timeframes and priorities.** Here, Council is able to influence these principles to ensure that they are transitioning to sustainability using appropriate processes.

Some actions incorporated into the Strategy to illustrate these principles include *ensure all new subdivision (infill and greenfield) incorporate water sensitive urban design principles into design layout and configuration; commit to collaborative and, where necessary, representative, community consultation: 'planning through debate'.* With these principles as a guide, Council are able to strongly influence and even control the activities they implement.

1.3.4 Activities

The TNS framework to this point acts as a guide for sustainable management activities for the total water cycle. The project criteria outlining activities that contribute to the strategy include a range related to sustainable management of the total water cycle. These include, **stormwater reuse; treatment techniques; infiltration, onsite retention, onsite detention; aquifer use; agriculture/irrigation; effluent treatment, infrastructure and reuse; onsite sewage treatment; incentives, rebates; licencing; planning – strategic and instruments; legislation and policy; development of technology (e.g. desalination); education and change management; research; and data gap analysis.**

These activities allow Council to address the problems that arise in the transition to sustainability. Examples in the Strategy include *Implement Council's Catchment and Sub-catchment Management Plans; Review the Sustainable Water Development Control Plan; Use E2 modelling and if necessary commission research to determine the implications of large scale water capture, storage, and use (e.g. household water tanks) on environmental flows, local ecology, flooding, and revise planning, design and construction practices where appropriate.* The actions that fall into this stage provide Council with an opportunity to take control of actions to ensure they alleviate problems that stand in the way of achieving sustainability. To ensure greatest benefit from activities, they should be measured and monitored.

1.3.5 Metrics

Monitoring and measuring the relevance of activities to sustainable development are an essential final part of the framework and Strategy. Metrics from our project criteria include **rural, urban and industrial sector analysis; water and energy budgets/balances; climate change predictive models; cost benefit analysis and triple bottom line reporting; key performance indicators; ecological footprint; future development scenarios – infill, redevelopment, greenfield, zonings; population and demand projections; land use and risk analysis.**

All of these criteria represent a measuring or monitoring process for actions within the Strategy. Examples include *Develop key performance indicators for water in Business Activities and internal service plans; Use EUM-E2 modelling capability to assess current water balance for Hornsby Shire;* ensuring that Council measure performance and reflect on the results and modify actions accordingly.

1.3.6 Using the TNS framework for sustainable management

The explanation of the TNS framework and Strategy examples outlined above for each stage implies the alignment of stages into the hierarchy to produce a path for sustainable

management. In linking the stages together, it is logical to progress through the hierarchy from principles, to actions and metrics.

Using the project criteria placed within the framework, we can see a logical pathway for Strategy actions that contribute to sustainable management of the total water cycle. For example, a critical task for catchment management is to ensure that catchment hydrology (*Ecosystem*) is carefully managed to ensure good water quality and healthy functional stream ecosystems (*Sustainability principles*). Principles for a process to achieve this may include the use of water sensitive urban design principles (*Sustainable development*), which requires a revision of the Sustainable Water Development Control Plan (*Activities*). Analysis of the water balance using modelling capabilities allows for measuring and monitoring (*Metrics*) against the original ecosystem principles.

Within the Strategy these project criteria concepts and tools lay the foundations for sustainable management. Placed in the TNS framework, we can understand the role of purpose of these concepts in the sustainable management of the total water cycle.

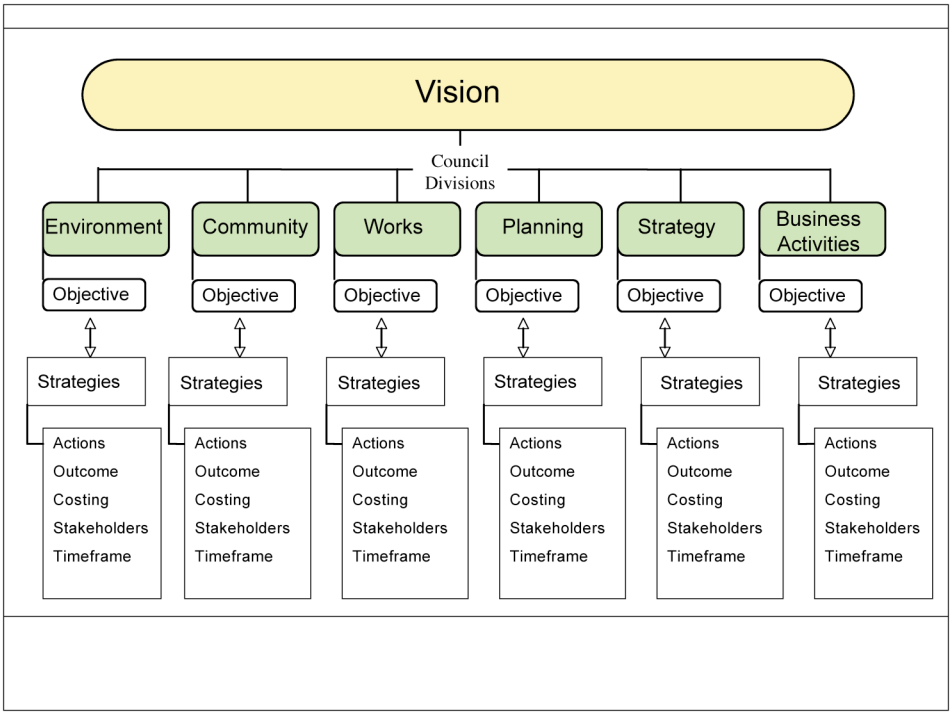
1.4 Strategy Format

The key principles behind the Strategy format are as follows:

- Strategic direction: the Strategy will inform, guide, and direct Council at a level of detail that will lay a framework for better decision making to meet the Council's vision for the water cycle;
- A total water cycle focus: the Strategy expands traditional thinking of water quantity and quality, to an understanding of the total water cycle. A better understanding of the water balance in the Shire and the implications of all activities on the water balance is key;
- Concentrated on Council control, influence, and concern in Hornsby Shire: the strategy involves and gains support of stakeholders in a framework of understanding key areas of control and influence by Council, and where there is a need for concern;
- Bringing together strategies, plans, and actions: links the broader Council goals and planning processes to achieve the vision; and
- Local community is key: where the local community need to be consulted, best practice process will be used.

The Strategy is set out so that each Council Division can understand what actions they are responsible for, and how their actions contribute to attaining the overall Vision. The Strategy is divided into sections that replicate Council (i.e. Divisions). Figure 1 shows how each Division are allocated strategies, and how each strategy has outcome and actions. Each action is allocated an indicative cost, potential stakeholders, and timeframe for implementation.

Figure 1: Strategy Structure



The stakeholders are separated into "primary", "secondary", and "passive". Primary Stakeholders are responsible for leading the action and are expected to play the principle role in the action. Secondary stakeholders are expected to assist the primary stakeholder, or play a smaller role in the action. The passive stakeholders are those effected by the action or whom have a stake in the action that necessitates their consultation.

The costs and timeframe are intended to indicate the size and timing of the action. The prioritisation of actions require consideration within the competing roles and responsibilities of the Council Division or Team in question.

2 SECTION 2: STRATEGY DOCUMENT

Vision: *to establish a sustainable total water cycle management strategy that enables an holistic approach to the management of water resources. The key goals include:*

1. *Mimic natural flows*
2. *Maintain and enhance water quality*
3. *Maximise efficiency and effectiveness of water use and reuse*
4. *Involve community through effective participation and learning*
5. *Promote a productive economy and contribute to the well being of Hornsby's people*
6. *Develop governance structures, provide incentives, and foster partnerships to achieve this vision.*

Objectives for Hornsby Shire Council Divisions:

1. Environment Division*: to develop, implement, communicate, monitor, and evaluate a sustainable total water cycle management strategy that enables an holistic approach to the management of water resources whilst protecting and enhancing Hornsby Shire's ecosystems*

2. Works Division*: to provide efficient and effective infrastructure, and to minimise impacts during and post construction, consistent with sustainable total water cycle management*

3. Planning Division: *to develop and implement efficient and effective land use planning and assessment to support sustainable total water cycle management*

4. Strategy Division: *to develop effective strategic tools to direct Hornsby Shire Council in achieving its vision for sustainable total water cycle management*

5. Business Activities*: to develop, implement and promote business activities, goods, and service provision, consistent with sustainable total water cycle management*

All Divisions: *to engage the community and provide the tools to allow the Hornsby community to make informed choices about sustainable total water cycle management*

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Objective: to develop, implement, communicate, monitor, and evaluate a sustainable total water cycle management strategy that enables an holistic approach to the management of water resources whilst protecting and enhancing Hornsby Shire's ecosystems

The Environment Division includes the following responsibility centres: Bushland and Biodiversity; Environment Customer Services; Environmental Health and Protection; Fire Control; Parks and Landscapes; Waste Management; and Water Catchments.

Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
1. Mimic natural flows					
1.1. Evaluate the water balance in Hornsby Shire	A summary of existing water flows through Hornsby Shire; a basis for benchmarking and prioritising future	Use EUM-E2 modelling capability to assess current water balance for Hornsby Shire; update every 5 years, or more frequently was key issues, trends and innovations arise, to show progress in understanding the total water cycle, e.g. water conservation, environmental flows, groundwater management, evapotranspiration, intercatchment transfers, source substitution, STP flows, and stormwater flows and	**Environment**, Planning, Strategy, *the Hornsby community*	**$$**	**Ongoing**

[1] Actions marked with an asterix (*) are current actions. All other actions are new actions.

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Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
	activities	reuse; use as a community engagement tool			
1. 2. Evaluate the implications of future development scenarios and population and demand projections on the water cycle	Improved understanding and management of the impact of development on the water cycle	Work with Planning Division to use EUM-E2 modelling capabilities to identify, quantify and evaluate the water balance implications under new planning development scenarios	**Environment**, Planning	**$**	**Ongoing**
		Work as part of a "Virtual Water Cycle" team to develop future and ongoing EUM-E2 modelling research and development needs, to understand and manage the implications of development on the total water cycle	**Environment, Planning, Strategy, Works**	**$$-$$$**	**Ongoing**
1.3. Identify, understand and implement environmental flows program	An environmental flow strategy that Council applies to development approvals	Model environmental flows pre European settlement and thus set flow targets for all waterways	**Environment**	**$**	**S**
		Develop and implement environmental flows strategy for Hornsby Shire, including objectives, timeframes, local business and community needs, the role of return flows, and contribution to improvements in river health for the Hawkesbury-Nepean River	**Environment**, local business, the Hornsby community, HNLGAG, HNCMA, DIPNR	**$$**	**S**
		Investigate management practices that would reflect more natural flow patterns to contribute to	**Environment**	**$**	**Ongoing**

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Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
		improvements in water quality in Hornsby Shire catchments			
		Communicate environmental flows program and monitor and report annually on the program outcomes	**Environment**, *the Hornsby community*	**$**	**Ongoing**
1.4. Evaluate implications of climate change on the water cycle	An understanding of what climate change means for Hornsby Shire, which Council can consider in its planning and operations	Maintain a watching brief on climate change trends and research relevant to sustainably managing the total water cycle in Hornsby Shire	**Environment**	**$**	**M-L**
		Undertake hydrological modelling and desktop assessment to investigate potential climate change impacts on the hydrological cycle in Hornsby Shire, including the impacts of sea level rise, and the implications for sustainable total water cycle management, including issues of storm intensity and interval, causing flooding in low lying riverbank areas (e.g. Wiseman's Ferry)	**Environment**, Works, Planning	**$$**	**M-L**
1.5. Understand local groundwater	The informed management of groundwater	Implement a groundwater study to determine areas of high, medium and low risk of over-extraction of groundwater resources	**Environment**, Works, Planning	**$$**	**S**

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Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
dependent systems	resources while protecting ecosystems and avoiding impact on the groundwater system in the short term	Identify and map groundwater dependent ecosystems	**Environment**	**$$**	**S**
		Map groundwater quality to identify the impact of unsewered areas and illegal waste water disposal	**Environment**	**$$**	**M**
		Using a risk assessment framework apply the precautionary principle to the management of groundwater resources through the development of a groundwater management strategy	**Environment,** Works, Planning, DIPNR	**$$**	**M**
		Implement recommendations from the Council's Maroota Groundwater Study, where appropriate	**Environment**	**$$**	**M**
		Monitor groundwater and communicate results to the Hornsby community and groundwater users on an annual basis	**Environment**, *the Hornsby community*	**$**	**M-L**
		Investigate groundwater discharge to creeks to identify where the main discharges occur	**Environment**	**$**	**M-L**
1.6. Identify and understand stormwater flows and implement	Planning and development that balances natural stormwater flows	With Council engineers, implement Council's Catchment and Sub-catchment Management Plans*	**Environment**, **Works**	**$$$**	**S-M**
		Assist Works Division to adopt Stormwater Trust's	**Works,**	**$**	**S**

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processes to help mimic natural flows	and flooding protection	(DEC) forthcoming *Managing Urban Stormwater* documents for best practice stormwater sensitive urban design, including stormwater treatment and detention, use of swales, detention prior to discharge off-site, drainage system capacity upgrades, and water sensitive streetscape design	Environment, DEC		
		Assist Planning Division to review the Sustainable Water (Water Sensitive Urban Design) Development Control Plan*	**Planning,** Environment, Works	**$**	**M**
		Assist Planning to incorporate best planning practices, including 'floodplain' risk management, into the Sustainable Water (Water Sensitive Urban Design) Development Control Plan, where appropriate*	**Planning**, Environment, Works	**$**	**M**
		Use E2 modelling and if necessary commission research to determine the implications of large scale water capture, storage and use (e.g. household water tanks) on environmental flows, local ecology and flooding, and revise planning, design and construction practices where appropriate	**Environment**, Works, Planning	**$$**	**M**

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Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
		Communicate Council's flow management of stormwater to the community in a way that enables them to make connections between their actions and the implications for receiving waters*	**Environment**, *the Hornsby community*	**$**	**S-M**
2. Maintain and enhance water quality					
2.1. Enhance water quality from stormwater flows	Plans, programs, and partnerships for improved stormwater quality	Assist Works to implement Council's catchment based Stormwater Management Plans*	**Works** Environment	**$$$**	**S**
		Implement Stormwater Trust's (DEC) forthcoming *Managing Urban Stormwater* documents, including integrated stormwater treatment and reuse systems, relevant to the attainment of Hornsby Shire water quality objectives	**Environment**, Works, DEC,	**$$-$$$**	**S**
		Directly consult with NPWS to understand the consequences of stormwater runoff from increased intensity of development and land use, and to enhance water quality in National Parks from stormwater pollution emanating from Hornsby Shire	**Environment,** NPWS, Works	**$**	**S**

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Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
		Use Catchment Remediation Rate program to help achieve water quality outcomes for stormwater by way of Capital Works Improvement Program and existing non-capital initiatives, e.g. street sweeping, spill response, education and industrial auditing*	**Environment,** Works	**$$$**	**Ongoing**
		Implement ongoing management and maintenance of stormwater quality improvement assets	**Environment,** Works	**$$$**	**Ongoing**
		Examine and implement opportunities for Hornsby Community to become 'pollutant trap watchdogs' where appropriate*	**Environment,** Works, The Hornsby Community	**$**	**Ongoing**
		Monitor, evaluate and report the success of managing stormwater quality asset performance*	**Environment,** Works, *The Hornsby Community*	**$**	**Ongoing**
2.2. Review and adapt water quality monitoring	An informed and experienced approach to water quality monitoring	Through an appropriate community engagement process (see All Divisions section), evaluate current water quality monitoring program to ensure it matches the environmental values the community wish to protect. Adapt if necessary	**Environment,** the Hornsby community	**$**	**S**

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Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
program		Review local water quality objectives, associated trigger values, and monitoring, in a manner consistent with the ANZECC/ARMCANZ (2000) Water Quality Guidelines	**Environment**	**$**	**S**
		Consolidate and synthesise water quality and estuarine health monitoring data and information, e.g. various studies at Cowan and Berowra Creeks, such as the Berowra Creek and Brooklyn Estuary Management Studies and Management Plans	**Environment**	**$$**	**S**
		Implement recommendations and findings from previous water quality studies, where appropriate e.g. Brooklyn Estuary and Cowan Process studies, Berowra Creek Estuary Management Plan, Brooklyn Estuary Management Study and Plan	**Environment,** Estuary Management Committees	**$$**	**S**
		Investigate effects of 'pulses' on Berowra Creek (hydrology, nutrient and pollutant loads)	**Environment**	**$$**	**S**
		Conduct review of best practice understanding and management of cumulative catchment impacts on water quality and identify implications and opportunities for Hornsby Shire to mitigate impacts	**Environment**	**$**	**M**

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Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
		Develop and implement water quality monitoring program based on past data, information, recommendations, and findings, current monitoring program, objectives and needs, community values, and options for enhancing water quality	**Environment**	**$$**	**M**
		Consult directly with DEC (NPWS) about 'in park' needs of the water monitoring program	**Environment, DEC**	**$**	**Ongoing**
		Evaluate water quality monitoring program biannually. Engage Hornsby community appropriately in setting criteria for evaluation. Revise where necessary*	**Environment,** the Hornsby Community	**$**	**M**
		Communicate water quality report card in the State of Environment reporting, and the water quality toolkit to Hornsby community*	**Environment**, *the Hornsby community*	**$**	**M**
2.3. Improve response and reduce potential for hazardous spills on water quality	An effective and rapid mechanism to respond to hazardous spills	Work with DEC (EPA) to respond to the DEC 24 hours pollution phone line, and examine and if necessary enhance capability in terms of spill response kits, resources, manuals and industry and transport education	**Environment, DEC**	**$**	**Ongoing**

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Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
2.4. Improve effectiveness of onsite sewage management	Enhanced onsite sewage management; reduced environmental and public health risks	Monitor and evaluate the effectiveness of Council's Onsite Sewage Management Strategy*	**Environment**	**$$**	**Ongoing**
		Conduct an onsite risk assessment, including links to all elements of the water cycle, and collect the necessary information for the first priority areas of Brooklyn, Mt Kuring-gai, Dangar Island and Cowan, to influence Sydney Water's Priority Sewage Program	**Environment, Sydney Water**	**$$**	**S**
		Develop a policy on treatment and reuse of onsite sewage	**Environment,** Sydney Water	**$**	**S**
		Communicate onsite sewage issues and management strategies to the community	**Environment,**	**$**	**Ongoing**
2.5. Improve effectiveness of bushland management	Integrated management of bushland and the total water cycle	Implement Council's Biodiversity Conservation Strategy related to improving the effectiveness of bushland management*	**Environment**	**$$**	**S**
		Implement Council's ICLEI Water Management Plan actions related to improving the effectiveness	**Environment**	**$$**	**S**

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Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
		of bushland management*			
		Develop resources to assist the community to make links between their actions and the role of bushland in the water cycle, including water storage, transpiration, and soil stabilisation*	**Environment**, *the Hornsby community*	**$**	**S**
		Develop incentives for community and business partnerships, to enhance the water cycle and bushland management*	**Environment,** The Hornsby community, local business, Business Activities	**$**	**S**
		Undertake a review of the role of vegetation in the water cycle to understand its value as an asset contributing to sustainable total water cycle management	**Environment**	**$**	**S**
		Develop a partnership strategy with DEC (NPWS)	**Environment,**	**$**	**S**

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Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
		to combat weed incursion via water flows into National Parks in Hornsby Shire	DEC (NPWS)		
2.6. Protect and enhance aquatic biodiversity	Coordinated management of aquatic biodiversity and the total water cycle	Implement Council's Biodiversity Conservation Strategy to protect and enhance aquatic biodiversity*	**Environment**	**$$**	**S**
		Implement the Hawkesbury Lower Nepean Catchment Blueprint actions relating to the protection of aquatic biodiversity*	**Environment**, HM CMA	**$**	**S**
		Implement the Sydney Harbour Catchment Blueprint actions relating to the protection of aquatic biodiversity*	**Environment**	**$**	**S**
		Work with the HN and Sydney Harbour's CMA on relevant new management frameworks	**Environment, HN CMA, SH CMA**	**$**	**Ongoing**
		Communicate aquatic biodiversity issues and strategies to the community	**Environment,** *the Hornsby community*	**$**	**S**
2.7. Protect and enhance areas of	Improved management of	Consolidate and synthesise water quality and biological monitoring data in terms of	**Environment**	**$**	**S**

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Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
aquatic ecological significance	aquatic ecosystems	benchmarking aquatic ecosystem health			
		Develop a catchment rating system for the purpose of identifying areas of high, medium and low aquatic ecological significance based on a set of ecological attributes such as habitat type, size, composition, representativeness, uniqueness and other attributes as derived from the ecological literature	**Environment**	**$**	**S**
		Identify areas of high, medium, and low aquatic ecological significance, including groundwater dependent ecosystems	**Environment**	**$**	**S**
		Map areas of aquatic ecosystem significance and high conservation value	**Environment**	**$**	**M**
		Use mapping to guide response to future development pressures	**Environment**	**$**	**M-L**
2.8. Protect and enhance the estuaries within (and adjacent to)	Enhanced management of estuaries	Work with Hornsby Shire's Estuary Management Committees to implement current Estuary Management Plans for Brooklyn and Berowra Creek*	**Environment**	**$**	**Ongoing**

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Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
Hornsby Shire		Continue to implement remote monitoring of estuaries for toxic algal blooms*	**Environment**	**$**	**Ongoing**
2.9. Control pollutant loads from Sewage Treatment Plants (STPs) and sewage system	Appropriate sewage collection, treatment, and disposal within the Shire	Evaluate effectiveness of nutrient reduction programs through ambient water quality and compliance monitoring*	**Environment, Sydney Water, DEC**	**$$**	**S**
		Work with Sydney Water to reduce duplication of monitoring downstream of STPs	**Environment, Sydney Water**	**$**	**S**
		Identify and prioritise sewer overflows for upgrade through a 'SewerFix' program to alleviate major sewage spills during storm events*	**Environment, Sydney Water**	**$**	**M**
		Collaborate with Sydney Water to assess potential sources of toxicants discharged from STPs and sewer overflows for the purpose of source control for priority toxicants	**Environment, Sydney Water**	**$$**	**M**
		Identify top 20 (by volume) industrial sewage producers and work with them as part of an environmental audit program to reduce volume and load going through the sewer	**Environment,** local industry, Sydney Water	**$$**	**M**

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Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
		Implement strategies of freshwater reduction from STPs and stormwater	**Environment,** Works	**$$**	**M**
2.10. Investigate options for distributed sewage treatment and dual reticulation in new or (re-) developed areas	A move towards more sustainable sewage treatment and reuse	Identify opportunities for and test the feasibility of distributed sewage treatment and dual reticulation in rezoned areas	**Environment, Sydney Water**	**$**	**M-L**
2.11. Enhance water quality from problem sites, agriculture and industries	Management of pollution intensive sites and processes	Audit existing agricultural and commercial horticultural sites to determine and quantify problems and links to the water cycle*	**Environment,**	**$$**	**S**
		Develop and implement best management practices for management of leachate and runoff from disused waste disposal sites and /or contaminated sites	**Environment, Works,** Business Activities	**$**	**M**
		Implement the Sustainable Businesses Program, including auditing existing industrial premises, to examine and assess water cycle related waste and	**Environment**	**$$**	**Ongoing**

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Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
		pollution management practices			
		Ensure waste management programs, including street sweeping, kerb side clean up service chemical clean out days, and litter collection services, are consistent with achievement of Council water quality objectives and sustainable total water cycle management*	**Environment,** Works	**$**	**M**
3. Maximise efficiency and effectiveness of water use and reuse					
3.1. Improve water conservation within Council	Management tools to reduce water consumption within Council	Implement Council water conservation policy through Council regulations, incentives and communication, and report on targets in the State of the Environment report*	**Environment,** Planning, Works, Strategy	**$$**	**M**
		Establish water use reduction campaign*	**Environment,** Strategy	**$**	**S**
		Audit water wastage within Council and report to the Community evidence of reductions to set an example and show leadership	**Environment,** Strategy,	**$**	**S**

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Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
		Collect water consumption data for Hornsby Shire Council and undertake end use modelling to forecast consumption and implement options for reducing water consumption through time	**Environment,** Sydney Water	**$**	**Ongoing**
		Use EUM capabilities to monitor water consumption rates within Council and the community and report on a regular basis in State of the Environment.	**Environment,** Sydney Water	**$**	**Ongoing**
		Implement Council's ICLEI Water Management Plan*	**Environment**	**$$-$$$**	**Ongoing**
		Compile results of Sydney Water's "Every Drop Counts" Corporate water diagnostic for HSC, and ICLEI's Water Campaign corporate initiatives, and identify and evaluate areas for further cost-effective water savings, e.g. strategies for all Pools, Parks, and Buildings	**Environment**, Sydney Water	**$**	**S**
3.2. Promote water conservation best practice in existing	Further water savings in existing sites	Use EUM to investigate and implement options that promote water conservation by existing residential and business end users; including free water audits for large non-residential users, institutions, industry, golf courses and bowling clubs, along with	**Environment,** Strategy	**$$$**	**Ongoing**

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Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
households and businesses		residential incentive schemes to retrofit			
3.3. Reduce water flow to STPs	Less pressure on the sewage system	Amend Council planning controls to reflect the introduction of BASIX*	**Environment,** Planning, DIPNR	**$**	**S**
		Develop a sustainable water management code for commercial and industrial premises	**Environment,** local business and industry	**$$**	**S**
3.4 Develop an overarching water recycling and reuse policy for Council	More effective water reuse across the Shire	Engage the community in the development of the reuse policy and criteria for evaluation of reuse options and communicate reuse and health issues and the implications of the Council reuse policy and specific strategies to the community	**Environment,** the Hornsby community	**$**	**S**
		Identify opportunities for effective reuse in urban and peri-urban areas, consistent with the forthcoming national water reuse guidelines and DEH regulations	**Environment,** DEH, Works	**$**	**S**
		Promote new National and Sydney Water guidelines for "fit for purpose" water use and best practice treatment technologies with Council and key	**Environment,** DEH, Sydney Water, local	**$**	**S**

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Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
		stakeholders	business		
3.5. Develop and implement water recycling and reuse for Council's high volume water uses	Council leading by example in implementing 'fit-for-purpose' water principles (i.e. the water quality cascade); Potable water savings by large water users within Council	Identify opportunities for water recycling, reuse, and sewer mining. Evaluate using EUM-E2 modelling capabilities, including an assessment of commercial and social viability and in consultation with potential reuse industries such as garden nurseries and parks	**Environment,** Sydney Water	**$**	**M**
		Encourage State Government agencies to develop health standards monitoring to enable water reuse in public pools, parks and sportsgrounds	**Environment,** Business Activities, NSW Health, DEH	**$**	**S**
		Identify and evaluate reuse options in the locality of Council Aquatic Centres, including opportunities for water reuse in swimming pools and implement and monitor preferred reuse options*	**Environment,** Business Activities, NSW Health, Works	**$**	**S**
		Identify, develop and implement on a priority or pilot basis, options for decentralised wastewater reuse and stormwater recycling for all 'developed' Hornsby Shire parks, including water saving irrigation technology trials, partnership opportunities (e.g. with Schools), onsite detention	**Environment,** Works, Business Activities	**$$**	**S**

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Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
		and use of stormwater, and groundwater irrigation and sewer mining*			
		Explore opportunities to fund implementation and monitoring of these initiatives e.g. national Water Smart Australia Program and Sydney Water rebates	**Environment,** Business Activities	**$**	**S**
		Engage the local community in the design and implementation of water recycling and reuse strategy for Hornsby Shire parks	**Environment,** *the Hornsby community*	**$**	**S**
		Develop and implement an evaluation program for the parks water reuse strategy against community-determined criteria for success and report in SOE	**Environment,** *the Hornsby community*	**$**	**M**
		Learn from reuse scheme for Council's nursery at Pennant Hills and develop strategy for implementation at other nurseries, depots and parks*	**Environment,** Works, Business Activities	**$**	**S**
		Monitor and evaluate the success of nursery reuse schemes*	**Environment,** Works, Business Activities	**$**	**M**

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Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
3.6. Develop reuse strategy for Child Care Centres in Hornsby Shire	An understanding of fit for purpose water use in Child Care Centres	Consult with parents of children at the centres to develop water reuse options	**Environment,** Corporate and Community Division, Business Activities	**$**	**M**
		Investigate and implement source substitution and water reuse options in Child Care Centres	**Environment,** Works, Corporate and Community Division, Business Activities	**$**	**M**
3.7. Develop a water use strategy for Hornsby Quarry	Sustainable total water cycle management for a key development site within the Shire	Identify local water use options for the future use and management of the Quarry pit, and determine quality and quantity of water source. Seek community feedback on those options. Evaluate water use options using options cost modelling and implement*	**Environment, Planning,** Works, Strategy, the Hornsby community	**$**	**M**
3.8. Design and implement a water reuse	An understanding of fit for purpose reuse of black	Using a least cost planning framework, re-evaluate sewer mining opportunities for reuse on Golf Courses in the Shire to identify barriers and	**Environment,** Sydney Water	**$**	**S**

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Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
strategy for the Hornsby Heights Sewage Treatment Plant (HHSTP) and West Hornsby Sewage Treatment Plant (WHSTP)	water	solutions to sewer mining, including recent developments in cost effective technologies.			
		Develop and implement HHSTP and WHSTP reuse strategy accordingly	**Environment,** Sydney Water	**$**	**M**
3.9. Develop and implement reuse strategy for the two major old refuse sites in Hornsby Shire, i.e. Foxglove Oval and Arcadia Oval	A water treatment and reuse strategy for old refuse sites	Conduct ecological risk assessment on current treatment facility at leachate site at Foxglove Oval	**Environment, Works**	**$$**	**S**
		Evaluate risk assessment and develop further options for collection, treatment and reuse at Foxglove Oval	**Environment**, **Works**	**$**	**S**
		Use findings to design and construct collection, treatment and reuse facilities for the leachate from Arcadia and other sites as identified.	**Environment**, **Works**	**$$$**	**M**
4. Involve community through effective participation and learning					

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Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
4.1 Contribute to community learning about sustainable total water cycle management	A community that understands sustainable total water cycle management	Communicate the Council Sustainable Total Water Cycle Management Strategy to the community, identifying their key roles, and facilitate education to understand the nature and importance of human impacts on water quality	**Environment,** Sydney Water	**$**	**Ongoing**
		Implement a community workshop or talk series to share water cycle research and works, and promote the valuable natural assets of Hornsby's waterways to the community, groups and clubs	**Environment,**	**$**	**S**
		Promote how community, groups and clubs can get involved in water cycle research and work	**Environment,**	**$**	**S**
		Continue to promote total water cycle education in schools, through activities and programs such as the Stormwater Activity Model*	**Environment**	**$**	**Ongoing**
		Facilitate discussion and debate about water use to understand changing community attitudes and use the outcomes to inform Council strategy	**Environment,** Strategy	**$**	**S**
			Environment,	**$**	**M**
		Promote programs to the community which are designed to minimise stormwater pollution, such as			

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Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
		an anti-rubbish tossing campaign*			
		Promote water cycle management measures to the community through Business Activities	**Environment, Business Activities**	**$**	**Ongoing**
4.2 Enable the community to meet their water conservation targets	A community that actively reduces its water use	Promote Council's Water Conservation Policy targets for the community as developed through the ICLEI Water Campaign*	**Environment,** Strategy, Sydney Water	**$**	**S**
		Develop and implement incentives for community based (including community groups and clubs) water conservation programs*	**Environment,** Strategy, Sydney Water	**$**	**S**
		Assist the community in accessing appropriate State Government incentives for water conservation	**Environment,** Strategy, Sydney Water	**$**	**Ongoing**
5. Promote a productive economy and contribute to the well being of Hornsby's people					
5.1. Ensure business can meet its needs from	Business working in harmony with the total water		**Environment,** Sydney Water, local business	**$$**	**S**
		Undertake a review of business water users and use EUM-E2 modelling capabilities to determine water quality and water quantity requirements. Work with			

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Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
water sources	cycle	Sydney Water to identify 'fit for purpose' water substitution, and meet water needs at least cost			
		Identify best practice water users in high water use industries and work with them to promote water conservation by others	**Environment,** Sydney Water, local business	**$**	**M**
		Evaluate Council regulations and identify opportunities to remove barriers to business in meeting their water needs. Where appropriate implement changes or remove regulations	**Environment, Planning,** Strategy, local business	**$**	**L**
5.2. Ensure the community can meet its lifestyle needs from water sources	Community living in harmony with the water cycle	Use community discussion and other research to understand public perceptions of water reuse and work annually with the community to evaluate success of the program	**Environment,** *the local community*	**$**	**S**
6. Develop governance structures, provide incentives, and foster partnerships to achieve this vision					
6.1 Management planning and management	Systems in place for sustainable total water cycle	Implement Sydney Water's Waterwise program*	**Environment**	**$**	**S**
		Incorporate principles of sustainable total water	**Environment**	**$**	**M**

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Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
systems	management within Council	cycle management into Council's Waste Reduction and Procurement Policy			
		Monitor trends in Council State of the Environment Reporting relating to sustainable total water cycle management and use this information to adapt management systems over time	**Environment,** Strategy	**$**	**Ongoing**
		Complete the required tasks to achieve ICLEI Water Campaign Milestones 4 and 5*	**Environment,** Strategy	**$$$**	**Ongoing**
		Ensure that implementation of this Strategy is consistent with the principles of the State Government forthcoming Sydney Water Sharing Plan, the Water Management Act 2000 and *Meeting the challenges: Securing Sydney's water future* , the Metropolitan Water Plan	**Environment**	**$**	**S**
		Maintain certification to ISO 14001(Environmental Management) and ISO 9001 (Quality Management)*	**Environment**	**$**	**Ongoing**
		Ensure sustainable total water cycle management is embedded into Council ISO 14001(Environmental Management) and ISO 9001 (Quality Management)	**Environment**	**$**	**Ongoing**

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Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
		management systems*			
6.2 Ensure adequate maintenance of new systems	Prolonged useful life of effective systems	Collaborate with Works to develop stream remediation techniques, and apply to drainage system maintenance*	**Works, Environment**	**$**	**S**
6.3. Build partnership with the Sydney Harbour Catchment Management Authority and Hawkesbury Nepean Catchment Management Authority and the Local Government Advisory Group	Partnerships to foster sustainable total water cycle management within the larger region	Influence and participate in relevant Catchment Management Authority strategies, and the Sydney Coastal Councils Group, to assist regional total water cycle management*	**Environment,** HNCMA, HNLGAG, SHCMA, SCCG	**$**	**S-M**
		Develop and implement key actions for Hornsby Shire, from the Catchment Blueprint for the Hawkesbury Nepean*	**Environment,** HNCMA, HNLGAG, DIPNR	**$**	**S**
		Develop and implement key actions for Hornsby Shire, from the Catchment Blueprint for Sydney Harbour*	**Environment,** DIPNR, SHMA	**$**	**S**
6.4. Build	Partnerships to	Implement actions targeted at sustainable total water	**Environment**	**$**	**S**

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Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
partnerships with the State Government and other Local Government jurisdictions	foster sustainable total water cycle management within the larger region	cycle management in the Strategic Plan of Management for the Hawkesbury Nepean Catchment and River System, where appropriate*			
		Foster partnerships with other jurisdictions where their activities effect sustainable total water cycle management in Hornsby Shire, or where Hornsby Council affects other jurisdictions	**Environment, State and Local Government**	**$**	**Ongoing**
		Implement actions targeted at sustainable total water cycle management in the Sydney Regional Environment Plan, where appropriate*	**Environment,** Planning	**$**	**M**
6.5 Build long term collaborative research opportunities where appropriate	Partnerships to foster research on sustainable total water cycle management	Explore and pursue strategic collaborative research opportunities with relevant institutions, e.g. universities, CRC's and Sydney Water*	**Environment**	**$**	**Ongoing**
		Examine the potential to set up a water cycle research committee with relevant institutions	**Environment**	**$**	**M**
6.6.Expand funding options for the Catchment	Effective use of the Catchment Remediation Rate	Expand options for funding from the Catchment Remediation Rate using an integrated planning approach to include water quantity and reuse issues	**Environment,** Strategy, Works	**$**	**S**

ENVIRONMENT

Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
Remediation Rate to include TWCM	for sustainable total water cycle management	Communicate to the community the best value for money CRR investment	**Environment,** Strategy,	**$**	**S**
6.7. Promote the uptake of business incentives in sustainable total water cycle management	Business which understands and acts on its role in sustainable total water cycle management	Develop business incentives for sustainable total water cycle management	**Strategy, Environment,** Business Activities	**$**	**S**
		Work with Business Activities to develop key performance indicators for water in Business Activities. Monitor performance and act to improve performance.	**Environment, Business Activities**	**$**	**Ongoing**
		Investigate funding options for incentive programs, e.g. rebates, funding deals with financial institutions	**Environment**	**$**	**S**
		Implement the Sustainable Businesses Program to achieve better water conservation by business	**Environment**	**$$**	**Ongoing**
6.8. Enhance incentives for sustainable total	Incentives that create change	Use scenario modelling to identify scenarios with the best sustainable total water cycle outcomes, including the use of best available incentive options	**Environment,**	**$**	**S**

ENVIRONMENT

Goal / Strategy (what/why)	Outcome (results)	Action (how) [1]	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
water cycle management		Implement the Council's ICLEI Water Management Plan*	**Environment**	**$**	**Ongoing**
		Identify how incentive programs, e.g. Every Drop Counts, can be incorporated into the Council's planning instruments	**Environment, Planning**	**$**	**S**
6.9. Devise and implement simple, understandable and useful criteria for assessing progress towards sustainable total water cycle management vision	Shared understanding of achievements and future targets	Collaborate across Council to devise and implement an effective community engagement process to identify sustainable total water cycle management progress indicators that meet best practice requirements (e.g. significance and relevance; ability to show changes over time; within Council's capacity to control and/or influence; understandable and easy to communicate to others; establish targets and promote remedial action; available data; and reasonable cost)	**All Divisions**	**$**	**S**

WORKS

2.2 WORKS

Objective: to provide efficient and effective infrastructure and to minimise impacts during and post construction, consistent with sustainable total water cycle management

The Works Division is responsible for technical, management and education services to develop and maintain Hornsby Shire's infrastructure, including roads, drains, and Council and community buildings and amenities. It includes the responsibility centres of Assets, Design and Construction, Engineering Services, Traffic & Road Safety, Property Development and Aquatic Centres.

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders **Primary** Secondary *Passive*	Cost **$** < 50k **$$** 50-100k **$$$** > 100k	Timeframe **S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
1. Mimic natural flows					
1.1 Achieve greater balance between mimicking natural flows and flood prevention	Infrastructure that reduces the impact of human settlement on the water cycle, whilst protecting human settlement from the water cycle	Adopt Stormwater Trust's (DEC) forthcoming *Managing Urban Stormwater* documents for best practice stormwater sensitive urban design, including stormwater treatment and detention, use of swales, detention prior to discharge off-site, and water sensitive streetscape design	**Works,** Environment, Business Activities, DEC	**$$-$$$**	**S**
		Assist Planning to incorporate best planning practices, including 'floodplain' risk management, into Sustainable Water (Water Sensitive Urban Design) Development Control Plan, where appropriate*	**Planning**, Works, Environment, DEC	**$**	**M**

WORKS

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
		Continue to advocate Council's 'non-piping of creeks' policy and maintenance and renewal of urban drainage lines*	**Works,** Planning, Environment	**$**	**Ongoing**
		Revise and implement cost prioritisation model to include triple bottom line elements embodied by the Sustainable Total Water Cycle Management Strategy vision	**Works,** Environment	**$**	**S**
		Seek advice on rain tanks and onsite detention needs and solutions for Hornsby Shire, including the implications of poorly maintained onsite detention equipment	**Works**, Environment, Planning	**$**	**S**
		Include in design briefs the potential for multi-objective roles of infrastructure, e.g. sports fields as detention basins, and implement multi-objective infrastructure where appropriate*	**Works**, Environment	**$$$**	**Ongoing**
		Implement water sensitive urban design features including grass swales, sloping footpaths away from roads, permeable surfaces, and reused material, where appropriate*	**Works**, Environment	**$$$**	**Ongoing**
		Consider purchasing 'problem area' properties to reconfigure major 'quantity' assets to deliver	**Works,** Strategy	**$**	**Ongoing**

WORKS

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
		environment and public health outcomes*	Environment		
		Work as part of a "Virtual Water Cycle" team to develop future and ongoing EUM-E2 modelling research and development needs, to understand the implications of development on the total water cycle	**Environment, Planning, Strategy, Works**	**$$-$$$**	**Ongoing**
1.2. Balance public health risks with mimicking natural flows	An understanding of the risks involved with transporting water	Review risk assessment of drainage infrastructure and devise and implement balanced responses that protect natural stream lines, adequate ecosystems, human health and infrastructure	**Works,** Environment	**$$**	**S**
2. Maintain and enhance water quality					
2.1 Integrate water quality and quantity (flooding) operational outcomes in all works projects	An operational understanding of the total water cycle in construction and maintenance of infrastructure	Apply water sensitive urban design techniques / principles / controls from Stormwater Trust's (DEC) forthcoming *Managing Urban Stormwater* documents in site planning, residential design, commercial, industrial and construction site management	**Works,** Planning, Environment, DEC	**$$-$$$**	**Ongoing**
		Collaborate with Environment Division to implement findings and recommendations from Stormwater Catchment and Sub-catchment	**Works**, Environment	**$$**	**S**

WORKS

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
		Management Plans*			
		Collaborate with water catchments team to co-fund integrated water quality and quantity outcomes	**Environment, Works**	**$-$$$**	**Ongoing**
		Collaborate on and contribute to a stormwater quality improvement program as per the Catchment Remediation Rate 5 year program*	**Environment, Works**	**$$$**	**S-M**
		Incorporate findings from Catchment Remediation Rate capital works performance reports into stormwater quality management works*	**Works**, Environment	**$**	**S**
		Apply lifecycle asset management principles to stormwater infrastructure	**Works, Environment**	**$**	**Ongoing**
2.2 Minimise water quality impacts during Works projects	Best practices for reducing water quality impacts of construction and maintenance of infrastructure	Implement Stormwater Trust and State guidelines best practice in water sensitive urban design processes, particularly Erosion and Sediment Control (Vols 1 + 2), and the Council Sustainable Water best practices booklet (Vol 1 & 2)	**Works,** Environment, DEC	**$$**	**Ongoing**
2.3. Enhance water quality from problem sites	Management of pollution intensive sites and processes	Collaborate with Environment Division to implement best management practices for management of leachate and runoff from current and former waste disposal sites, depots, and	**Works, Environment,** Business	**$**	**S**

WORKS

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
		material handling facilities, unsealed rural roads, road shoulders and stockpile sites	Activities		
2.4 Improve delineation of responsibility between Council and State Government for foreshores	A productive working relationship with State Government to maintain and improve foreshores	Strengthen partnerships with key State Government agencies to work more collaboratively towards agreed outcomes for foreshore protection and preservation	**Works,** State Government	**$**	**Ongoing**
2.5. Control pollutant loads from Sewage Treatment Plants (STPs) and sewage system	Appropriate sewage collection, treatment, and disposal within the Shire	Collaborate with Environment Division to implement strategies of freshwater reduction from STPs and stormwater	**Environment,** Works	**$$**	**M**
3. Maximise efficiency and effectiveness of water use and reuse					
3.1 Maximise water efficiency in Council buildings, including	Best available water saving devices in Council buildings and operations	Implement and maintain water efficient devices according to specifications and prioritise retrofitting of existing assets consistent with Council's Water Conservation Policy targets*	**Works,** Business Activities, Environment	**$$**	**S**

WORKS

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
recreational facilities		Implement, monitor and report on Council's Water Conservation Policy*	**Environment, Works**	**$**	**Ongoing**
		Monitor and report on water use in existing water efficient buildings*	**Environment, Works**, Business Activities	**$**	**Ongoing**
3.2. Develop and implement reuse strategy for Council's Nursery	Potable water savings by large water users within Council	Learn from reuse scheme for Council's nursery at Pennant Hills and develop a strategy for implementation at other nurseries, depots and parks, and monitor and evaluate the success of water reuse schemes	**Environment, Works, Business Activities**	**$**	**Ongoing**
3.3 Maximise sound water reuse in Council buildings and assets, including recreational facilities	Source substitution in Council buildings and operations	Maximise effective use of recycled water in capital works program	**Works,** Environment, Business Activities	**$$**	**Ongoing**
		Monitor and evaluate actual use and/or security of supply from existing alternative water sources e.g. raintanks at Thornleigh Depot. Use this local information to inform subsequent design, costing, and pricing of new installations	**Works,** Environment, Business Activities	**$$**	**S**
		Implement and monitor effectiveness of Works components of Environment's water reuse	**Works,**	**$**	**Ongoing**

WORKS

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
		strategies for Council's assets	Environment		
		Collaborate with Environment Division to investigate barriers and solutions to options for water efficiency and water reuse in Child Care and other service centres	**Works,** Environment, Corporate and Community Division, Business Activities	**$**	**S**
4. Involve community through effective participation and learning					
4.1 Engage community in resolving trade-offs	A sustainable approach to resolving water cycle trade offs	Collaborate with Environment Division to support an appropriate community process to determine criteria for resolving trade-offs between environmental, societal, and financial outcomes for design and construction projects for sustainable water cycle management	**Environment,** Works, *the Hornsby community*	**$**	**Ongoing**
		Collaborate with Environment Division to support an appropriate consultation process to deliberate on Council's range of responses to legal advice about risk assessment of stormwater and related infrastructure	**Environment,** Works, *the Hornsby community*	**$**	**Ongoing**

WORKS

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
5. Promote a productive economy and contribute to the well being of Hornsby's people					
5.1 Review opportunities in planning controls to require contributions to infrastructure provision	Total water cycle management approach to S94 contributions	Review and revise S94 contribution plan for drainage. Consider and integrate where appropriate, biodiversity, environmental flows, and groundwater recharge into S94 contributions.	**Strategy,** Planning, Works	**$**	**M**
6. Develop governance structures, provide incentives, and foster partnerships to achieve this vision					
6.1 Continue capacity building within Council to implement best practice sustainable total water cycle management measures	Further enhanced staff understanding about how to implement total water cycle management	Apply outcomes from Stormwater Trust's (DEC) forthcoming *Managing Urban Stormwater* documents	**Works, DEC,** Environment,	**$**	**S**
		Works staff to attend relevant conferences, short courses and training workshops on water cycle management (where appropriate)	**Works**	**$**	**Ongoing**

WORKS

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
6.2 Create partnerships with Council stakeholders	A network for better sustainable total water cycle management in Works programs	Provide opportunities for Councillors to visit TWCM sites to experience issues and observe solutions firsthand	**Works,** Councillors	**$**	**Ongoing**
		Collaborate with water catchments team to co-fund quality and quantity outcomes, e.g. backwash water treatment and reuse at aquatic centres	**Works,** Environment,	**$$-$$$**	**Ongoing**
		Maintain, enhance, and identify opportunities for collaboration with best practice Government agencies e.g. Stormwater Trust (DEC)	**Works,** Environment, DEC, DIPNR, Sydney Water	**$**	**Ongoing**
		Collaborate with Environment to consult with community on contentious sustainable total water cycle management issues	**Works,** Environment	**$**	**Ongoing**
6.3 Ensure sustainable total water cycle management works are prioritised to provide greatest benefits	Methods to prioritise Works on a sustainability basis	Apply Strategic Asset Management (e.g. risk cost processes) to identify locations/actions that provide best outcome from sustainable total water cycle management retrofit/refurbishment/upgrade*	**Works,** Environment	**$**	**Ongoing**
		Use integrated resource planning to determine whole of society costs (including business and community) and rank order of works projects	**Works,** Environment	**$**	**Ongoing**

WORKS

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
6.4 Balance capital and operating costs for new and existing infrastructure	Skills and practice in methods that deliver better outcomes at least cost	Implement Strategic Asset Management to use risk-cost techniques to identify best opportunities for investment and trade-offs between infrastructure capital and operating costs*	**Works,** Environment	**$$**	**Ongoing**
		Investigate innovative funding and/or management approaches that enable installation of infrastructure with higher than average operating costs but high environmental and/or societal benefits	**Works**	**$**	**Ongoing**
6.5 Ensure adequate maintenance of new systems	Prolonged use of effective systems	Collaborate with Strategy and Planning to develop innovative arrangements to encourage quality maintenance of systems e.g. performance contracting, etc	**Works, Strategy, Planning**	**$**	**S**
		Collaborate with Environment to develop stream remediation techniques, and apply to drainage system maintenance*	**Works, Environment**	**$**	**S**
		Review maintenance performance biannually and act on outcomes*	**Works**	**$**	**Ongoing**

PLANNING

2.3 PLANNING

Objective: to develop and implement efficient and effective land use planning and assessment to support sustainable total water cycle management

The Planning Division seeks to strike a sustainable balance between meeting the needs of Hornsby Shire's growing population and protecting the natural environment. It encompasses the responsibility centres of Assessment Teams (1) and (2), Subdivisions, Town Planning Services, and Customer Service.

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
1. Mimic natural flows					
1. 1 Evaluate the implications of future development scenarios and population and demand projections on the total water cycle	An understanding of the impact of development on the water cycle	Work with Environment Division to use EUM-E2 modelling capabilities to identify and measure the water balance under new planning development scenarios	**Environment,** Planning	**$**	**Ongoing**
		Work as part of a "Virtual Water Cycle" team to develop future and ongoing EUM-E2 modelling research and development needs, to understand the implications of development on the total water cycle	**Planning, Environment, Strategy, Works**	**$$-$$$**	**Ongoing**
1. Mimic natural flows					

PLANNING

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
and **2. Maintain and enhance water quality**					
2.1 Ensure effective planning instruments to align and integrate water quality and water quantity concerns and outcomes	The best available planning framework for sustainable total water cycle management	Ensure principles within the Sustainable Water (Water Sensitive Urban Design) Development Control Plan are consistent with BASIX for water conservation and reuse including, efficiency first, then all sources (rainwater, stormwater, wastewater), and end uses (new and existing residential and non residential)*	**Planning,** Environment, DEUS	**$$**	**M**
		Implement Stormwater Trust's (DEC) forthcoming *Managing Urban Stormwater* documents by applying water sensitive urban design techniques / principles / controls in the assessment of development applications incorporating site planning, residential design, commercial, industrial and construction site management	**Planning,** Environment, Works, DEC	**$$-$$$**	**M**
		Revise the Council's Sustainable Water (Water Sensitive Urban Design) Development Control Plan and Best Practices Manual to incorporate best planning practices, including, flood plain management, the installation of water quality	**Planning,** Environment, Works, DEC	**$-$$**	**M**

PLANNING

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
		treatment devices, protection and remediation of urban streams and watercourses, maximum retention of natural watercourses and buffer zones in new developments, and the initiation of soil and water management plans, in development applications*			
		Devise innovative mechanisms (e.g. partnerships, bonds, incentives etc) to maintain and protect riparian corridors and conserve biodiversity	**Planning,** Environment, Strategy	**$**	**M**
		Collaborate with Environment to determine the implications of large scale water capture, storage and use, on local ecology and flooding and revise planning design and construction practices, where appropriate	**Environment, Planning,** Works	**$**	**M**
		Incorporate sustainable total water cycle management into the new comprehensive Hornsby Shire LEP (as part of the DIPNR mandated planning reforms)*	**Planning,** Environment, DIPNR	**$**	**M**
		Ensure all new subdivision (infill and greenfield) incorporate water sensitive urban design principles into design layout and configuration*	**Planning,** Environment	**$**	**Ongoing**

PLANNING

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
2.2 Ensure best practice documents are reflected in Council planning controls	Latest knowledge and best practice in planning decisions	Participate in capacity building for Stormwater Trust's (DEC) forthcoming *Managing Urban Stormwater* strategy	**Planning,** DEC	**$**	**M**
		Incorporate Stormwater Trust's (DEC) forthcoming *Managing Urban Stormwater* strategies into Council's stormwater best practice and planning controls	**Planning,** Works, DEC	**$-$$**	**M**
3. Maximise efficiency and effectiveness of water use and reuse					
3.1. Ensure best practice water conservation for indoor/outdoor water use in new developments	Effective use of planning instruments for water saving in new developments	Devise innovative mechanisms (e.g. partnerships, bonds, incentives etc) to ensure best practice indoor/outdoor water use, and BASIX compliance, in new developments	**Planning,** Environment, Strategy	**$**	**M**
3.2. Develop a water use strategy for Hornsby Quarry	Sustainable total water cycle management for a key development site within the Shire	Collaborate with other Council Divisions to identify, evaluate and (where appropriate) implement local water use options for the future use and management of the Quarry pit*	**Planning, Environment,** Strategy, Works	**$**	**M**
4. Involve community through effective participation and learning					

PLANNING

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
4.1. Ensure community ownership of local planning controls	An understanding in the community of total water cycle management achievements and future targets	Collaborate across Council to devise and implement an effective community engagement processes to identify sustainable total water cycle management progress indicators that meet best practice requirements (e.g. significance and relevance; ability to show changes over time; within Council's capacity to control and/or influence; understandable and easy to communicate to others; establish targets and promote remedial action; available data; and reasonable cost)	**All Divisions**	**$**	**Ongoing**
5. Promote a productive economy and contribute to the well being of Hornsby's people					
5.1. Ensure planning controls encourage business and community to meet their sustainable water targets	Use of planning instruments to ensure local businesses are working in harmony with the total water cycle	Revisit the recommendations from the Industrial Lands Review and consider the inclusion of total water cycle sensitivities in the Environment Protection element of the Industrial Lands DCP	**Planning,** Environment	**$**	**M**
		Negotiate with State Government for special dispensation regarding planning controls over development applications for "sensitive areas" in terms of water cycle and ecology where	**Planning,** Environment, DIPNR	**$**	**M**

PLANNING

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
		appropriate.			
5.2. Ensure planning controls and policy provide the certainty in land use and water allocations that business need to ensure a productive economy	Business working in harmony with the total water cycle	Collaborate with Environment and Strategy to identify and evaluate Council regulations for opportunities to remove barriers to business in meeting their water needs while providing certainty and meeting the intention of the regulation and ecological needs, and where appropriate implement changes or remove regulations	**Planning, Environment, Strategy**, local business	**$**	**M**
5.2. Ensure that sustainable water service provision is a key consideration in long term population and development planning	An understanding of the needs for planning sustainable water service provision	Work with Environment Division to use EUM-E2 modelling capabilities to identify sustainable water provision, decentralised sewage treatment opportunities, and water balance, in long term decision making and planning for expansion and development in Hornsby Shire	**Environment,** Planning, Strategy,	**$$**	**L**
6. Develop governance structures, provide incentives, and foster partnerships to achieve this vision					

PLANNING

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
6.1. Promote compliance	Ensure greater implementation of planning controls	Investigate opportunities to establish a system of incentives within the planning system to promote compliance with planning requirements for sustainable total water cycle management	**Planning,** Environment, Strategy	**$**	**M**

STRATEGY

2.4 STRATEGY

Objective: to develop effective strategic tools to direct Hornsby Shire Council in achieving its vision for sustainable total water cycle management

The Strategy Division is key to coordinating change and development within Council. It encompasses the responsibility centres of Strategic Direction, Quality Systems, Human Resources, and Development Contributions.

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
1. Mimic natural flows					
1.1 Evaluate the implications of future development scenarios and population and demand projections on the total water cycle	An understanding of the impact of development on the water cycle	Work as part of a "Virtual Water Cycle" team to develop future and ongoing EUM-E2 modelling research and development needs, to understand the implications of development on the total water cycle	**Environment, Planning, Strategy, Works**	**$$-$$$**	**Ongoing**
1. Mimic natural flows **and**					

STRATEGY

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
2. Maintain and enhance water quality					
2.1. Promote effective integration of water quantity and quality at the strategic level	A strategy to integrate water quantity and water quality management within Council	Collaborate with Council Divisions to ensure the implementation of Council's Water Conservation Policy*	**Environment, Works, Strategy** Planning,	**$**	**Ongoing**
		Collaborate with the internal "virtual water cycle" team to ensure integration of water quality and water quantity works and within Council's Management Plan	**Strategy,** Environment, Planning, Works	**$**	**S**
3. Maximise efficiency and effectiveness of water use and reuse					
3.1. Promote water conservation within Council	A strategic approach to conserving water within Council	Ensure Council's Water Conservation Policy is incorporated into Council strategy documents, where appropriate*	**Strategy**	**$**	**S**
		Collaborate with Environment to establish a water use reduction campaign*	**Environment,** Strategy,	**$**	**S**
		Collaborate with Council Divisions to ensure a sustainable water use outcome for the Hornsby	**Planning, Environment,**	**$**	**S**

STRATEGY

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
		Quarry*	Works, Strategy		
		Promote the implementation of the vision and actions in Council's Sustainable Total Water Cycle Management Strategy to Council's Business Activities	**Strategy,** Business Activities, Environment	**$**	**S**
4. Involve community through effective participation and learning					
4.1. Empower the community to meet their water conservation targets	A local community that actively attempts to reduce its water use	Assist with Environment to promulgate the Council Water Conservation Policy and develop incentives for the Hornsby community to reduce their water consumption*	**Environment,** Strategy, the Hornsby community	**$**	**S**
		Assist the Hornsby community to access State Government incentives for water conservation	**Environment, Strategy,** *the Hornsby community*	**$**	**Ongoing**
4.2. Contribute to community learning about total water cycle management	A community that understands sustainable total water cycle management	Collaborate with Environment to facilitate discussion and debate to better understand changing community attitudes about water use and incorporate outcomes into Council strategy	**Environment,** Strategy, *the Hornsby community*	**$**	**Ongoing**

STRATEGY

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders **Primary** Secondary *Passive*	Cost **$** < 50k **$$** 50-100k **$$$** > 100k	Timeframe **S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
5. Promote a productive economy and contribute to the well being of Hornsby's people					
5.1. Incorporate total water cycle management principles into S94 decision making	Total water cycle management approach to S94 contributions	Ensure that principles and actions of Council's Sustainable Total Water Cycle Management Strategy are incorporated into S94 decision making	**Strategy,** Environment	**$**	**S**
5.2. Ensure business can meet its needs from water sources	Business working in harmony with the total water cycle	Collaborate with Planning to evaluate Council regulations and identify opportunities to remove barriers to business in meeting their water needs while meeting ecological needs, and where appropriate implement changes or remove regulations	**Planning, Environment, Strategy**, local business	**$**	**S**
6. Develop governance structures, provide incentives, and foster partnerships to achieve this vision					
6.1. Ensure global water strategies filter through to Hornsby Council	Total water cycle management based upon latest international principles of ecological sustainable	Implement Global Water Partnership integrated water resource management and water efficiency strategies, along with principles of ecological sustainable development, where appropriate	**Strategy,** Environment	**$**	**S**

STRATEGY

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders **Primary** Secondary *Passive*	Cost **$** < 50k **$$** 50-100k **$$$** > 100k	Timeframe **S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
	development				
6.2 Ensure adequate maintenance of new systems	Prolonged useful life of effective systems	Collaborate with Works to develop innovative arrangements to encourage quality maintenance of systems, e.g. performance contracting arrangements, environmental bonds, etc, and annually review quality of systems maintenance	**Works,** Strategy	**$**	**S**
6.3. Promote the uptake of business incentives in sustainable total water cycle management	Business which understands and acts on its role in sustainable total water cycle management	Develop business incentives for sustainable total water cycle management	**Strategy, Environment,** Business Activities	**$**	**S**
6.4. Devise simple, understandable and useful criteria for assessing progress towards Sustainable Total Water Cycle Management vision	An understanding of what has been achieved and what needs to be achieved next	Collaborate across Council to devise and implement an effective community engagement process to identify Sustainable Total Water Cycle Management key performance indicators that meet best practice requirements (e.g. significance and relevance; ability to show changes over time; Council's capacity to direct control and/or influence the indicators; understandable and easy to communicate to others; establish targets and promote remedial action; available data; and	**Environment,** Strategy, *the Hornsby community*	**$**	**Ongoing**

STRATEGY

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
		reasonable cost)			
6.5. Maintain a useful and appropriate Sustainable Total Water Cycle Management Strategy	A useful and appropriate strategic direction for sustainably managing the total water cycle	Review this Strategy document in the medium term to ensure that it remains useful and appropriate	**Strategy**, Environment	**$$**	**M**

ALL DIVISIONS

2.5 ALL DIVISIONS

Objective: to engage the community and provide the tools to allow the Hornsby community to make informed choices about sustainable total water cycle management

Hornsby Shire are an active community and the implementation of this Strategy is an opportunity to direct this energy. This section runs in parallel with the technical water cycle management actions in other sections and should be consulted for all other actions and implemented appropriately.

In this section, the elements of the vision are brought together. This section is focused on enabling the community to be active participants in the decisions and actions to meet the vision[2]. There are two elements to this. The first is about the nature of the consultation processes that will ensure better TWCM outcomes. The second is about enabling behaviour change in the community at large. Effective information provision is just the first step in this process. Identifying perceptions and motivations through consultative processes and then influencing these through campaigns, incentives, and regulatory processes are essential for enabling learning, which is the pre-requisite for behaviour change.

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
Consultative Processes					
Use 'Ideas for community consultation' (Carson and	Engagement and consultation processes that ensure better total water cycle	Ensure the principles for effectiveness (make it timely, inclusive, community-focussed, interactive, deliberative, effective, matter, well-facilitated, open, fair, subject to evaluation, cost-effective, and	**Appropriate Division,** *the Hornsby community*	**$**	**Ongoing**

[2] Some elements of the Community Services Team's activities are significant water consumers. These internal opportunities are dealt with under the Works division (Assets).

ALL DIVISIONS

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
Gelber 2001) to foster effective community engagement processes for TWCM decisions and outcomes	management outcomes	flexible) are embedded in the community consultation processes			
		Commit to collaborative and, where necessary, representative, community consultation: 'planning through debate'	**Appropriate Division,** *the Hornsby community*	**$**	**Ongoing**
		Use the 4-step model (visioning, operationalising, testing, and evaluation) to design and implement community consultation	**Appropriate Division,** *the Hornsby community*	**$**	**Ongoing**
		Match the community consultation process (e.g. citizen's jury, deliberative polls, consensus conferences, focus groups, charrette, residents feedback panels) to the total water cycle management issue	**Appropriate Division,** *the Hornsby community*	**$**	**Ongoing**
Communicative Processes					
Use the outcomes of the consultative	An understanding of community	Use consultation participants as part of the evaluation of the actions, campaigns, tools, etc	**Appropriate Division**	**$**	**Ongoing**

ALL DIVISIONS

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
processes to identify stakeholder/learner motivations and knowledge gaps and needs	perceptions about and motivations towards the water cycle	Ensure residents of non-English speaking heritage or with English as a second language are adequately consulted and appropriately targeted*	**Appropriate Division**	**$**	**Ongoing**
Provide water cycle information that is important and useful from the community's perspective	A community that understands their place in the water cycle, is aware of the impacts of their actions on the water cycle, and is likely to choose to act to sustain a healthy total water cycle	Develop and provide information to the community that is useful in helping them make connections between their actions, the stormwater system, and receiving water impacts (Related Council Water Management Plan actions: Provide information to the community about existing stormwater drainage system, and water quality improvement initiatives under the CRR, develop and implement a litter reduction campaign)*	**Environment,** *the Hornsby community*	**$**	**Ongoing**
		Develop and provide information to the community that is useful in helping them make connections between their actions and water use and the nature and scale of impacts elsewhere	**Environment,** *the Hornsby community*	**$**	**Ongoing**
		Develop and provide information to the community that is useful in helping them make connections between their actions and the sewage system and	**Environment,** *the Hornsby community*	**$**	**Ongoing**

ALL DIVISIONS

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
		receiving water impacts			
		Develop and provide information to the community that enables them to link their practices with the value of stream bank vegetation in the maintenance of bank stability and improvement of water quality	**Environment,** *the Hornsby community*	**$**	**Ongoing**
		Develop and provide information to the community that is useful in helping them make connections between household and residential land use practices and adverse impacts on receiving waters	**Environment,** *the Hornsby community*	**$**	**Ongoing**
Make available and accessible information from existing monitoring and reporting processes	A community informed about water quality in the Shire	Report annually on water quality using a web-based interactive map and the State of the Environment report in a manner compatible with the needs of the community*	**Environment,** *the Hornsby community*	**S**	**Ongoing**
		Report to community on results of investigations and progress made in relation to the Berowra Creek Water Quality Management Strategy, and Annual Water Quality Monitoring Report*	**Environment,** *the Hornsby community*	**$**	**S**
Participate in key education programs offered by other agencies	Skills transfer in understanding the water environment	Develop a program in conjunction with Sydney Water which supplies and maintains Streamwatch Kits and assists with educational material for local schools*	**Environment, Sydney Water**	**$**	**Ongoing**

ALL DIVISIONS

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
		Assist local schools to participate in the Sustainable Schools Program*	**Environment,** DEH, local schools	**$**	**Ongoing**
Celebrate and publicise HSC's achievements in sustainable total water cycle management	Awareness of the Shire's success in sustainable total water cycle management	Include water consumption data in the State of the Environment Report*	**Environment,**	**$**	**Ongoing**
		Enter Council activities into (international and national) awards and competitions*	**Appropriate Division**	**$**	**Ongoing**
		Publicise Council water activities in local media outlets*	**Environment,** *the Hornsby community*	**$**	**Ongoing**
		Examine opportunity to host a water cycle management conference, in consortium with research partners if necessary	**Environment**	**$**	**L**
		Publish technical papers on total water cycle management initiatives and outcomes in journals, conference proceedings, web site, and print media*	Environment,	**$**	**Ongoing**
Provide tools to the community to participate in sustainable total water cycle	A local community able to participate in sustainable total water cycle management	Adapt existing resources (Council and elsewhere) to develop and implement water quality and quantity awareness programs for local schools and community	**Environment Division,** the Hornsby community,	**$**	**Ongoing**

ALL DIVISIONS

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders **Primary** Secondary *Passive*	Cost **$** < 50k **$$** 50-100k **$$$** > 100k	Timeframe **S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
management		(Related Council Water Management Plan actions: Develop and implement a school-based water quality awareness program, develop and instigate a community-based water quality awareness program, develop an information base for use in community water quality education programs)*	local schools		
		Work with existing community networks to enable community participation	**Appropriate Division,** the Hornsby community	**$**	**Ongoing**
Develop incentives for groups and individuals to take action that will enhance the water cycle	A local community empowered for water saving	Establish a water use reduction campaign targeting both community and corporate goals*	**Environment**	**$**	**S**
		Implement Hornsby Shire Council Biodiversity Conservation Strategy*	**Environment Division**	**$**	**S**
Ensure community consultation and information strategies and actions are evaluated and	Reflection and learning from previous approaches leads to continual improvement	Plan for evaluation when designing and implementing campaigns and actions	**Appropriate Division**	**$**	**Ongoing**
		Engage community/stakeholders in evaluating campaigns and incorporate findings into future campaigns	**Appropriate Division,** the Hornsby	**$**	**Ongoing**

ALL DIVISIONS

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
incorporated into future work programs			community		
		Conduct post-construction surveys about water cycle infrastructure activities and incorporate findings into future work programs	**Environment,** the Hornsby community	**$**	**Ongoing**

BUSINESS ACTIVITIES

2.6 BUSINESS ACTIVITIES

Objective: to develop, implement and promote business activities, goods, and service provision, consistent with sustainable total water cycle management

The Business Activities provide those Council services that operate as businesses. It encompasses the responsibility centres of Waste Management Services, Property Services, Tennis Courts, Nursery and Pre-School Centres, Aquatic and Recreation Centres, and Development Assessment Services (competitive activities).

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
1. Mimic natural flows					
1.1. Ensure that flows in local water courses mimic natural flows	Sustainable stormwater management on Council business sites	Collaborate with Works engineers and Environment to implement the Stormwater Trust's (DEC) forthcoming *Managing Urban Stormwater* documents on sites of Business Activities	**Works, Business Activities**, Environment, DEC	**$**	**S**
2. Maintain and enhance water quality					
2.1. Eliminate water discharge from aquatic centres into waterways	Reduced discharge of water and chemicals to local waterways	Collaborate with Environment Division in the pursuit of water reuse from aquatic centres*	**Environment, Business Activities**	**$**	**S**

BUSINESS ACTIVITIES

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
2.2. Enhance water quality from problem sites	Management of pollution intensive sites and processes	Collaborate with Works and Environment Divisions to implement best management practices for management of leachate and runoff from current and past waste disposal sites, depots and material handling facilities	**Works, Environment,** Business Activities	**$**	**S**
3. Maximise efficiency and effectiveness of water use and reuse					
3.1. Develop a Council water conservation and reuse strategy for Council businesses	A strategy for greater water conservation and reuse in Council	Support and promote the development and implementation of a specific water conservation and reuse strategy for particular Business Activities	**Environment,** Strategy, Business Activities	**$**	**S**
3.2. Develop and implement a water reuse strategy for Council Aquatic Centres	Potable water savings by large water users within Council	Work with Environment to develop and implement a water reuse strategy for aquatic centres*	**Environment, Business Activities**	**$**	**S**
		Work with key State Government agencies to review and update health standards for the reuse of water in pools	**Environment,** NSW Health, Business Activities	**$**	**S**
3.3. Develop and implement reuse strategy for	Potable water savings by large water users within Council	Learn from reuse scheme for Council's nursery at Pennant Hills and develop a strategy for implementation at other nurseries, depots and parks	**Environment, Works, Business**	**$**	**S**

BUSINESS ACTIVITIES

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
Council's Nursery			**Activities**		
		Monitor and evaluate the success of water reuse schemes	**Environment, Works, Business Activities**	**$**	**Ongoing**
4. Involve community through effective participation and learning					
4.1. Contribute to community learning about total water cycle management	An effective link to the community for total water cycle management	Promote water cycle management measures to the community through Business Activities	**Business Activities, Environment** *the Hornsby community*	**$**	**Ongoing**
5. Promote a productive economy and contribute to the well being of Hornsby's people					
5.1. Ensure that the community can meet its lifestyle needs from sustainable water use in business activities	Community living in harmony with the water cycle	Identify community lifestyle needs from sustainable water use in business activities and act on the outcomes	**Business Activities** Environment. *the Hornsby Community*	**$**	**S**

BUSINESS ACTIVITIES

Goal / Strategy (what/why)	Outcome (results)	Action (how)	Stakeholders	Cost	Timeframe
			Primary Secondary *Passive*	**$** < 50k **$$** 50-100k **$$$** > 100k	**S**=1-2 yrs **M**=3-5 yrs **L**=6-10 yrs
6. Develop governance structures, provide incentives, and foster partnerships to achieve this vision					
6.1. Promote the uptake of business incentives in total water cycle management	Business which understands and acts on its role in total water cycle management	Assist Council Divisions to develop business incentives for sustainable total water cycle management	**Strategy, Environment,** Business Activities	**$**	**S**
		Promote Council incentives to similar operators, where applicable	**Business Activities**	**$**	**Ongoing**
		Work with Environment Division to develop key performance indicators for water in Business Activities and internal service plans. Monitor performance and act to improve performance.	**Environment, Business Activities**	**$**	**Ongoing**

2.7 EXTERNAL AGENCIES

The intention is for this section to contain key external agencies, including Sydney Water, DEC, DIPNR, and the HN CMA.

Agency role/responsibility: Stormwater Trust

***Goal** / Strategy (what/why)*	*Outcome (results)*	*Action (how)*	*Timeframe (when)*
		Publish updated suite of Managing Urban Stormwater documents which provide guidance in relation to stormwater planning, water sensitive urban design, erosion and sediment control, stormwater treatment measures and urban stormwater education activities	
		Provide training course for local council officers, following the publication of individual documents within the Managing Urban Stormwater series	
		Develop a stormwater module for the BASIX Sustainability Index	
		Pilot the application of BASIX Stormwater with selected local councils	