

We are all Cooks River People

MARRICKVILLE
Council

WATEREVOLUTION

Funded by the Marrickville community through the Stormwater Charge

Eastern Channel North Subcatchment Management Plan 2013



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Acknowledgements

The Eastern Channel North Subcatchment Plan was prepared in 2013 by Murrumbidgee Council, and acknowledges contributions made by the EC North Subcatchment residents, Addison Road Community Centre, Hawkesbury-Nepean Catchment Management Authority, Murrumbidgee SES, Newington College, Stanmore Public School, Sydney Water Corporation, and other stakeholders who participated in planning meetings and the forum, and provided valued information and support along the way.

Cover: Mounted soldiers of the 14th Field Brigade, with gun carriage, at Addison Road Military Depot, 1936 (now Addison Road Community Centre). © COPYRIGHT Murrumbidgee Council, 2013.

Flora and fauna are back! We open our doors and see trees. Water birds from our wetlands fly by, and we hear frogs at night...

Nowadays, we are personally connected with each other, our waterways and ecosystems. We have knowledge and guardianship of nature.

Nature and the built environment are integrated through years of good urban planning. We are well prepared for floods and droughts. We have beautiful streetscapes and biodiversity corridors. Reclaimed streams with grassy banks support wildlife and play. Streets are safe, shared places for walking and cycling and are designed to cool in hot weather and reduce pollution.

Our community has returned the Cooks River to a natural state. We have learnt from the Aboriginal relationship and knowledge of the River, and from our past mistakes. We can swim, fish and boat in the River: "We are all Cooks River People."

Our community is resilient and self-sufficient because we locally source fit-for-purpose water and produce much of our food and energy. Fruit trees and vegetables are everywhere. Everything is valued and used wisely.

Eastern Channel North is a sharing community. We do things together, all generations of all cultures. Our community and Council actively cooperate and we participate in determining our future.



Eastern Channel North Subcatchment

1.1 BACKGROUND TO SUBCATCHMENT PLANNING

Marrickville Council is aiming to make the Marrickville local government area a *water sensitive community* and has developed the Strategy for a Water Sensitive Community for 2012 to 2021 that sets out the ways to get there.

Through the **Waterrevolution** program, funded by the Marrickville Stormwater Management Service Charge, Council and citizens are gradually changing the way they think about and manage water. The subcatchment planning program is key to bringing about this change by developing a plan for each of the subcatchments in the Marrickville local government area.

Collaborative and integrated planning approach

The **Waterrevolution** approach to water management resulted from the **Urban Stormwater Integrated Management (USWIM)** joint research project of Monash University and Marrickville Council.

Beginning in 2002, the USWIM project worked closely with the community and government stakeholders to integrate water management approaches in Marrickville. This means implementing sustainable water management and best practice governance (see box right) that will improve the quality of stormwater going into waterways, reduce dependence on drinking quality water brought from outside the catchment, and improve flood preparedness. The project trialed a new 'collaborative' planning process (Brown, 2003) that:

1. **Focuses on subcatchments** as appropriately sized areas for planning for integrated sustainable urban water management;
2. **Carries out detailed social, (bio)physical and organisational studies** to have a good understanding of the subcatchment characteristics and the planning context;
3. **Includes people from a range of disciplines** in identifying problems and solutions - engineers, social planners, environmental scientists, educators, parks and recreation managers; and,
4. **Involves a wide spectrum of stakeholders** including residents, businesses and other government agencies to come up with visions and plans and help to implement them.

The resulting plans suit local conditions and are flexible enough to include new information, practices and technologies over time.

It is beyond Council's ability to achieve all that is required to become a water sensitive community. Therefore, by working with citizens and businesses, this approach encourages planning on private property and builds Council and community relationships, recognising that sustainability is a whole of community issue that government cannot address alone.

In 2003, Council joined with the Illawarra Road Subcatchment community in Marrickville South and other stakeholders and created Marrickville's first subcatchment management plan in 2006. Council completed the Tennyson Street Subcatchment Plan in Dulwich Hill in 2009, the Riverside Crescent Subcatchment Plan in 2010 and the Eastern Channel East Subcatchment Plan in 2011. The Eastern Channel North Subcatchment Plan is the fifth plan. The subcatchment plans are reviewed annually to track progress and have a major review every five years by Council and subcatchment stakeholders, including the subcatchment working groups.

WATER SENSITIVE COMMUNITY

A Water Sensitive Community supplies water from within its catchment, provides green infrastructure to support ecosystem services and participates in making plans, designs and decisions that are water sensitive (Marrickville Council, 2013).

Marrickville strategies to become a Water Sensitive Community:

1. Reduce the use of potable mains water in homes, businesses, Council facilities and public spaces.
2. Manage the stormwater system and its impacts on the urban environment.
3. Support regional projects to improve the health of the Cooks River, Botany Bay, Lower Parramatta River, Sydney Harbour and their catchments.
4. Implement sustainable urban water management.

(Marrickville Council, 2012)

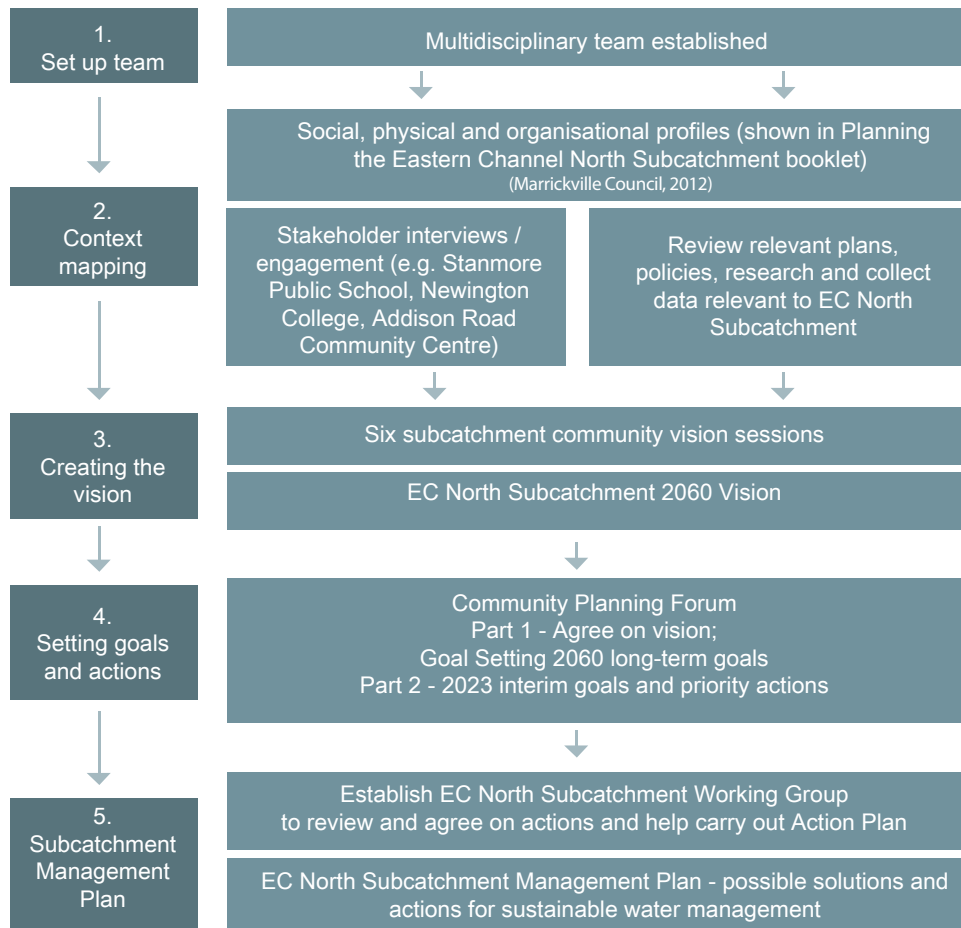
Best practice governance:

1. Work with the people who live and work in the area.
2. Improve the ability of Council, other governments and land managers to manage water sustainably, e.g. develop skills, collect and share data, learn from evaluation.
3. Integrate planning and projects.
4. Communicate progress and results to all stakeholders.

(Principles of best practice governance, Brown 2008)

1.2 How we planned EC North Subcatchment

Planning the EC North Subcatchment was done in partnership with local residents, schools, community groups, businesses and stakeholders including the Addison Road Community Centre, Sydney Water and the Hawkesbury-Nepean Catchment Management Authority. The aim is to collaboratively develop a long-term management plan to address stormwater issues in the subcatchments and meet the Water Strategy objectives.



Collaborative planning process in EC North Subcatchment.

Collaborative planning

To create the *Eastern Channel North Subcatchment Plan*, the collaborative process, shown left, involved stakeholders at each stage of planning and decision making, including creating the vision, goals and actions, and finding possible solutions. EC North will integrate stormwater quality management and reuse opportunities through Council's collaborative planning process. Flood management will be incorporated when the Marrickville Valley Flood Management Plan has been finalised.

1. Multidisciplinary team

The multidisciplinary team of Council staff and consultants mainly included environmental managers, engineers, and social scientists, with planners and asset managers involved when needed.

2. Context Mapping

The context mapping (see 2, left) included the EC North Subcatchment's history, community make up, water cycle, and the other details shown in Section 2.

The physical profiling included the Marrickville Valley Flood Study (WMAwater, 2011) following the process set out by the NSW Government (2005). The study identifies flood prone areas and impacts of different sized storm events.

Context information was presented in the *Planning the Eastern Channel North Subcatchment* information booklet (2012) that was given to all who took part in the planning process. Everyone then had access to a broad range of relevant information and a good common understanding of the planning environment, creating the conditions for successful communication and decision making between disciplines and participants.

Stakeholders invited for interviews and/or to planning sessions included:

- residents
- businesses
- schools
- Council staff
- community groups
- government organisations

Major land managers, water users and decision makers, such as the Addison Road Community Centre, Newington College, Stanmore Public School and Murrumbidgee SES were invited to be part of the planning and exploring of possibilities for on-ground works and capacity building initiatives.

The combined knowledge of local water issues with participant aspirations helped Council develop a better understanding of the solutions that will be most appropriate for the community, environment and economy of the subcatchment.

3. Creating the Vision

All residents, schools and businesses in the EC North Subcatchment were invited to vision sessions during April, May and June 2013. *The Eastern Channel North Subcatchment 2060 Vision* results from the ideas from the six vision sessions. Representing community desires, it is the reference point for planning the EC North Subcatchment.

4. Setting Goals and Actions

The community vision was the basis of the planning forum held over two nights in June 2013. On the first night, the forum made up of a group of residents, businesses, students and staff from Council, Sydney Water Corporation, Murrumbidgee SES and the Hawkesbury-Nepean Catchment Management Authority developed goals and possible actions to reach the 2060 vision. On the second night, the group developed the short-term 2023 goals and actions.

5. EC North Subcatchment Management Plan

The EC North Subcatchment Management Plan will integrate flood management in a few years with stormwater quality and reuse. The plan includes the subcatchment vision, goals and the action plan in Section 3. Recommendations for stormwater treatment are outlined in Section 4.

EC North Subcatchment Working Group

Following the vision sessions and planning forum, the EC North Subcatchment Working Group of local residents and businesses was established to refine and prioritise the actions and review the proposed on-ground options. The working group will continue to partner Council to implement and assess the action plan, and provide feedback.



EC North Community vision session, 2013.



EC North Community vision session, 2013.



EC North Community planning forum, 2013.

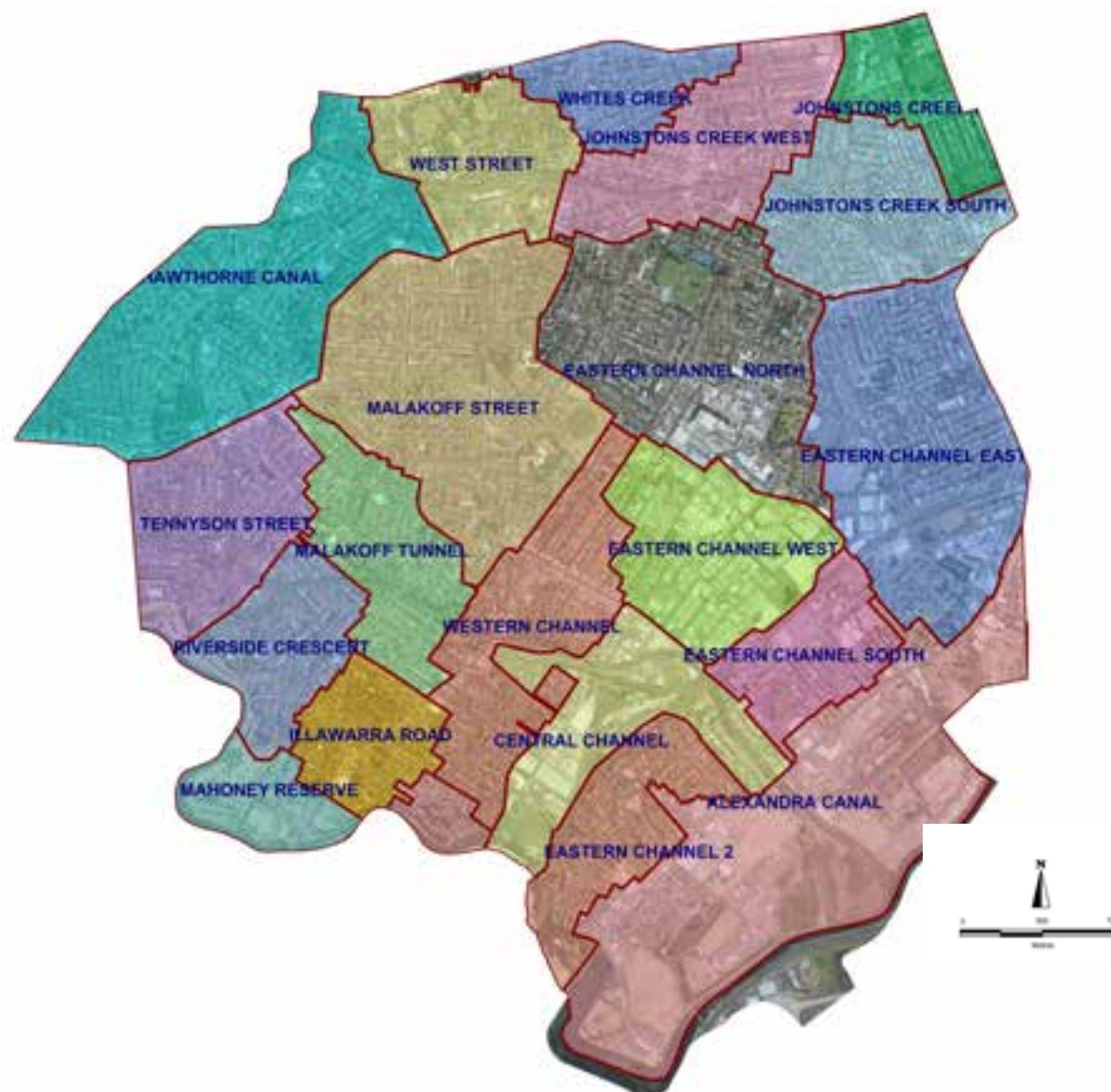
2. About the EC North Subcatchment

2.1 OVERVIEW

The EC North Subcatchment is located in the central part of the Marrickville local government area and covers parts of Marrickville, Stanmore, Enmore and Petersham.

Fast Facts

- 136 hectares
- Population 6,605 (8% of Marrickville LGA) (ABS 2011)
- 2,785 residential dwellings
- Mostly residential
- Light to medium industrial areas in south east of Subcatchment
- 5 parks and reserves, (Montague Gardens, Ryan Park, Newington Road Playground, Amy St Playground and western side of Enmore Park)



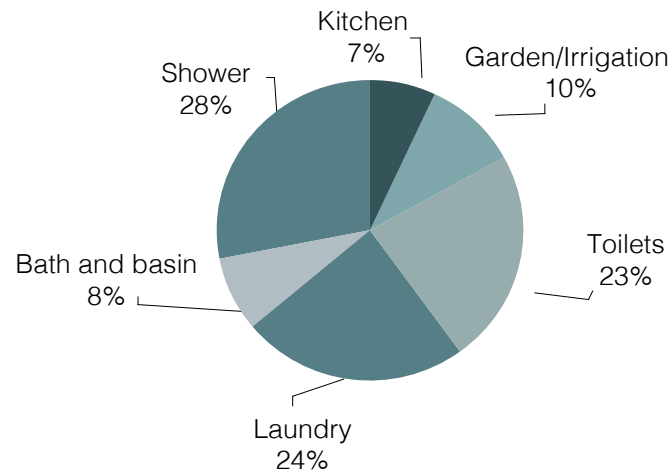
Subcatchments in Marrickville LGA, highlighting the EC North Subcatchment.

2.2 EC North Subcatchment Water Cycle

The water cycle in the EC North Subcatchment is based on research and data from the Bureau of Meteorology, Sydney Water, and stormwater modelling.

A study of the urban water balance highlights where potable (drinking quality) water savings can be made through harvesting rainwater and stormwater. Stormwater harvesting also provides an opportunity to treat stormwater and reduce the amount of pollution going into the Cooks River.

Household Water Use



2.3 Contours and Drainage Network



- LEGEND**
- STORMWATER STRUCTURE (COUNCIL)
 - STORMWATER STRUCTURE (SW)
 - STORMWATER STRUCTURE (OTHER)
 - STORMWATER CONDUIT (COUNCIL)
 - STORMWATER CONDUIT (SW)
 - STORMWATER CONDUIT (OTHER)
 - SUBCATCHMENT BOUNDARY
 - CONTOURS 2.0 METRE
 - ROADS
 - REGIONAL/STATE ROADS

The contour map shows the gradient of the EC North Subcatchment with its ridges and valleys and the locations of the stormwater drainage pits and pipes. The Subcatchment has moderate grades from the ridgelines to the lower areas on the southern side of the EC North Subcatchment.

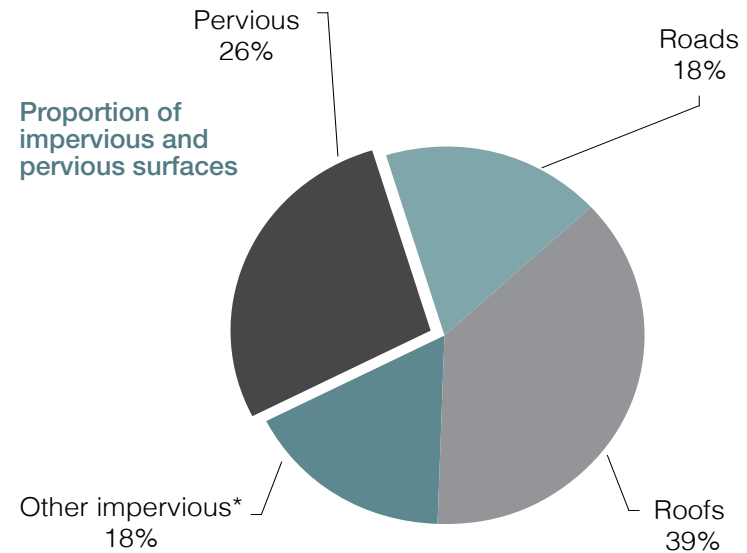
Most of the stormwater then drains eastwards into two Sydney Water owned trunk drainage lines that discharge water to the Eastern Channel.



About 74% of the EC North Subcatchment is made up of hard and impervious surfaces. Of the total hard surfaces, roofs make up the majority (50%), followed by driveways (26%) and roads and pavements (24%). These hard surfaces generate approximately 95% of pollutants found in stormwater in the Subcatchment.



Left: Addison Road, Marrickville. Right: Standing water, Edinburgh Road, Marrickville.



Water quality modelling determines the relative pollutant contributions from the Subcatchment based on a breakdown of these impervious surface areas.

Subcatchment Pollution Levels

The table below shows the estimated amount of pollutants currently found in stormwater in the Subcatchment. The long-term aim is to meet the Best Practice Stormwater Targets set by the Office of Environment and Heritage and Botany Bay Water Quality Improvement Program to improve stormwater quality.

| Pollutant | Estimated Mean Annual Pollutant Load (kg/yr)* | Best Practice Stormwater Targets (% reduction) | Target Pollutant Load (kg/yr) |
|-------------------------|---|--|-------------------------------|
| Gross Pollutants | 25,000 | 90% | 2,500 |
| Total Suspended Solids# | 228,000 | 85% | 34,200 |
| Total Phosphorus | 462 | 65% | 162 |
| Total Nitrogen | 3,640 | 45% | 2,002 |

* Estimated with MUSIC modelling software.

Note: removal of suspended solids will result in a reduction of heavy metals and hydrocarbon loads.

These figures do not take into account the performance of existing gross pollutant traps within the Subcatchment.

Private Property

46% of the EC North Subcatchment is private property, which contributes significantly to gross pollutant and nitrogen loads due to the large volume of stormwater runoff from these areas. Reducing the flow volume would reduce the amount of gross pollutants and nitrogen entering into waterways.

Public roads contribute the largest amount of phosphorous and suspended solids. The stormwater drainage network combines the runoff from public roads and private property. It is therefore important to target both public roads and private areas in order to reduce the transport of stormwater pollutants into waterways.

2.5 Capital Works Program and Connecting Murrickville



Capital Works Program

The planning process for capital works is carried out as part of the integrated planning and reporting. This includes asset management plans, the long-term financial plan, 4-year delivery plan and annual operational plan. Council has a rolling program for capital works for new infrastructure, upgrades and renewal. Stormwater drainage and water sensitive urban design (WSUD) works are currently prioritised by:

- condition – are they in good condition or should they be replaced?
- function – are they doing what they are designed / expected to do?
- level of service – do they meet community needs and expectations?
- long-term strategies and plans – are they meeting the goals of a strategy or plan?

Connecting Murrickville

Connecting Murrickville is a new program that will deliver more drainage and water sensitive urban design (WSUD), better footpaths, street trees, cycle ways, and local area traffic management, while building on Council’s social justice, access, and Sustainable Streets programs. The program is transforming Council’s approach to urban streetscape design, delivery and maintenance by integrating capital works where possible, moving Council from single-issue to place-based planning and delivery of capital works. The WSUD works proposed for EC North Subcatchment will be delivered through Connecting Murrickville.



Above: Map of Eastern Channel North showing proposed capital works over the next four years.

This page shows the stormwater issues and hot spots as identified by the community and in interviews with Council staff.



Stormwater Ponding and Overland Flows

Stormwater ponding typically occurs in low points or 'sags' where water cannot drain quickly. Overland flows occur when the capacity of the underground drainage system is exceeded and stormwater flows down the street or other overland flow paths. In these circumstances, stormwater can spread across the road and into adjacent properties. Ponding and overland flows in Eastern Channel North Subcatchment occur in:

- Cnr Stanmore Rd & Liberty St
- Browns Ave
- Newington Rd at Enmore Rd
- College Ln
- Philpott St
- Addison Rd near Perry Rd
- Neville Lane
- Addison Road Community Centre
- Essex St and Surrey St



Gross pollutant trap on the Cooks River.

Dumping

Dumping is a regular problem at:

- Gordon Street
- Edinburgh Road



Local flooding on the corner of Liberty Street and Stanmore Road.

Residential Dwellings

- Subcatchment area - 136 ha
- Residential dwellings - approx. 2,785



34%
Separate houses



13%
2 or more storey semi, row, terrace or townhouse



16%
1 or 2 storey residential flat building



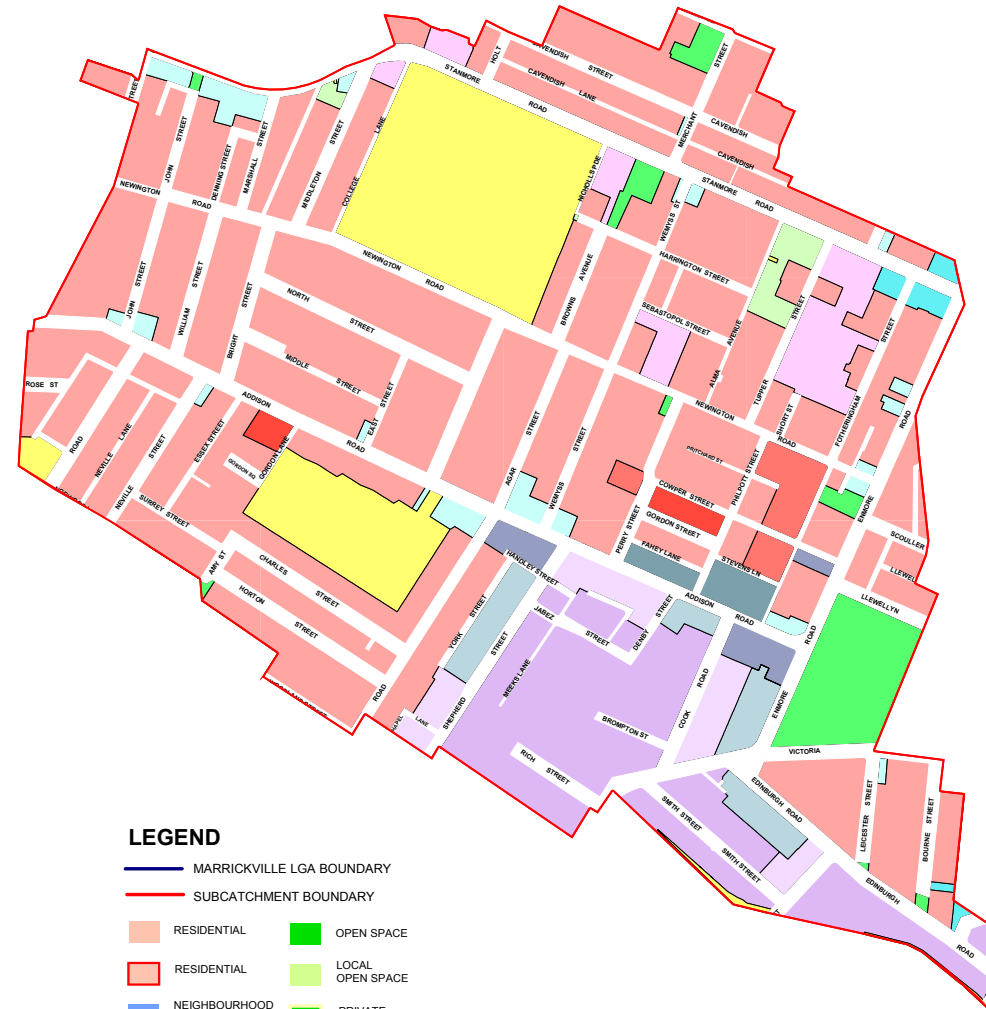
13%
3 storey residential flat building



16%
1 storey semi, row, terrace or townhouse

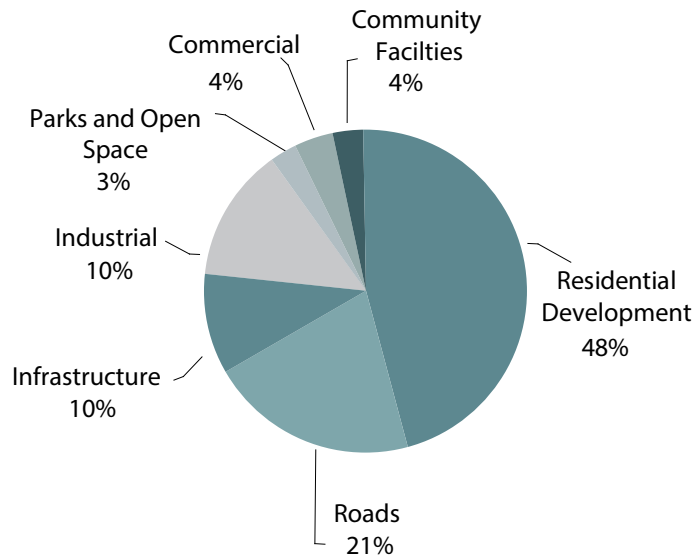


8%
4 storey residential flat building



Above: Eastern Channel North land zoning map.

Land Use



LEGEND

- MARRICKVILLE LGA BOUNDARY
- SUBCATCHMENT BOUNDARY
- RESIDENTIAL
- RESIDENTIAL
- NEIGHBOURHOOD BUSINESS
- GENERAL BUSINESS
- RESERVATION
- RESERVATION (ARTERIAL ROAD AND ARTERIAL ROAD WIDENING)
- RESERVATION (LOCAL ROAD AND LOCAL ROAD WIDENING)
- OPEN SPACE
- LOCAL OPEN SPACE
- PRIVATE OPEN SPACE
- GENERAL INDUSTRIAL
- LIGHT INDUSTRIAL
- SPECIAL USE
- SPECIAL USE (RAILWAYS)

Marrickville Council

The Eastern Channel North Subcatchment falls within the Marrickville local government area. Marrickville Council manages roads, parks, playgrounds and open space. It is also responsible for implementing planning controls and services such as waste collection.

Authorities

Sydney Water Corporation

Controls wastewater and potable water infrastructure and delivery within the Subcatchment; responsible for the management of trunk drainage, the Eastern Channel stormwater channel and Sydney's desalination project.

Roads and Maritime Services (RMS)

Jointly responsible for the operation and maintenance of Stanmore Road.



Stanmore Road, Stanmore.

Departments

Housing NSW

Provides affordable housing options for approximately 2% of residents (ABS, 2012).

Office of Environment and Heritage

Within the NSW Department of Premier and Cabinet, provides funding and regulates Sydney Water and the RMS to ensure that their activities do not negatively affect the environment.

The NSW Office of Water

Coordinates the development of metropolitan water policy and planning; responsible for surface water and groundwater management, water licensing and compliance, and implementation of major water infrastructure projects.

Catchment Management Authority

The Hawkesbury-Nepean Catchment Management Authority promotes the improvement of the catchment for "a healthy and productive catchment valued now and into the future".

Land Users

Schools and Community

- Newington College
- Stanmore Public School
- Addison Road Community Centre

Addison Road and Enmore Road host a wide variety of business and commercial operators.

Industrial

Light to medium industries are located in the south-eastern corner of the Subcatchment. Activities range from smash repairs to distribution centres and art studios.

Community Housing

Community housing organisations own and/or manage properties in the Subcatchment.

Places of Worship

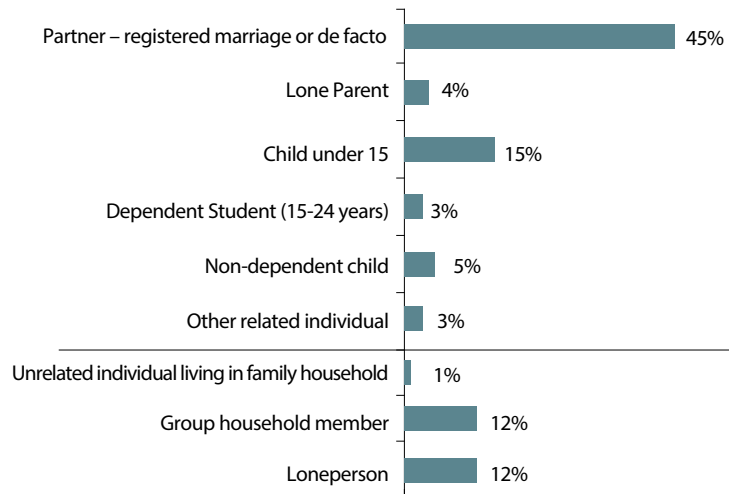
- Greek Orthodox Church of St Peter and St Paul - 264 Stanmore Road, Petersham
- Jehovah's Witnesses - 315 Enmore Road, Marrickville

| Organisation/ Operation | Activities/Management | Location |
|--|--|-------------------------------|
| Addison Road Early Learning Centre | Long day care for ages 6 weeks to 6 years | 142 Addison Rd Marrickville |
| Cavendish Street Child Care Centre | Long day care for ages 6 weeks to 6 years | 142 Cavendish St Marrickville |
| Addison Road Community Garden | Productive garden with individual and shared plots | 142 Addison Rd Marrickville |
| The Bower Eco-Library | Access to information on how to live sustainably | 142 Addison Rd Marrickville |
| The Bower Re-Use and Repair Centre Co-operative | Collects, repairs and resells goods to divert waste from landfill | 142 Addison Rd Marrickville |
| Reverse Garbage | Australia's largest creative reuse centre since 1974 | 142 Addison Rd Marrickville |
| Wirriga Baiya Aboriginal Womens Centre | Service for Aboriginal women and children victims of domestic violence | 142 Addison Rd Marrickville |
| Brazilian Community Council of Australia | Non-profit organisation to promote Brazilian culture | 142 Addison Rd Marrickville |
| Marrickville Organic Food and Farmers Market | Organic food markets every Sunday from 8.30am to 3pm | 142 Addison Rd Marrickville |
| Ethnic Child Care Family and Community Services Co-operative | Community based, not-for-profit social justice group "with a particular emphasis on multiculturalism and access and equity in childrens', aged and disability services". | 142 Addison Rd Marrickville |
| Radio Skid Row 88.9FM | Community radio station catering for indigenous, refugee and emerging communities | 142 Addison Rd Marrickville |
| Marrickville Community Nursery, Marrickville Council | "Protecting, conserving and promoting the biodiversity of species and natural habitats of the area". Open Wed (10am-12pm), Sat & Sun (10am -1pm) | 142 Addison Rd Marrickville |
| Sidetrack Theatre | 150 seat theatre for local and community productions | 142 Addison Rd Marrickville |
| Australia Day Celebrations, Marrickville Council | Entertainment, information, citizenship ceremony and fireworks every January 26 | Enmore Park |

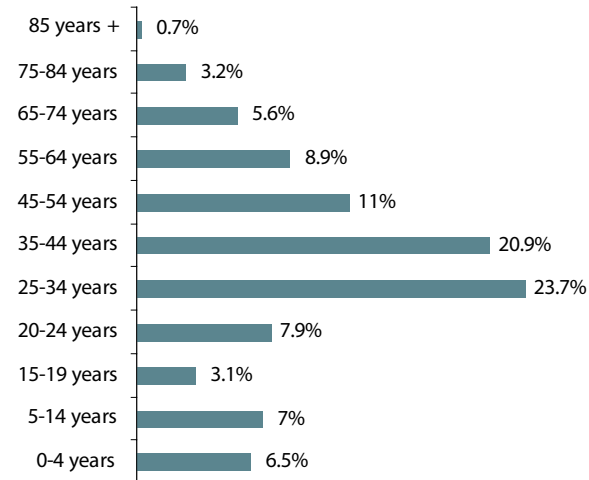
Key Statistics

- Population: 6,605 residents
- Origin: Born overseas 30% – United Kingdom 5%, Greece 4%
- Languages spoken at home: non-English 21%, Greek 6%, Chinese 3%, Italian 2%, Portuguese 1%
- Travel to work: Car 49%, Bus 19%, Train 15%, Walk 8%
- Religion: No religion 41%, Catholic 24%, Anglican 9%, Eastern Orthodox 8%, Buddhism 3%

Household Types



Age Distribution



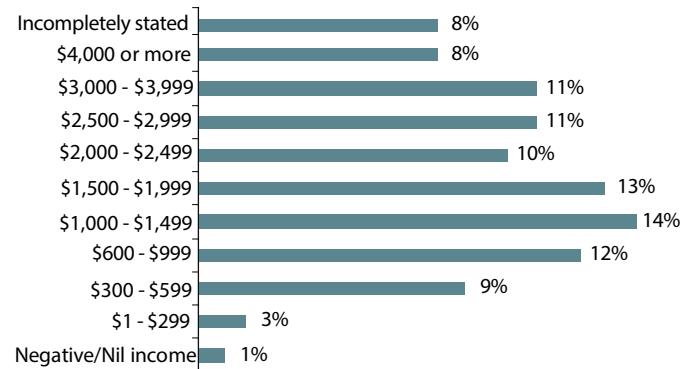
Education

Educational attendance **29%** (1,931 people) of those attending:

- Preschool **5%**
- Infant/Primary **17%**
- Secondary **10%**
- Technical or Further Education Institution **10%**
- University or other Tertiary Institution **28%**
- Other Education Institution **3%**

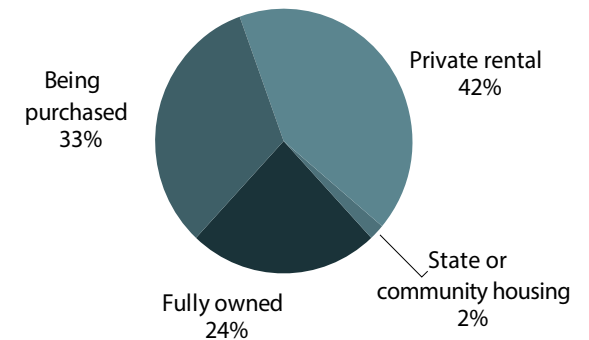
Non-School qualifications (over 15 years):
University **38%**, None **42%**, Other **20%**

Weekly household income



- More than 40% of households have income above the Marrickville median of \$1,605
- 19% of households have an income above \$3,000 per week

Household Tenure



Addison Road Markets (Photo: Addison Rd Centre)

[All data from ABS 2011 Census]

Who answered the survey?

| | |
|--------------------------------|--|
| Gender | 57% Female 43% Male |
| Origin | 68% Australia 19% Europe 5% Asia 2% New Zealand 2% Aboriginal or Torres Strait Islander 2% Americas 1% North Africa & Middle East |
| Age | 34% 20-39 years 27% 40-49 years 39% >50 years |
| Household Type | 30% Couple with no children at home 30% Couple with children at home 20% Single person living alone 11% Other 9% Share accommodation with non-family |
| Tenure Type | 53% Fully own home 26% Buying home 20% Private rental 1% Other |
| Dwelling | 42% Separate house 32% Semi-detached, terrace or townhouse 25% Flat, unit or apartment |
| Time in Current Residence | 42% 1 - 5 years 17% 6 - 10 years 13% 11-15 years 28% >15 years |
| Individual Gross Weekly Income | 48% \$2,000+ 27% \$1,000 - \$1,999 21% \$300 - \$999 4% \$1 - \$299 |

The Community Water Survey was carried out in April 2011 with 485 responses (12% of households).

Knowledge of urban water systems

1. In Marrickville, the rainwater in the street drains normally goes:

- 74% to the nearest waterway (correct answer)
- 21% to the sewerage system
- 3% to the sea

2. Water from which of the following would normally end up in the street drains?

| Water from: | % Responses | |
|-------------------------|-------------|-----------|
| The kitchen sink | 11% | Incorrect |
| The shower | 11% | Incorrect |
| The toilets | 6% | Incorrect |
| The washing machine | 11% | Incorrect |
| The garden | 71% | Correct |
| Driveways, footpaths | 89% | Correct |
| Other paved areas | 81% | Correct |
| Rainwater from the roof | 80% | Correct |

3. On average, how many litres of water does a typical Marrickville household use per day?

- 52% underestimated daily water use
- 26% chose the correct range (300-400L per day)
- 21% overestimated daily water use

Behaviour

Of 485 people:

1. Rainwater Tanks

65 respondents (14%) indicated that they have a rainwater tank

- 90% use for watering the garden
- 25% for toilet flushing and for laundry

2. Greywater Systems

22 respondents (5%) indicated that they have a greywater system

3. Water Saving Devices

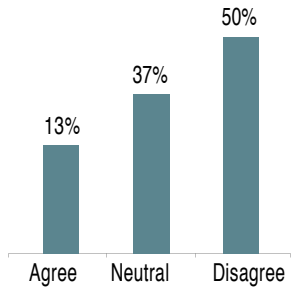
388 respondents (83%) have water saving devices such as water saving showerheads, tap aerators and toilet flush water savers

Receptivity to using rain and greywater

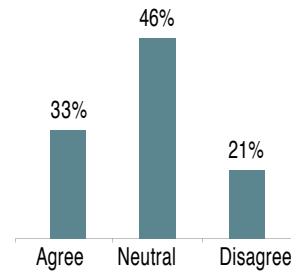
The percentage of people that would consider using rainwater and greywater, and how they would use them:

| | Filtered Rainwater | Treated Recycled Water |
|-----------------|--------------------|------------------------|
| Watering garden | 89% | 86% |
| Flushing toilet | 84% | 86% |
| Washing car | 80% | 76% |
| Washing clothes | 69% | 49% |
| Showering | 53% | 28% |
| Cooking | 28% | 10% |
| Drinking | 23% | 8% |
| Nothing | 1% | 3% |

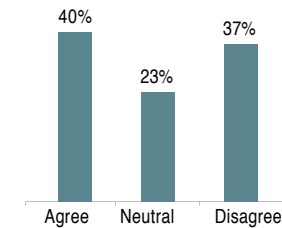
ATTITUDES TO THE WATERWAY ENVIRONMENT



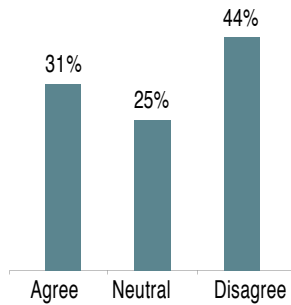
a) 'Jobs are more important than the environment.'



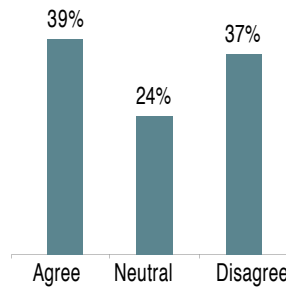
b) 'Access to a healthy natural environment is more important than access to community facilities.'



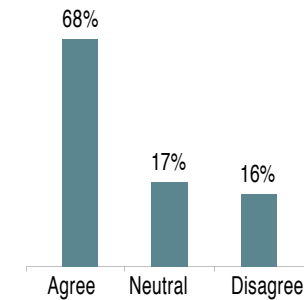
c) 'My daily activities have little negative impact on the waterway environment.'



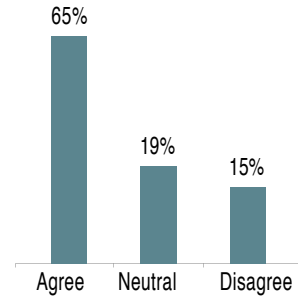
d) 'Government agencies should have the main responsibility for the waterway environment rather than the individual.'



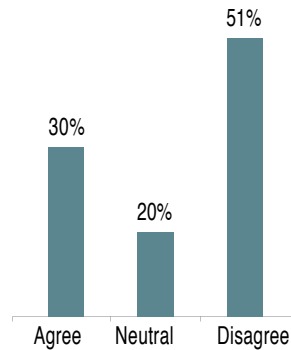
e) 'We should aim for the same waterway conditions as before the Europeans arrived over 200 years ago.'



f) 'I would reduce my shower time by half to save limited water resources.'



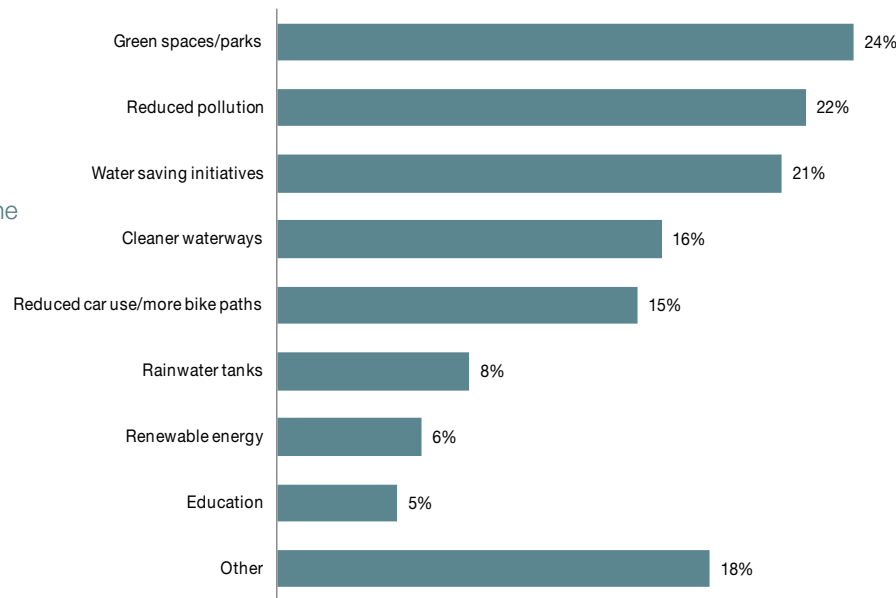
g) 'Most people want to help improve the health of the waterway environment.'



h) 'Laws are more effective than education for protecting the waterway environment.'

Major environmental improvements wanted in the next 20 years.

This question was open ended. The responses were clustered into the categories shown on the graph.



29% of suggestions for environmental improvements directly relate to water management: 21% water saving initiatives, 16% cleaner waterways and 8% rainwater tanks.

Business Water Survey – Summary Results

The June 2012 Marrickville Valley Business Water Survey received 52 responses:

Respondents - manufacturing (29%), retail trade (22%), wholesale trade (13%), construction (9%), professional scientific and technical (7%)

52% owned their premises outright, 33% leased premises privately and 13% were purchasing their premises

Water use

Two of the respondents had rainwater tanks of 20,000L and 24,000L

The percentage of respondents that would consider using rainwater and greywater in their business:

| Use | Filtered Rainwater | Treated Recycled Water |
|-------------------------|--------------------|------------------------|
| Flushing toilet | 63% | 70% |
| Washing car | 50% | 48% |
| Washing clothes | 35% | 33% |
| Showering | 24% | 22% |
| Cooking | 22% | 17% |
| Drinking | 24% | 8% |
| <i>In manufacturing</i> | | |
| Food production | 9% | 6% |
| Washing | 24% | 24% |
| Cooling | 22% | 26% |
| Other | 11% | 11% |

Attitudes

The majority of respondents (64%) agreed that: "Most people want to help improve the health of the waterway environment."

3.1 EC NORTH SUBCATCHMENT 2060 VISION

The EC North Subcatchment 2060 Vision was created by the Subcatchment community at a series of vision sessions and planning forums in 2013. The community goals set out clear aims for the Subcatchment for the year 2060, as well as interim goals for 2023, which will help achieve the 2060 goals.

EC North Subcatchment Vision for 2060

Flora and fauna are back! We open our doors and see trees. Water birds from our wetlands fly by, and we hear frogs at night...

Nowadays, we are personally connected with each other, our waterways and ecosystems. We have knowledge and guardianship of nature.

Nature and the built environment are integrated through years of good urban planning. We are well prepared for floods and droughts. We have beautiful streetscapes and biodiversity corridors. Reclaimed streams with grassy banks support wildlife and play. Streets are safe, shared places for walking and cycling and are designed to cool in hot weather and reduce pollution.

Our community has returned the Cooks River to a natural state. We have learnt from the Aboriginal relationship and knowledge of the River, and from our past mistakes. We can swim, fish, and boat in the River: *"We are all Cooks River People."*

Our community is resilient and self-sufficient because we locally source fit-for-purpose water and produce much of our food and energy. Fruit trees and vegetables are everywhere. Everything is valued and used wisely.

Eastern Channel North is a sharing community. We do things together, all generations of all cultures. Our community and Council actively cooperate and we participate in determining our future.

3.2 EC NORTH SUBCATCHMENT 2060 GOALS

Preamble:

In 2060, we have had 50 years of working together to achieve the EC North Subcatchment vision. We achieved the 2060 goals so now our community is calm, wise and content, and our streets and urban spaces are multifunctional, contributing to a productive, resilient and liveable community.

In 2060:

1. All the people in EC North are knowledgeable, aware and active in managing water in their environment.
2. Our multifunctional infrastructure and natural places are planned and managed collaboratively with all stakeholders in the community.
3. Diverse public and private spaces are available for growing fruit and vegetables.
4. EC North Subcatchment has established a biodiversity network that prioritises corridors connecting to local waterways and the Cooks River.
5. EC North Subcatchment has diverse water supplies to support fit-for-purpose water use so that potable water consumption has reduced by 50%.
6. All water from EC North entering the Cooks River is of a suitable quality for swimming, fishing or boating.
7. In 2060, overland runoff to the Cooks River mimics the Subcatchment's natural water cycle.

In 2023:

1. The majority of the EC North community understands the EC North water cycle and the concept of fit-for-purpose water use.
2. The EC North community has changed its water practices so that water sensitive urban design (WSUD) is implemented in the subcatchment:
 - A. 100% of households have water efficient devices installed
 - B. 15% of households use alternative water sources such as rainwater tanks for indoor purposes.
 - C. Industrial/business mains water use has reduced by 15%
 - D. Over 10% of properties (residential and commercial) have some form of water treatment.
3. Collaborative place-based planning for the public domain is the norm.
4. All new subcatchment infrastructure achieves multiple objectives.
5. A program is in place for the implementation of productive spaces/places.
6. All new private development and infrastructure upgrades in EC North enhance biodiversity.
7. 15% of existing open space in EC North has been converted to improve and increase biodiverse areas.
8. 30% of the EC North stormwater runoff is treated before leaving the subcatchment.
9. 5% of the channels in EC North have been naturalised.
10. Flooding (stormwater peak flows and flow volume) are reduced in the subcatchment.



**Rain garden in Dulwich Hill backyard built by community volunteers.
(Courtesy Gayle Adams, 2011).**

Role of Actions

The Subcatchment actions aim to meet multiple goals. In addition to water management goals (water conservation, wastewater minimisation, water quality and drainage/flooding issues), EC North Subcatchment residents are interested in actions that address broader sustainability concerns, e.g., climate change, energy, food production, biodiversity, community involvement, and good governance. The management plan for the Subcatchment is therefore focused on meeting the community's goals, and addressing other sustainability goals by linking them to water wherever possible.

The EC North Subcatchment Action Plan is a working document that will be regularly reviewed by Council and the EC North Subcatchment Working Group.



Pelicans on the Cooks River.



Peregrine Falcon photographed in the Murrumbidgee LGA in 2008.

Changing Streets for Multiple Goals

Wide streets could be redesigned to include a central median swale when they are resurfaced. Wide streets could also be redesigned by extending the nature strip on either side and narrowing the paved area. In the photographs below, this would allow for additional stormwater treatment to be incorporated into the streetscape.



Left: vegetated garden beds within the streetscape could be designed as a passive irrigation or biofiltration system. Right: wide streets provide ample opportunity for water sensitive urban design (Equatica, 2009).

GOAL 1

The majority of the EC North community understands the EC North water cycle and the concept of fit-for-purpose water use.

Actions

1. Establish a subcatchment working group of Council and community members.
2. Council, community and relevant stakeholders:
 - a. Develop and implement a comprehensive water campaign for EC North that results in:
 - 90% of households being receptive to using rain and recycled water
 - 20% of properties having some form of WSUD
 - b. Promote the “We are all Cooks River People” curriculum to schools in the Subcatchment.
 - c. Promote the *Sustainability Ambassadors Program* and tours to sustainable homes.
 - d. Create at least one demonstration site showcasing best practice WSUD planning and design for residential and/or commercial properties.



GOAL 2

EC North community has changed its water practices so that:

- a. 100% of households have water efficient devices installed.
- b. 15% of households use alternative water sources such as rainwater tanks for indoor purposes.
- c. Industrial/business mains water use has reduced by 15%.
- d. Over 10% of properties (residential and commercial) have some form of water treatment.

Actions

1. Update the subcatchment social and physical profile every 5 years:
 - a. Administer the community and business water surveys
 - b. Model the water cycle
2. Promote WSUD through the *Rainwater Tank Incentive Scheme* and the *Sustainability Ambassadors Program*.
3. Work with subcatchment businesses to develop, promote and implement incentives for businesses, including the annual Sustainable Business awards program.
4. Implement and promote a multi-user alternative water supply system.

(See also Goal 1, Action 2)



GOAL 3

Collaborative place-based planning for the public domain is the norm.

Actions

1. Collaborate with Council and subcatchment stakeholders to identify, plan, design and implement a demonstration multifunctional green infrastructure project e.g. a living lane.
2. Collaborate with Council and subcatchment stakeholders to investigate, design and integrate WSUD with other capital works planned for the streetscape, including:
 - a. the WSUD stormwater treatment options identified for EC North Subcatchment public domain.
 - b. Flood mitigation works recommended in the Marrickville Valley Flood Management Plan (once adopted).

GOAL 4

All new subcatchment infrastructure achieves multiple objectives.

Actions

See Goal 3, actions 1 & 2.

GOAL 5

A program is in place for the implementation of productive spaces/places.

Actions

Develop an action leaning program that identifies, plans and implements local food production sites in partnerships and that source water from the subcatchment:

- a. in the public domain
- b. in partnership with local landholders including:
 - i. Addison Road Community Centre
 - ii. Schools
 - iii. Businesses

GOAL 6

All new private development and infrastructure upgrades in EC North enhance biodiversity.

Actions

1. Improve and increase the area of habitat to support biodiverse communities by:
 - a. reviewing the biodiversity chapter of the DCP
 - b. partnering with developers on major developments

(See also Goal 3, actions 1 & 2)

GOAL 7

15% of existing open space in EC North has been converted to improve and increase biodiverse areas.

Actions

1. Map opportunities for biodiversity networks across the LGA for use in future planning and design of public spaces.

(See also Goal 3, actions 1 & 2)



GOAL 8

30% of the EC North stormwater runoff is treated before leaving the subcatchment.

Actions

1. Collaborate with Council and subcatchment stakeholders to investigate, design and integrate WSUD with other capital works planned for the streetscape, including WSUD treatment options identified for EC North Subcatchment public domain.

(See also 2023 Goal 3, Action 2a)



GOAL 9

5% of the channels in EC North have been naturalised.

Actions

1. Collaborate with stakeholders including Sydney Water to develop a program for naturalisation of channels:
 - a. investigate suitable areas
 - b. cost and prioritise sites
 - c. seek funding



Thornley Street rain garden, community planting day 2010 (Equatica).

GOAL 10

Flooding (stormwater peak flows and flow volume) are reduced in the catchment.

Actions

See 2023 Goal 3, Action 2



Potential stormwater treatment and harvesting projects and their contributing catchments (highlighted).



Development of Options

Potential on-ground works to treat and harvest runoff were developed to meet the EC North 2060 goals. Sites for treatment and harvesting were selected by:

- looking at opportunities and site constraints;
- working out potential pollution reductions in stormwater runoff going to the Cooks River; and
- calculating water savings that could be achieved.

Possible locations include Council's parks and streetscapes, the Addison Road Community Centre, and Newington College as shown on the map on this page. (NB. The map is only an indicative representation of potential sites). All options have been prioritised with Council's existing water sensitive urban design works and require further investigation.

Flooding

Flood management works recommended in the Marrickville Valley Flood Management Plan will be added to this plan when that project is finalised.

Funding

Implementing the works over time is estimated to cost about \$5 million (stormwater treatment, \$2 million; stormwater harvesting, \$3 million). Works will be funded by the Marrickville Stormwater Charge and grants as they become available. They will also be integrated with the Connecting Marrickville capital works program as opportunities arise.

4.1 STORMWATER HARVESTING

The subcatchment planning identified possible stormwater harvesting sites at Enmore Park and in the industrial area in the southeast of the subcatchment. The harvesting at Enmore Park requires further investigation. The industrial project will be developed further with the Eastern Channel West Subcatchment planning over 2014/15.

4.2 Stormwater treatment

Council identified 30 potential options for stormwater treatment across Eastern Channel North. A comprehensive assessment of the options was undertaken with specialist staff, assessing them on the basis of feasibility, environmental benefits, social outcomes and cost. Twelve priority sites were selected as the best options.

| Number | Location | Size of treatment system (m2) | Size of Catchment (m2) | Estimated cost | Comments |
|--------|-----------------------|-------------------------------|------------------------|----------------|----------------------------|
| 1 | Addison Rd CC | 1000 | 136,650 | \$450,000 | Various options |
| 2 | Enmore Park (Central) | 300 | 27,700 | \$180,000 | Rain garden/landscaped bed |
| 3 | Ryan Park | 35 | 2,900 | \$52,000 | Rain garden |
| 4 | East Street | 100 | 27,000 | \$80,000 | Rain garden |
| 5 | Edinburgh Rd | 90 | 9,600 | \$80,000 | Rain garden |
| 6 | College Lane | 30 | 3,000 | \$55,000 | Rain garden |
| 7 | Perry St (W) | 120 | 12,000 | \$110,000 | Rain garden |
| 8 | Bright St | 80 | 5,900 | \$80,000 | Rain garden |
| 9 | England Ave (E) | 80 | 5,600 | \$130,000 | Rain garden |
| 10 | William St (E) | 70 | 4,900 | \$70,000 | Rain garden |
| 11 | Leicester St | 80 | 7,800 | \$80,000 | Rain garden |
| 12 | Fotheringham St (W) | 120 | 4,500 | \$110,000 | Rain garden |
| | Various | 2-10 | Various | \$20,000 | Tree pit/mini rain garden |



Addison Road - Reverse Garbage sculpture.



Ibis at Ryan Park.



Fig trees at Enmore Park.

| Term | Meaning in Subcatchment Planning |
|--|--|
| Action Plan | A planning guide for council officers, subcatchment residents, other community members and stakeholders that provides the direction for Council and the community to achieve the water vision. |
| Adaptive management | Management approach that promotes change and learning by identifying and accepting that there are uncertainties. It uses an experimental approach. |
| Biofiltration | The use of vegetation and natural materials (including bacteria) to trap and remove pollutants. Examples include rain gardens, bioretention systems and constructed wetlands. |
| Biophysical | Relates to the combined study of physics, maths, chemistry and biology to effectively model and understand how biological systems work. |
| Bioregional | Defines the context for environmental management by natural boundaries (e.g. watershed, biophysical boundary, or area of concern of local community). A bioregional structure would mean identifying regional priorities for environmental management while encouraging local action and ownership of the process. This requires an integrated approach that coordinates diverse management processes and achieves multiple goals. |
| Bioretention | A system that uses vegetation to treat stormwater and reduce downstream stormwater flow velocities and subsequent drain sizes. |
| Botany Bay Water Quality Improvement Program (BBQIP) | Managed by the Hawkesbury-Nepean Catchment Management Authority (HNCMA), the BBQIP has developed draft water quality objectives and load targets needed to protect the draft environmental objectives. Web site: http://www.sydney.cma.nsw.gov.au/bbcci/ |
| CALD community | People from culturally and linguistically diverse backgrounds. |
| Capacity building (organisational) | The development of skills, management practices, strategies, and systems to improve an organisation's effectiveness, sustainability and ability to fulfil its vision and objectives. |
| Catchment | An area where water is collected. In a catchment, all rain and run-off water eventually flows to a creek, river, lake or ocean, or into the groundwater system. |
| Context mapping | Assessing the social, physical, organisational, policy and political influences on the subcatchment at the time of planning. |
| DCP | Development Control Plan made under Section 72 of the Environmental Planning and Assessment Act 1979. It outlines councils' detailed planning policies for land uses and the design of new development. |
| Ecology | The scientific study of the interaction between living things and their environment. |
| Ecosystem | The relationship between environment, living organisms and non-living structures within a connected system. An example would be a desert, coral reef or ice cap. |

| Term | Meaning in Subcatchment Planning |
|--|---|
| Evapo-transpiration | The loss of water from the soil, water surface and plants by evaporation to the atmosphere. |
| Fit-for-purpose | The water is suitable for the purpose for which it is used. An example is using rainwater to irrigate the garden and flush the toilet, rather than using potable water. |
| Governance | "How power within society is maintained, exercised, delegated and limited. In the context of an organisation or 'corporate' governance, it is the way decisions are taken, communicated, monitored and assessed" (adapted from ANZSOC, 2009). |
| Gradient | Slope - either ascending or descending. |
| Green infrastructure | Green spaces and water systems that deliver multiple environmental, economic and social values and benefits. Includes parks, gardens, waterways, wetlands, green roofs and walls, sports fields and cemeteries. |
| Gross pollutant trap (GPT) | Devices that trap coarse pollutants in stormwater - especially litter and coarse sediments. |
| Gross Solids | Pieces of debris larger than 5mm such as cigarette butts, leaf litter, grass cuttings and pebbles. |
| Hydrocarbons | Type of chemicals found in crude oil. Petrol, diesel and lubricating oils contain hydrocarbons. In waterways, they cause visual and chemical pollution, endangering plant and animal life. Hydrocarbons do not mix with water and form oil slicks on the water surface. |
| Impervious | A surface that cannot be penetrated. Pavements, concrete, roofs and roads are usually impervious to water. |
| Infiltration | The act of water penetrating into soil. |
| Inorganic matter | Things that do not break down to form carbon are inorganic. Examples are metals, phosphates and chlorine bleach. |
| Integrated Urban Water Management (IUWM) | A holistic approach to urban water management and planning. Water supply, stormwater and wastewater are all seen as parts of an integrated physical system that is influenced by the social characteristics, organisational framework and the natural landscape. |
| Lead | Lead is a heavy metal used in car batteries, some paints, roof materials and some fuels. It is a toxic metal that can cause blood and brain disorders. |
| Local Environment Plans (LEPs) | These are the most prominent and legally enforceable of council planning documents and include controls on zoning and permissible land uses, and relevant local planning issues such as aircraft noise, flooding and contamination. |
| Modeling | Use of computer software to test scenarios and generate site specific data. |
| Multidisciplinary | Involving people from different professional backgrounds in an activity, including technical and non-technical experts and practitioners. |

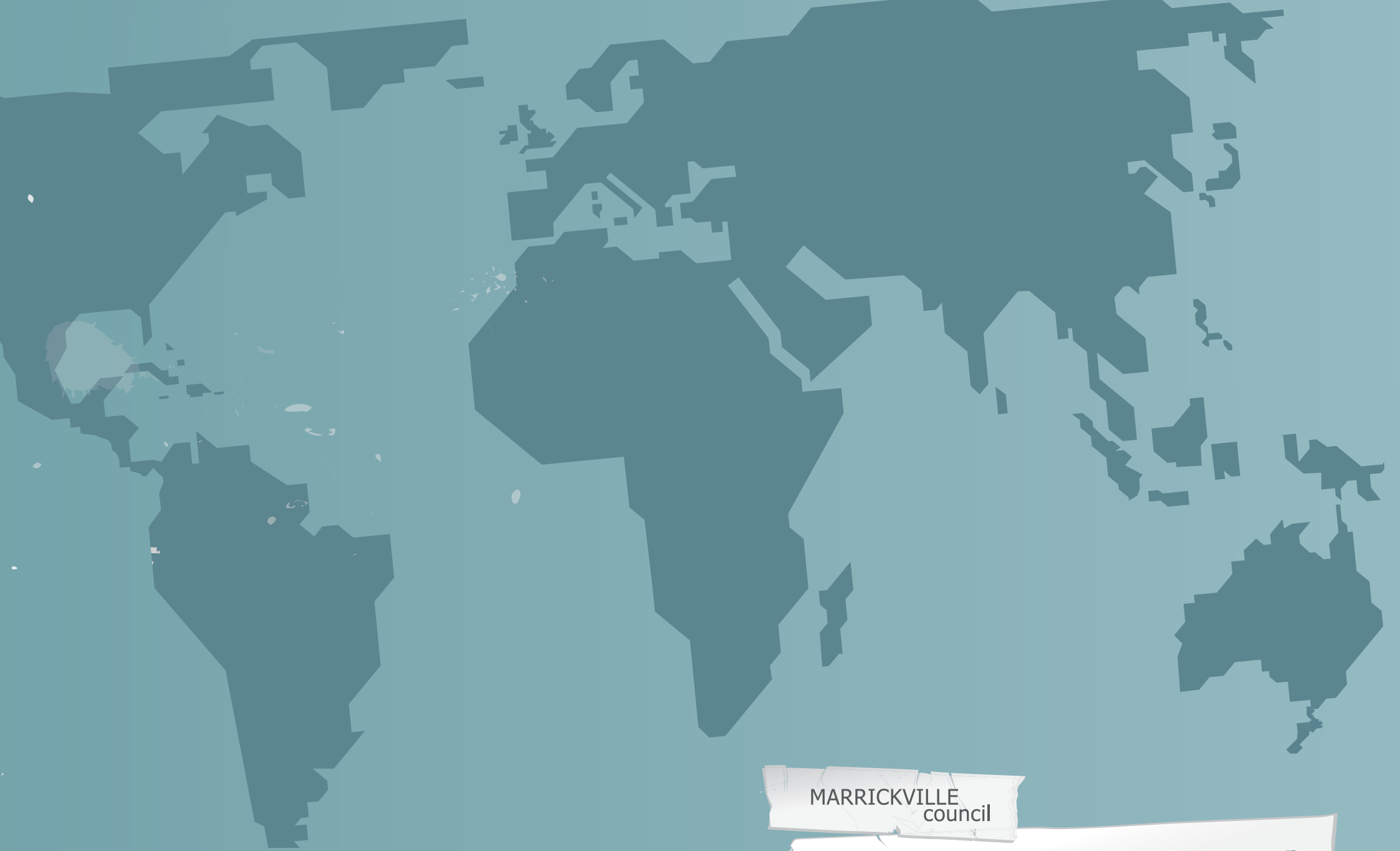
5. Glossary



| Term | Meaning in Subcatchment Planning |
|---|--|
| Nutrients | Chemical elements and compounds found in the environment that plants and animals need to grow and survive. In subcatchment planning, nitrogen and phosphorus are the nutrients of interest if levels are exceeded. |
| Organic matter | Things that break down and release carbon are organic. Leaves, grass cuttings, twigs and plants are all organic matter. |
| pH | The strength of acids and alkalines/bases. pH is measured on a scale of 1 - 14 with 1 - 6 being classed as acid and 8 - 14 alkaline. Pure water has a pH value of 7, the level a normal waterway should be. If pH varies too much, it can affect plant and animal life. |
| Phosphorus | A chemical element essential for life, phosphorus is a plant nutrient. Pesticides and detergents usually contain phosphorus. When too much phosphorus enters waterways, plant growth increases, putting pressure on oxygen and contributing to algal blooms. |
| Physical profiling | The physical context of planning, including hydrology, topography, area of open space, land use and land ownership, current water infrastructure, and pollution sources and hotspots in the area and modeling different solution possibilities, including retrofitting. |
| Potable water | Drinking quality water. |
| Rain gardens | A garden that includes a combination of native plants, shrubs and grasses that soak up stormwater and nutrients. Most are designed to allow small rainfall events to infiltrate the soil. |
| Runoff | Water that does not soak into the ground due to the surface being hard (impervious) or waterlogged. |
| Sediments | Small particles that get carried in water. The particles eventually settle to the bottom of a body of water. |
| Social profiling (also community profiling) | A way of learning about the characteristics of the community in a particular area, including population characteristics, community attitudes, values and practices. |
| Stormwater | Water from rain that 'runs off' across the land instead of seeping into the ground. |
| Subcatchment | A local watershed where all the rain falling in the area flows to the same waterway (or stormwater drain). |
| Subcatchment management plan | Plan for the subcatchment that has the subcatchment water vision, an action plan identifying the ways to achieve the vision, and the masterplan of on-ground works and other technical information, subcatchment profiles and any other studies relevant to the planning area. |
| Suspended solids | Undissolved substances in water that make the water cloudy (turbid). |
| Sustainable urban water management (SUWM) | The integration of social, economic and environmental aspects to planning and management of water, with the aim to minimise use of other resources, such as energy. |

| Term | Meaning in Subcatchment Planning |
|-------------------------------------|---|
| Swales | Shallow, open channels designed to slowly transport stormwater reducing velocity of the water and allowing some water to soak into the soil. |
| Topsoil | The surface soil that is rich in organic matter and contributes to plant nutrition. Topsoil forms very slowly so it is important to protect it for plant growth. |
| Trunk drain | Trunk drains are large channels or pipes that link an area's drainage system. During times of heavy rain, they assist in capturing and dispersing excess water as part of an area's flood management scheme. |
| USWIM | Marrickville Council's Urban Stormwater Integrated Management project. |
| Wastewater quality indicators | A set of tests carried out on water samples to find out if the water is safe to support plant and animal life. |
| Water cycle | The cycle where water evaporates from the soil, water surface and plants, and accumulates in the clouds and then returns to the Earth through rain. |
| Water sensitive urban design (WSUD) | The sustainable management of water within urban areas through intelligent and integrated design. It looks at the urban water cycle as a whole, taking into account all urban water sources: potable water, wastewater, and stormwater. |

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