



MONASH University

MARRICKVILLE  
council

# WATEREVOLUTION

Funded by the Marrickville community through the Stormwater Charge

Marrickville Council - Waterevolution  
Illawarra Road Subcatchment  
Management Plan

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Front Cover: Photograph taken from the top of the quarry at Undercliffe in 1917, showing Illawarra Road looking towards Marrickville. The present day Steel Park was then a swamp. Marrickville Local Studies Collection.

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In 2050, our community is time-rich, smart, connected and awake to the value of water as a scarce resource. Awareness of the value of water is passed on through the generations.

Our people have ownership through ongoing participation in planning and maintaining self-sufficient dwellings and infrastructure where water, transport, energy and land use systems are integrated.

In 2050, appropriate technology works for the community, supporting the systems. There is equity of access to clean water. 'Fit-for-purpose' usage is the norm and wastewater and pollution are forgotten concepts.

In 2050, there is native habitat with wildlife around Cooks River, which is clean and safe for recreation, fishing and swimming.

## Acknowledgements

Since 2003, people and organisations that have influenced the planning and implementation of the Illawarra Road Subcatchment Management Plan include:

- Dr Rebekah Brown, Monash University
- Dr Tony Wong and David Knights, Ecological Engineering
- *The Illawarra Road Sustainable Water Working Group*, current and past participants: John Butcher, Matthew Carlton, Katie Devine, Michael Easton, Ron Haering, Tom Harding, Syed Masud Hasan, Tina Kao, Jonathan Lam, Jan Lansdowne, Keren Lavelle, Fran and Peter Munro, Catriona Pyner, and Geoffrey Pyner.
- The Illawarra Road Subcatchment community
- Marrickville Council staff
- Connect Marrickville Schools as Communities Centre
- Marrickville West Public School



The Illawarra Road Subcatchment.



Volunteers at the Hill Street Rain Gardens planting day, November 2007.



# 1. Planning the Illawarra Road Subcatchment

## 1.1 Background to subcatchment planning

The *Waterevolution Subcatchment Planning* program is funded by the Marrickville Stormwater Management Service Charge. It aims to collaboratively plan each of the 22 subcatchments found in the Marrickville local government area in order to manage water sustainably in this highly urbanised environment.

### Collaborative and integrated planning approach

The *Waterevolution* approach to water management by Marrickville Council has 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 incorporating Water Sensitive Urban Design (WSUD), stormwater and rainwater harvesting, and addressing management of water quality, conservation and volume. The project trialled 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, biophysical 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
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 are designed to allow 'adaptive management' so are flexible enough to include new information, practices, and technologies as they arise. Importantly, by working with citizens and businesses, this approach encourages planning in the private domain, and builds Council and community relationships, recognising that sustainability is a whole of community issue that government cannot address alone. It is beyond Council's capacity to achieve all that is required for sustainable urban water management.

In 2003, Council joined with the Illawarra Road Subcatchment community in Marrickville South and other stakeholders and by 2006 had created the *Illawarra Road Subcatchment Management Plan*, Marrickville's first subcatchment management plan. As with all subcatchment management plans, the plan has been reviewed annually to track progress and will have a major review every five years by Council and subcatchment stakeholders, including the subcatchment working group.

## The Waterevolution

The aim of the *Waterevolution* is to work across the local government area (LGA), in both the public and private domain, to implement sustainable urban water management. To achieve this aim, Council is using a multidisciplinary approach, working collaboratively with the people of Marrickville to achieve the following objectives of Stormwater Management:

1. Apply the best practice governance to:
  - a. work with the people who live and work in the subcatchments;
  - b. build the organisational capacity – e.g. skill development, data collection and sharing, evaluation and learning;
  - c. integrate projects and planning in order to achieve value for money; and
  - d. communicate progress and results to internal and external stakeholders.
2. Apply the principles of sustainable water management to:
  - a. improve the quality of stormwater entering receiving waters;
  - b. reduce the quantity of stormwater entering receiving waters;
  - c. mitigate flooding; and
  - d. use water in fit-for-purpose applications (e.g. irrigation).

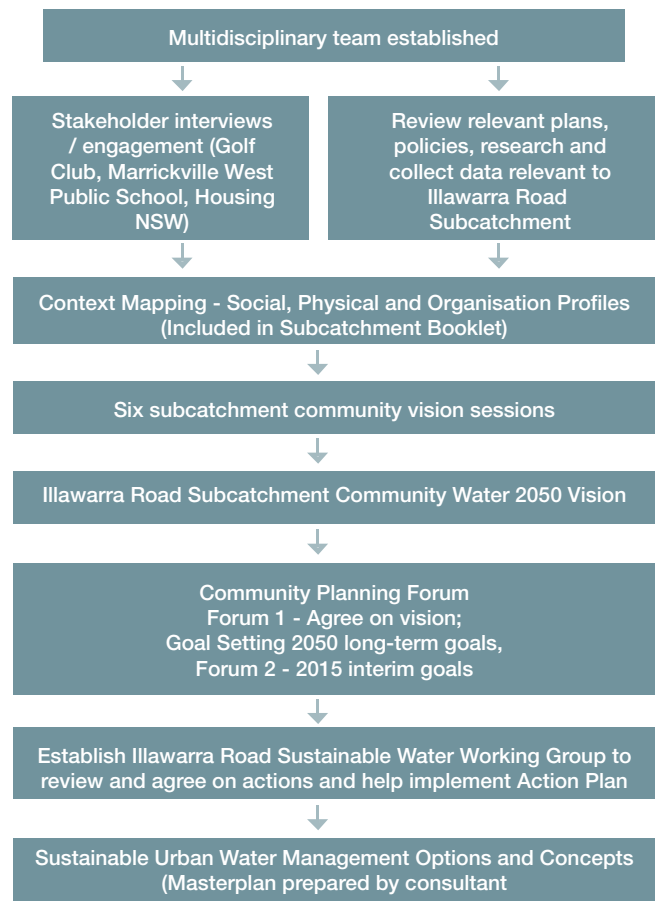
*(from Stormwater Management Service Charge Management Framework, 2008)*

# 1. Planning the Illawarra Road Subcatchment

## 1.2 How we planned Illawarra Road Subcatchment

### Collaborative planning

The goal of collaboration is to partner with the community and other stakeholders in each aspect of decision making, including developing alternatives and identifying preferred solutions. It means actively seeking direct advice and innovation in finding solutions and using the advice and recommendations into the decisions to the maximum extent possible (from IAP2, 2004).



The collaborative planning process in Illawarra Road Subcatchment (Diagram adapted from Equatica, 2009).

The collaborative planning process (Shown in diagram on this page) led to the *Illawarra Road Subcatchment Management Plan*. The plan includes the subcatchment planning context (social, biophysical, organisational), long-term vision, goals, and the actions to achieve the goals, plus the masterplan of options for on-ground works to treat and store stormwater, such as rain gardens and rainwater tanks. This revised plan includes updates to the social and physical context and the revised Illawarra Road Subcatchment Action Plan.

### Multidisciplinary team

The multidisciplinary team of Council staff, researchers from Monash University and consultants mainly included engineers, environmental managers, and social scientists with planners and asset managers involved at particular times. The team carried out the context mapping and worked with stakeholders and the community to develop the Subcatchment Management Plan.

### Context mapping

*Waterrevolution Subcatchment Planning* is an integrated approach where the plans are tailor-made to suit local conditions. For sustainable water management to be a reality, it is necessary to understand the context of the subcatchment and its community (Brown, 2003; Marsalek, et al 2001).

Context mapping provides all participants with the broad spectrum of relevant information about the subcatchment. It captures the way the subcatchment 'looks' to the local community and sustainable water management team at the time of planning. For the Illawarra Road Subcatchment, the team looked at the subcatchment history, determined the current social, water and other biophysical context, as well as the organisations and policies influencing decision making in this area.

With the planning team and subcatchment planning participants having a good common understanding of this context, an environment was created for effective communication and decision making between technical and non-technical people, and all the other participants in the planning process.

### Stakeholder engagement

Consultants and staff identified the major land managers, water users and decision-makers to discuss their participation in the planning and possibilities for works and non-structural initiatives. In the Illawarra Road Subcatchment, the Marrickville Golf Club, Marrickville West Primary School, Sydney Water, and Housing NSW (then the Department of Housing) were involved.

### *Community vision sessions*

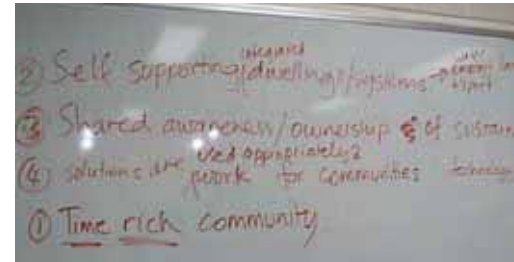
All citizens and businesses in Illawarra Road Subcatchment were invited to attend visioning sessions in June 2005. All participants were provided with the *Riverlife – Sustainable Water Environments, Planning Illawarra Road Water Futures* booklet (Marrickville Council, 2005) to ensure all participants had a common understanding of the planning area.

The *Illawarra Road Subcatchment 2050 Community Water Vision* is the result of the ideas contributed at six vision sessions, five held with local citizens and one with Marrickville Council staff. Over 60 people took part, including separate sessions with citizens from culturally and linguistically diverse backgrounds, and young people. The vision represents community desires, and forms the main reference point for subcatchment planning.

### *Planning Forum*

The community water vision formed the basis of the Illawarra Road Subcatchment Planning Forum held over two days in July 2005. The Planning Forum comprised two parts – agreeing on the vision and goal setting. The forum process provided the opportunity for development of specific goals to achieve the community vision, as well as potential actions.

The visioning and planning forum also gave insight into community receptivity to water reuse and treatment techniques, and raised awareness about sustainable water management. The combining of information compiled during context mapping with local knowledge of water issues, gave a broader understanding of the solutions that will be most appropriate for the community, environment and economy of the subcatchment.



**Key words and concepts generated from one vision session.**



**Participants and the planning forum.**

### *Illawarra Road Sustainable Water Working Group*

Following the vision sessions and forum, a subcatchment working group of community representatives was established to refine, implement and review the actions and to help prioritise and provide input to on-ground works. The Illawarra Road Subcatchment Management Action Plan was reviewed in June 2008 in collaboration with the working group.

### *Review of the action plan*

Progress with implementation of the Action Plan is reviewed on an annual basis through Council's Integrated Urban Water Management (IUWM) group. Like other action plans developed by Council, this plan has been designed for flexibility in reviewing the issues and to allow appropriate and timely response to external influences e.g. directives from the Minister. A major review of the Plan will be conducted every 5 years.

## Integrated Urban Water Management Group

Internally, Council has established the Integrated Urban Water Management Group to ensure best practice sustainable water management is integrated into all Council operations.

## Illawarra Road Sustainable Water Working Group

In the Illawarra Road Subcatchment, a community Sustainable Water Working Group has been established and has worked with Council on sustainable water programs that encourage skill-sharing and peer education within the community. This group also looks closely at emerging issues so Council policy can be revised to ensure practices implemented by the community are safe for public health and the environment.

The Illawarra Road Sustainable Water Working Group (IRSWWG), formed in February 2006, is a non-incorporated volunteer community-based group made up of local residents in Marrickville South.

The IRSWWG has worked with Council on sustainable water programs that encourage skill sharing and peer education within the community. It works with Council specifically to implement the activities identified in Illawarra Road Subcatchment Action Plan, such as the Hill Street Rain Gardens and the new Sustainability: Street by Street project. The group also looks closely at emerging issues so Council policies can be revised to make sure practices implemented by the community are safe for public health and the environment.

## On-ground works

The project has also generated two on-ground projects in the Illawarra Road Subcatchment. The Hill Street biofiltration systems (rain gardens) project is the first of its kind in Marrickville. The second project, the Sustainable Irrigation Strategy, originally looked at how stormwater could be harvested from the 34 hectare subcatchment and reused in Steel Park. The Strategy now aims to replace the potable water used to irrigate all Council's riverside playing fields with water from a range of sources that are fit-for-purpose.

## The Guidelines for Sustainable Water Planning

The Subcatchment Planning for Sustainable Water Management – Guidelines for Councils was published by Marrickville Council in 2007. It presents the new collaborative way of planning for sustainable urban water management to overcome traditional problems identified in earlier research. The Guidelines are designed primarily for regional and local government urban water managers, planners and technicians and describe the way to design an easy-to-adopt sustainable urban water management strategy with a subcatchment focus, describing the actions to take and the reasons for doing so at each step.

The Guidelines presents ten essential planning phases identified through the research as necessary for successful implementation of sustainable water practices. Each step provides a case study of Marrickville Council's experience in carrying out the step during the research project. The guidelines show how to identify and define stormwater management priorities, collaborate with communities to create a plan, and finally implement the solutions identified through the planning process.

The steps are adaptable so that management strategies for each subcatchment or other planning unit can be based on the physical and social character of the area, including competing land use requirements and community needs.

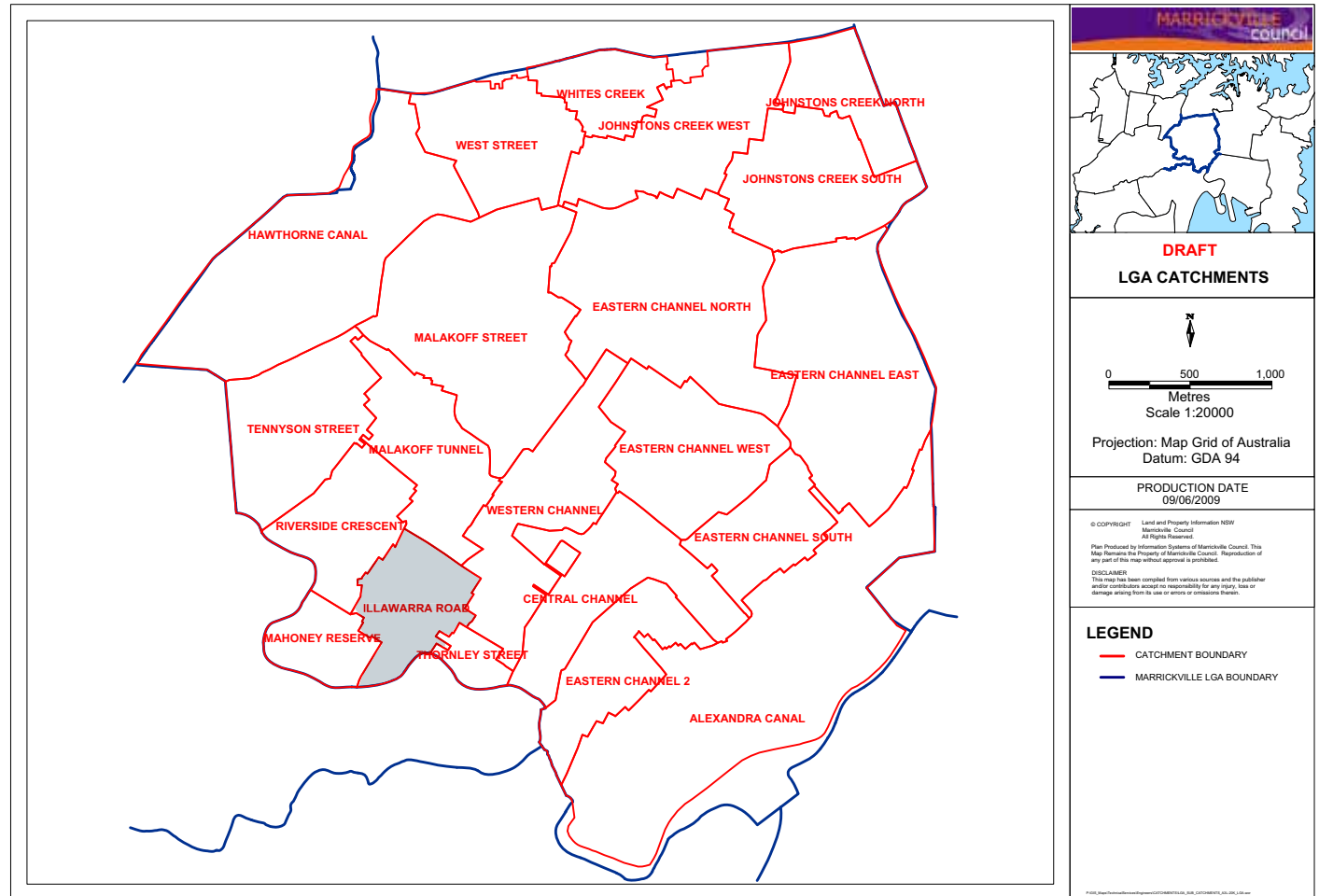
The Subcatchment Planning guidelines can be downloaded from Marrickville Council's website at: <http://www.marrickville.nsw.gov.au/environment/water/sustainablewaterplanning.htm#2>



**Guidelines for Sustainable Water Planning.**

## 2. About the Illawarra Road Subcatchment

Located in the southern part of Marrickville local government area (LGA) (see map), the Illawarra Road Subcatchment is a steep valley and drains to Cooks River via a stormwater pipe through Steel Park. The subcatchment is 36 hectares and predominantly residential (24 hectares), with the population of 3,600 making up almost five percent of Marrickville's estimated population of 75,500 (ABS 2006 Census). Compared with the Marrickville LGA, a higher proportion of people live in social housing. There is only a small commercial strip concentrated along the northern section of Illawarra Road and Renwick Street and no industrial zoning. Open space is concentrated along Cooks River in land that is reclaimed. Stormwater drainage is the responsibility of Council.



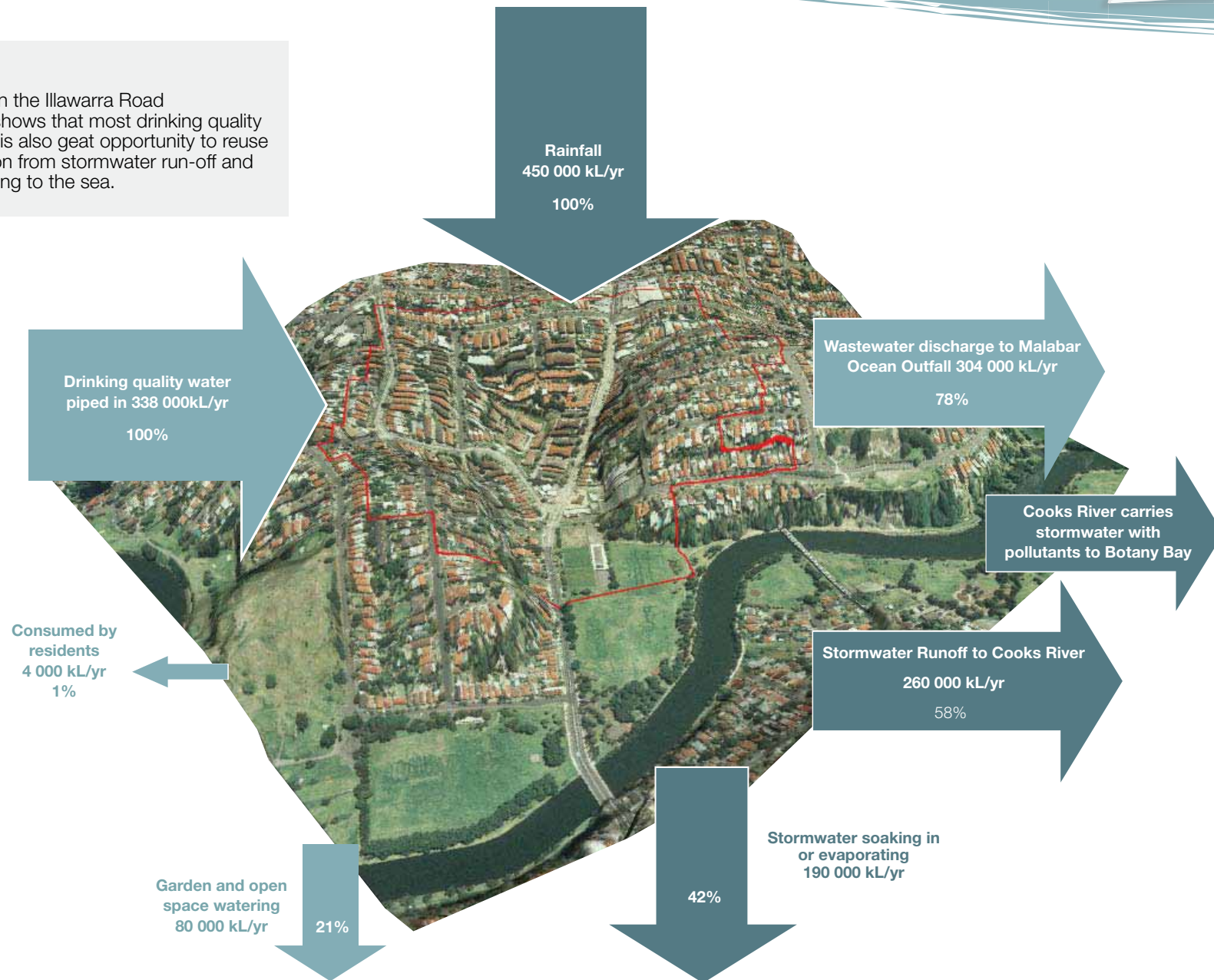
Subcatchments in Marrickville LGA with the Illawarra Road Subcatchment highlighted.



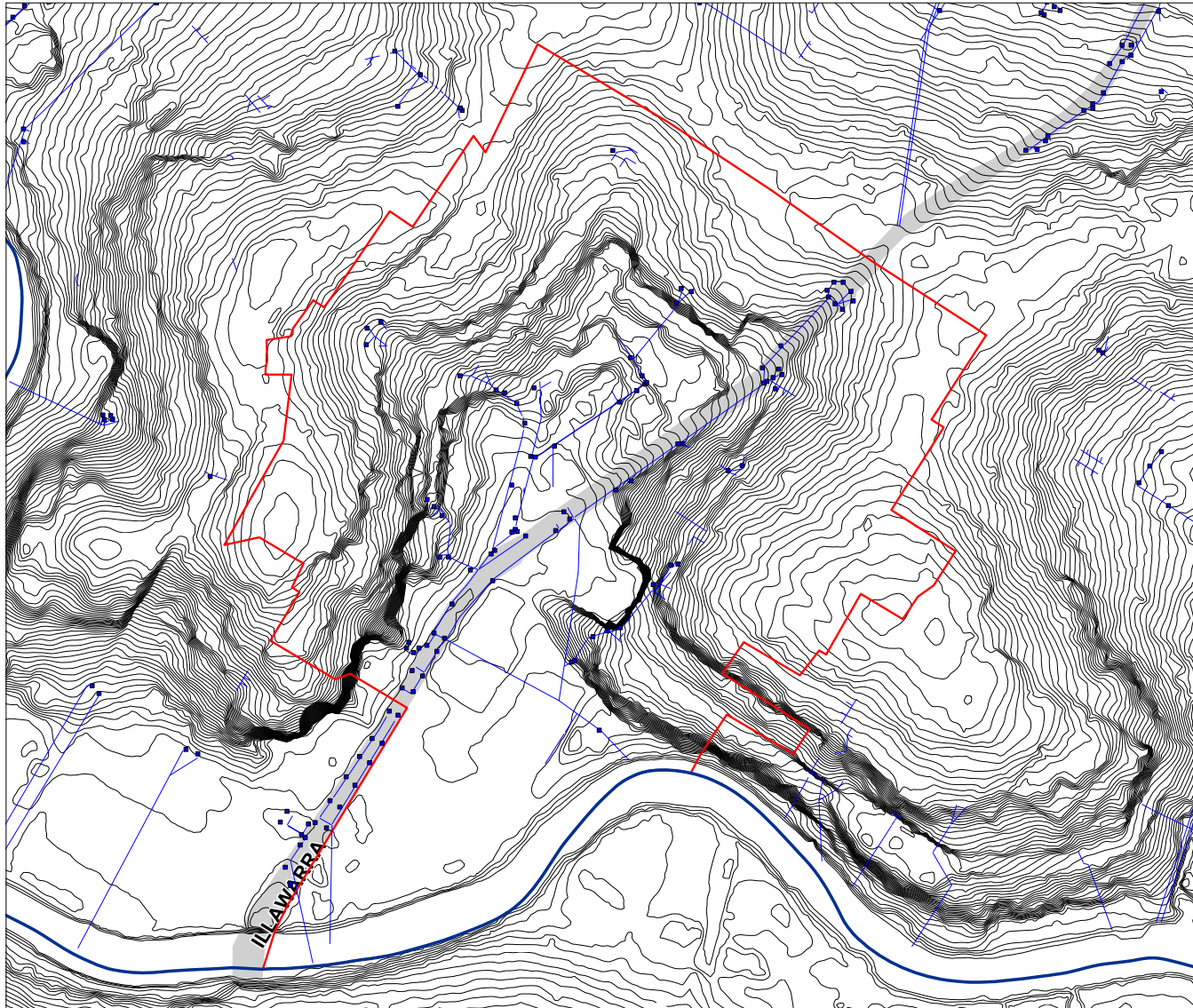
# The Illawarra Road Subcatchment Water Cycle

## The Water Cycle

Water cycle modelling in the Illawarra Road Subcatchment clearly shows that most drinking quality water is wasted. There is also great opportunity to reuse water to reduce pollution from stormwater run-off and prevent wastewater going to the sea.

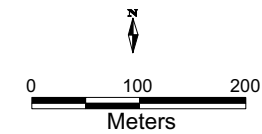


# Contour Map of Illawarra Road Subcatchment



The contour map clearly shows the steep gradient of the valley where Illawarra Road transects, and the locations of the stormwater drainage pits and pipes.

- Drainage Pits
- Drainage Pipes
- Contour Line
- Illawarra Road Subcatchment Boundary
- Marrickville LGA Boundary
- Major Roads



Projection: Map Grid of Australia  
Datum: GDA 94



Localised flooding on Illawarra Rd, February 2008.  
Photo by Paul King.



## Residential Dwelling Types

Catchment Size – 36 Hectares  
Number of residential dwellings – 1,250



24%  
Separate houses



29%  
4 or more storey block of flats, units, apartments



27%  
3 storey block of flats, units, apartments



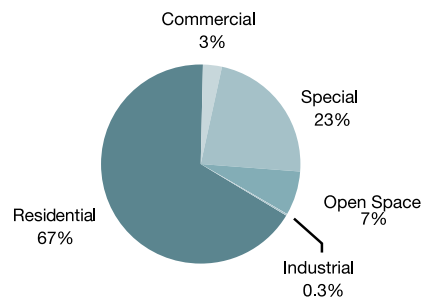
13%  
1 or 2 storey block of flat, units, apartments



6%  
1 or 2 semi, row or terrace houses

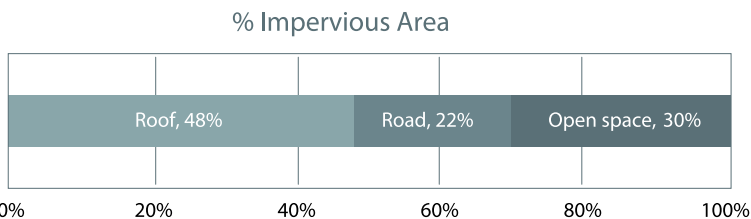
## Land Use

Illawarra Road is primarily residential

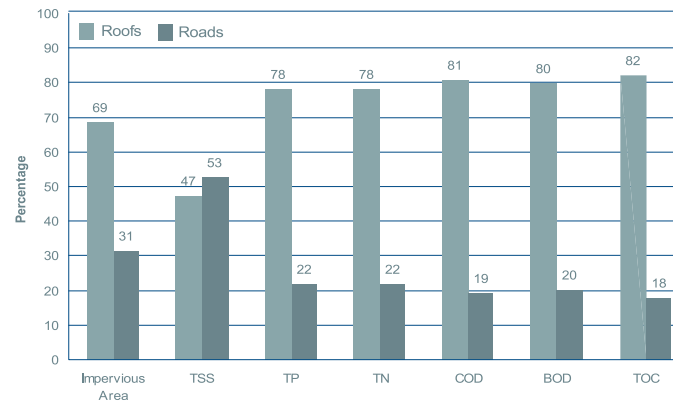


Approximately 70% of the catchment consists of hard (impervious) surfaces (roads and roofs). This reflects the high density residential and commercial character of the catchment.

A breakdown of this impervious area shows that approximately 69% is made up of roofs and 31% roads.



Based on this information, pollutant modeling software (MUSIC) was used to determine relative pollutant loads in the catchment. The analysis shows that except for suspended solids, the relative pollutant loads are generally related to the make up of catchment impervious surfaces.



**These results suggest that roof runoff is a significant contributor to stormwater pollutants in Cooks River.**

**KEY**

- TSS - total suspended solids
- TP - total Phosphorus
- TN - total Nitrogen
- COD - chemical oxygen demand
- BOD - biological oxygen demand
- TOC - total organic carbon



**Sediment build up between pit and Hill Street Rain Garden at corner of Illawarra Rd.**



**Hard surfaces increase the volume and speed of stormwater runoff that carries pollutants to Cooks River.**



## Stormwater Ponding

Stormwater ponding typically occurs in low points or 'sags' where water cannot drain quickly. Ponded water can spread across the road and into adjacent properties. Ponding and local flooding in the Illawarra Road Subcatchment occurs at:

- View St
- Premier Rd and Hampden St
- Corner of Glen St and Hill St
- Hampton Ave and Day St

### Spots along Illawarra Road

- Hill Street
- Wallace St
- Wharf Rd

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



## Dumping

Dumping is more common near unit blocks and in rear lanes. Dumping is a regular problem at:

- Phillips Lane on the back of Livingstone Rd (dumping)
- Renwick St and Harnett St (street litter bins)
- Livingstone Rd at the corner of Hill St (dumping)
- Bottom of Hill St (dumping)
- Thornley St, at the Steel Park car park entrance (dumping)



Photos by Paul King

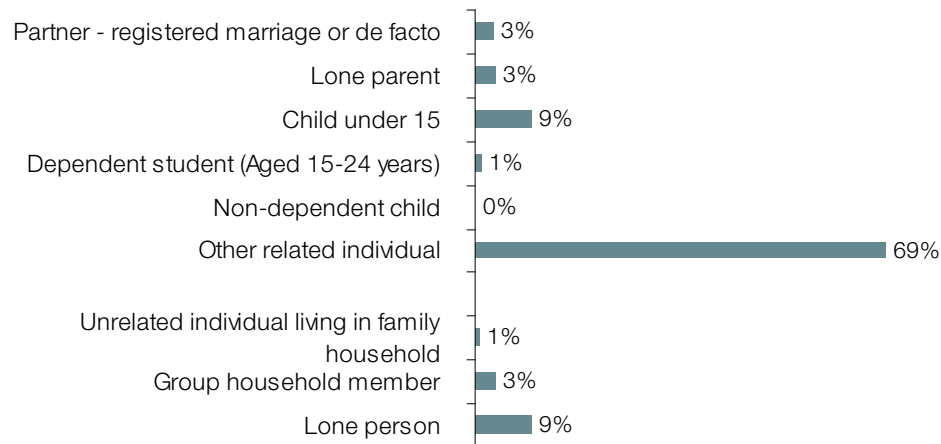
The area between Steel Park and Cooks River is well known for flooding up to Hill St and Illawarra Rd



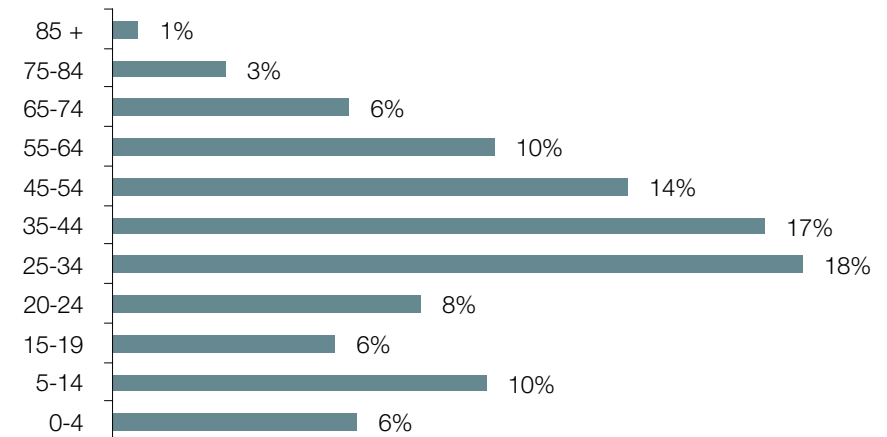
## Key Statistics

- Population – 3,060 residents
- Origin – 51% Australia (2% Indigenous)  
49% born overseas – Vietnam (7%), Greece (5%), China (4%), Lebanon (2%), UK (2%), New Zealand (2%)
- Languages at home – Chinese (10%), Greek (9%), Vietnamese (9%), Arabic (7%), Portuguese (3%), Italian (1%)
- Religion – Catholic (25%), Eastern Orthodox (11%), Islam (10%), Anglican (8%), Buddhism (8%)
- Transportation – Car (53%), Train (27%), Bus (14%), Walk (5%)

## Household Types



## Age Distribution



## Education

- Educational attendance in 2006 - 32% of total population  
Preschool 2%, Infant/Primary 6%, Secondary 5%,  
Technical or Further Education Institution 3%,  
University or other Tertiary Institution 5%
- People with non-school qualifications – 37% of adult population (15+ years)  
All university qualifications 21%, other post school 17%

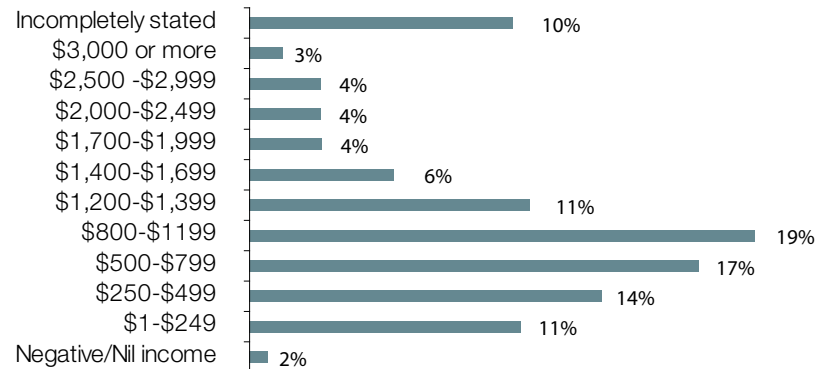
## Employment

Of total labour force:

- Full time - 62%
- Part time - 24%
- Unemployed - 7%

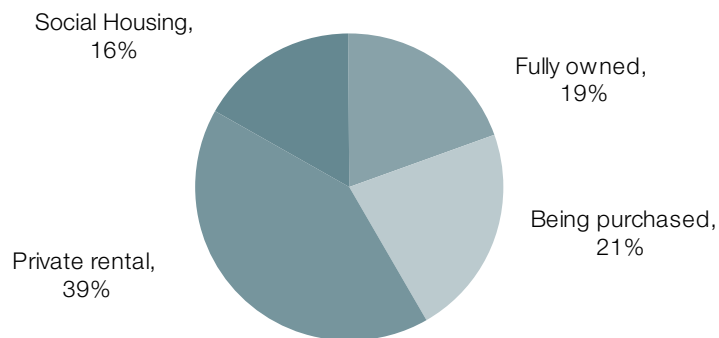


## Weekly Household Income



40% of households have income below Marrickville median of \$1160 per week.  
34% have income above \$2000 per week.

## Household Tenure



## Residency Time

- 83% lived at the same address 1 year ago
- 57% lived at the same address 5 years ago



The Illawarra Road Subcatchment community planting out the Hill Street rain gardens, November 2007.

## Who answered the survey?

227 households in February 2008 (18% response rate)

Gender	53% Females 47% Males,
Origin	66% Born in Australia 3% New Zealand 9.3% East/SE Asia 14.4% Europe
Language	82% Speak English at home
Education	53% University including postgraduate 23% TAFE or trade qualifications 22% school only
Age	87% in 20-59 age group
Household Type	31% couple with children 29% single living alone 21% Couple no children 5% Share Accomodation 8% One Parent
Tenure Type	43% Fully own 29% Purchasing 26% Rent private 1% Rent public
Dwelling	37% Separate House 6.6% Semi, Terrace, Townhouse 55% Flat,unit,apartment
Time in Current Residence	16.3% - <1 yr 42.3% - 1-5yrs 17.2% - 6-10 yrs 5.3% -11-15 yrs 5.7% - 16-20 yrs - 7.9% - >20 yrs
Individual Gross Weekly Income	11% - \$1000 28% - \$1499 - \$1500+ 11% - \$800-\$999 11.5% - \$600-\$799 14% - > \$599

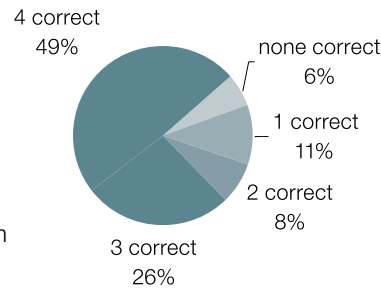
## Knowledge of urban water systems

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

Nearest waterway (correct)	76%
Sewerage system	18%
Sea	4%

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

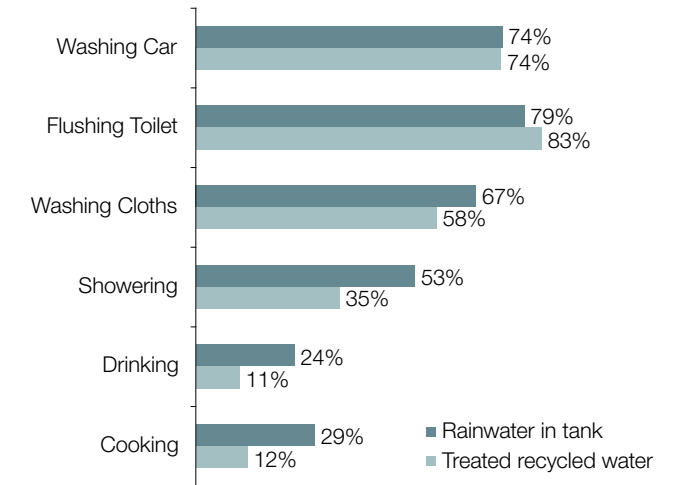
- the kitchen sink
- the shower
- the toilets
- excess water from the garden
- the washing machine
- driveways, footpaths
- other paved areas
- rainwater from the roof



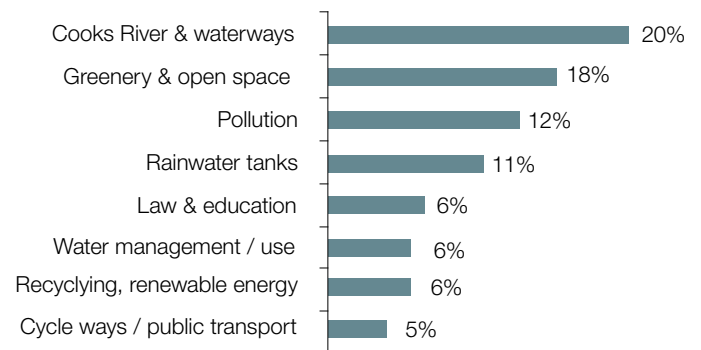
3. On average, how many litres of water does a typical Marrickville household use per day?

76% under estimate (0-400L)	0-100L	14%
14% correct range (400-500L)	100-200L	20%
9% over estimate (500+L)	200-300L	18%
	300-400L	23%
	400-500L	16%
	500+L	8%

## Willingness to Reuse Water

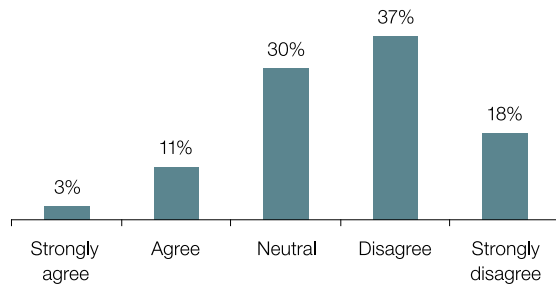


## Major improvements wanted in the next 20 years

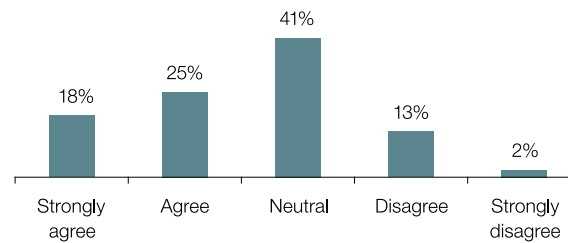




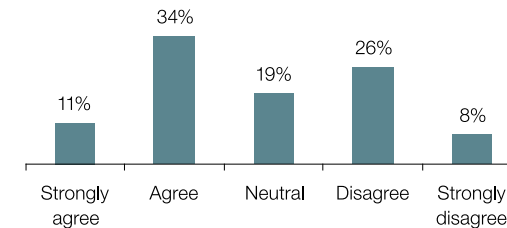
## Attitudes to the Waterway Environment



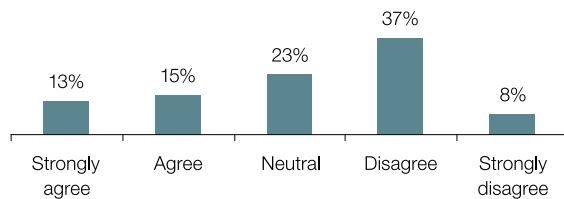
a) 'Jobs are more important than the environment'



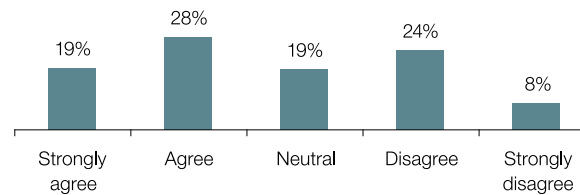
b) 'Access to a healthy natural environment is more important than access to community facilities'



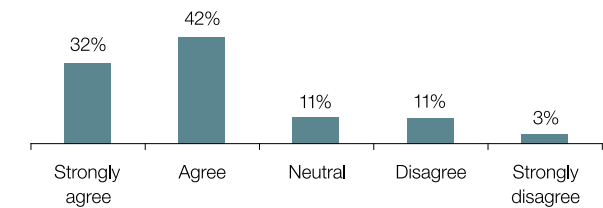
c) 'My daily activities have little negative impact on the waterway environment'



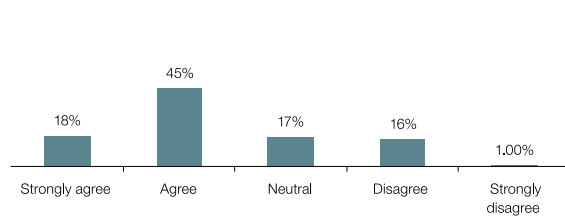
d) 'Government agencies should have the main responsibility for the waterway environment rather than the individual.'



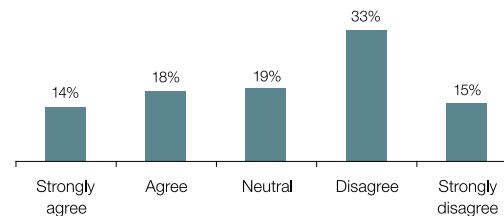
e) 'We should aim for the same waterway conditions as before the Europeans arrived over 200 years ago.'



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.'

## Authorities

### Sydney Water

Controls wastewater and potable water infrastructure and delivery within the subcatchment. Sydney Water owns the easement behind the Hill Street housing estate.

### Roads and Traffic Authority

Jointly responsible for the operation and maintenance of Illawarra Road.

### NSW Maritime

The consent authority for water-based developments on Cooks River. It is also responsible for the river below high tide, managing moorings and major aquatic events.

## Departments

### Housing NSW

Provides affordable housing for low-income families, 12% of dwellings in the subcatchment managed/owned by Housing NSW, including Aboriginal Housing.

### Metro Community Housing Co-operative

A community based housing association, which provides a range of self-managed, affordable quality, secure housing for tenants working through the Office of Community Housing.

## Land Users

### Schools

Marrickville West Public School – corner of Livingston Road and Beauchamp Street, 300 students. Community garden on school grounds

Ferncourt Public School – 74 Premier Street, 275 Students.

### Places of Worship

*(All just outside the subcatchment)*

The Seventh Day Adventist Church – Services in Spanish, 299A Livingston Road

Church of Christ – 389 Illawarra Road

Marrickville Uniting Church – Services in Vietnamese and Indonesian, 390 Illawarra Road

## Commerce

There are fewer than 10 commercial businesses in the Illawarra Road Subcatchment. Woolworths Supermarket with a large adjacent carpark, 463 Illawarra Road, is the largest commercial business in the subcatchment.



This diagram represents the range of authorities and major landusers in the catchment.

### Legend

Catchment Area	Pits
Arterial Roads	Sydneywater Drainage
Sewers	Stormwater Drainage
Department of Housing Property	Contour Lines (2m intervals)
General Business Zones	Railway Lands
General Industrial Zones	

## Community Services

Organisation/ Operation	Activities/Management	Location
Debbie and Abbey Borgia Community Recreation Centre	Provides a variety of services to Marrickville residents. Leased by Marrickville Council, managed by Police and Citizens Youth Club	531 Illawarra Road
May Murray Childcare Centre (new Marrickville West out of school hours care opened in 2008)	Provides childcare both during school hours and after hours – birth to 5 yrs/old	35 Premier Street
Castle Leap Nursing Home	Provides care for elderly and terminally ill – 38 beds	11 Wallace Street

## Parks, Playgrounds & Reserves

All parks and reserves managed by Marrickville Council's Parks and Reserves Section.

Steel Park	6.3ha. Playground, rugby field, two soccer fields and cricket pitch
The Louisa Lawson Reserve	0.14ha. Playground and rest area, basketball facilities
Premier Street and Day Street Reserves	Road closures for green space
Private recreation properties	4 tennis courts, corner of Thornley Street and Hampden Avenue.



The Debbie and Abbey Borgia Community Recreation Centre.

# 3. Illawarra Road Vision, Goals and Action Plan



The Illawarra Road Community Water Vision 2050 was created by the subcatchment community at a series of planning sessions in July 2005. The community goals set out clear aims for Cooks River and the subcatchment for the year 2050, as well as interim goals for 2015.

## The Illawarra Road Subcatchment 2050 Community Water Vision

In 2050, our community is time-rich, smart, connected and awake to the value of water as a scarce resource. Awareness of the value of water is passed on through the generations.

Our people have ownership through ongoing participation in planning and maintaining self-sufficient dwellings and infrastructure where water, transport, energy and land use systems are integrated.

In 2050, appropriate technology works for the community, supporting the systems. There is equity of access to clean water. 'Fit-for-purpose' usage is the norm and wastewater and pollution are forgotten concepts.

In 2050, there is native habitat with wildlife around Cooks River, which is clean and safe for recreation, fishing and swimming.

## Action Plan

For each 2015 goal, the strategies include:

- *Measurement* - assessment of status, gathering of data, review of programs;
- *Guidance* - setting policy directions, developing systems and methodologies;
- *Implementation* - taking on-ground action;
- *Promotion* - encourage and publicise - internally and externally; and
- *Education* - development and delivery of key programs to bring about change.

## Illawarra Road Subcatchment 2050 Goals

In 2050:

- water in Illawarra Road Subcatchment is valued as a scarce resource;
- planning and management of water is owned by the community and fully integrated with transport, energy, and land use planning and management;
- Cooks River is clean and suitable for primary recreation and fishing;
- fit-for-purpose water use is the norm;
- there is zero wastewater; and
- there is zero water pollution.

## Illawarra Road Subcatchment 2015 Goals

By 2015:

1. a whole-of-catchment (community and all 13 Councils) commitment to the 2050 Vision for Cooks River will be established;
2. the community values water to the extent that household water habits have changed;
3. integrated water management and planning is in place where the urban streetscape is reconnected with the natural water cycle;
4. planning instruments have been revised; and
5. the Illawarra Road community is a leader in wastewater reuse in ultra-urban areas and the reuse of wastewater has been adopted as the accepted practice.



Between 2003 and 2006, Marrickville Council with the subcatchment community, researchers and other stakeholders worked together to develop the Illawarra Road Subcatchment Management Plan. The subcatchment vision, goals and actions in the plan were created at the vision sessions, planning session, planning forum and other engagement activities. The Illawarra Road Sustainable Water Working Group was formed in 2006 and continues to work with Council with Council to implement and review the subcatchment management plan.

## Achievements to October 2009

Adopting this collaborative planning approach specifically led to:

- The Illawarra Road Subcatchment vision to the year 2050;
- The Illawarra Road Subcatchment Action Plan representing the ideas, knowledge and values of those living and working in the subcatchment;
- The Illawarra Road Masterplan for on-ground works specific to the subcatchment, prepared to achieve a sustainable water environment;
- Illawarra Road Sustainable Water Working Group;
- A wide range of site-specific solutions, locally appropriate for the subcatchment community, landscape, land use and existing infrastructure being identified;
- Selection of specific projects at concept stage eligible to be funded from the Stormwater Management Service Charge and suitable for seeking grant funding;
- Construction of Hill Street rain gardens;
- Preliminary designs for WSUD in Wallace Street, Thornley Street Street and Wharf Road;
- Community Water Surveys in 2003 and 2008;
- The Sustainable Water Ambassadors peer education program (now nine local volunteers);
- All Council and agency staff involved in creating the subcatchment management plan having a better understanding of the demography, administrative and physical nature of the Illawarra Road Subcatchment, improving their ability to deliver programs that meet definite community needs;
- Marrickville Stormwater Management Service Charge from July 2007 for funding Integrated Urban Water Management (IUWM);
- An undertaking from Council's Senior Staff not to embark on single issue water management planning;
- Council's *Integrated Urban Water Management Group*;
- Commitment to develop subcatchment management plans for all 22 subcatchments within 5 years;
- The appointment of a full-time environmental engineer in the Technical Services section of Council, plus the Stormwater Engineer, the Water and Catchments Coordinator, and the IUWM Officer in Environmental Services;
- The Rainwater Tank Incentive Scheme, including a rebate for rainwater tanks based on their capacity, and rainwater harvesting technical workshops to support implementation and maintenance;
- The collaborative and context based subcatchment planning being replicated by seven other Cooks River councils through *Our River: Cooks River Sustainability Initiative*;
- Local volunteers planting out the Hill Street Rain Gardens in Illawarra Road Subcatchment, November 2007.
- The collaborative approach used in the current development of the Marrickville Riverside Parks Sustainable Irrigation Strategy; and
- The development of the Illawarra Road Sustainable Water Working Group's Sustainability: Street By Street Project; and
- Planning of three more subcatchments, Tennyson Street (Dulwich Hill) and Riverside Crescent (Marrickville) subcatchments also on Cooks River, and Eastern Channel East Subcatchment covering parts of Enmore, St Peters and Newtown.
- The *Subcatchment Planning for Sustainable Water Management Guidelines for Councils*.



**Local volunteers planting out the Hill Street Rain Gardens in Illawarra Road Subcatchment, November 2007.**

## Goal 1

A whole-of-catchment (community and all 13 councils) commitment to the 2050 Vision for Cooks River will be established where the whole catchment recognises that the Illawarra Road Community Water Vision can only be achieved by addressing the three fundamental issues of:

- total catchment practices
- sewer and trade-water inflows
- contaminated sediments

This will be achieved by:

- taking a leadership role in creating a sustainable water environment
- demonstrating sustainable water management processes to drive a revolution in the Cooks River catchment

### Measure - assess status, gather data, evaluate

1. Undertake five yearly follow-up studies of the Cooks River benthic zone, to compare with data gathered through the 2005 study completed in partnership with the UNSW Centre for Marine and Coastal Studies. This will allow monitoring and analysis of trends in the:

- shape and form of the river bed - scour areas, sediment loads etc
- level and diversity of benthic life
- presence of heavy metals in sediments
- presence of heavy metals in the water column and associated availability to river life

Status: ✓

2. Undertake a stormwater quality monitoring program for Cooks River, based in the Illawarra Road Subcatchment, to measure pollutant levels at stormwater outlets, including Total Suspended Solids, Nitrogen and Phosphorus

Status: ✓

3. Assess irrigation management parameters in the Illawarra Road Subcatchment, including:

- Cost and logistics of transporting water
- Availability of water storage facilities
- Opportunities for improved irrigation systems
- Opportunities for fit-for-purpose water use

Status: ✓

4. Arrange for annual updates on the implementation and outcomes of SewerFix, Sydney Water's sewer overflow abatement program, to be presented to Council and Senior

Status: ✓

### Guide – set policy directions, develop systems and methodologies

1. Maintain an active partnership of all Cooks River councils through the Cooks River Foreshores Working Group (CRFWG) to ensure a continuing and productive dialogue on sustainable water management in the region including:

- the remediation of sediment
- the restoration of riparian ecosystems including weed management
- source control of pollutants, including nutrients, sediment, organic matter and litter
- water sensitive urban design

Status: ✓

2. Maintain a holistic approach to biodiversity management within the framework of total catchment management practice by liaising regularly with other Cooks River councils regarding use of provenance species, principles of ecology and design and to share skills and resources

Status: ✓

### Implement - take action

1. Establish the Illawarra Road Subcatchment as a demonstration of best practice sustainable water management to motivate surrounding councils by incorporating Water Sensitive Urban Design into all new public works projects including:

- road resurfacing with permeable paving
- installation of biofiltration systems
- use of vegetative buffer zones
- use of swales instead of curb and gutter systems
- the addition of underground water storage during park retrofitting
- dual piping where appropriate

Status: ✗

2. Continue implementation of restoration works program along Cooks River that functions to enhance the recreational aspects of the area, increase stormwater filtering and reduce stream bank erosion, including reestablishment of vegetative buffer zones, progressive removal of damaged steel sheet piling and rock banks and sediment contaminant remediation

Status: ✓

3. Implement projects to continuously raise awareness of sustainable water management, such as public art features, murals and decorative stormwater grates and promote these to the community

Status: ✓

Key: ✓ = implemented; ✗ = yet to be tackled

4. Promote the Bush Pockets program, ensuring appropriate guidance with regard to use of local provenance species and sustainable water management, to ensure small areas of open space are being used most profitably to filter, harvest and slow stormwater flows

Status: ✓

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5. Implement actions for stormwater filtration and harvesting as identified in the Illawarra Road Masterplan

Status: ✓

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## Promote - encourage and publicise - internally and externally

1. Complete Guidelines for Sustainable Water Planning and distribute to all Cooks River and SSROC councils

Status: ✓

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2. Seek funding to allow the distribution of Guidelines for Sustainable Water Planning to councils Australia wide

Status: ✓

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3. Present USWIM project findings on subcatchment based sustainable water planning at conferences and workshops

Status: ✓

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4. Continue to encourage the State Government, alone and in partnership with other Cooks River councils, for long-term commitment to the funding of Cooks River restoration works

Status: ✓

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5. Regularly report outcomes of regional and local programs to the State Government other Cooks River councils and SSROC to demonstrate active sustainable water management and encourage action by other agencies Action to be reworded to reflect more appropriate action to gain government support

Status: ✓

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6. Report on Council's integrated urban water management achievements to the community through Council newsletters, the State of the Environment Report, Council's website and through the local media

Status: ✓

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7. Promote the successful outcomes of the project through relevant journals, email discussion lists and newsletters

Status: ✓

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## Educate - develop and deliver key programs to bring about change

1. Liaise with and educate businesses in the Illawarra Road Subcatchment to assist them in reducing trade waste and pollutant inflows into stormwater

Status: ✓

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2. Liaise with and educate businesses in the Illawarra Road Subcatchment to assist them and to reduce illegal dumping

Status: ✓

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3. Create sustainable water demonstration sites and promote to other Cooks River councils, residents and businesses through:

- Demonstration of sustainable water management throughout Council's assets, including parks and buildings
- Community partnership projects with groups such as schools and community gardens
- Promotion of best practice sustainable water management in the community

Status: ✓

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4. Increase promotion of the water-wise category of the Marrickville Council Spring Garden competition to recognise residents and/or businesses that are practicing sustainable water management. Promote these residents as environmental champions

Status: ✓

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5. Continue to celebrate Cooks River as it is restored, through the annual Cooks River Festival and by ongoing education programs aimed at instilling respect for the River and water in the community

Status: ✓

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6. Use the annual Sustainable Water Showcase to promote a variety of approaches to sustainable water management. Invite representatives from other Cooks River councils to participate in the Showcase

Status: ✓

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## Goal 2

The community values water to the extent that household water habits have changed where:

- 85% of households are receptive to using recycled water for gardens, car washing, toilet flushing, washing machines/clothes and showering
- 50% of households have some infrastructure in place to allow use of recycled water e.g. dual pipe systems, rainwater tanks, grey water systems
- 100% of households will have some aspects of water conservation/reuse installed
- there is some Housing NSW urban renewal – business case for Housing redevelopment / renewal redevelopment/renewal to include public and private housing
- there is a demonstration project of a 2050 house

### Measure - assess status, gather data, evaluate

1. Track the rate of household retrofitting in the Illawarra Road Subcatchment through:

- Surveying households every five years on water saving practices being undertaken
- Obtaining residential and business water use data for the subcatchment from Sydney Water and comparing it with water use data from previous years, across the entire LGA and with the whole of Sydney

Status: ✓

2. Maintain records of attendance at workshops, showcases and tours to demonstration sites relating to sustainable water management that are held in the Illawarra Road Subcatchment to assess any change in receptivity over time

Status: ✓

3. Continue to survey residents at community events and workshops regarding their attitudes towards rainwater and reclaimed water to ascertain effectiveness of education programs

Status: ✓

### Guide - set policy directions, develop systems and methodologies

1. Gradually reduce Council's reliance on potable water for irrigation in the subcatchment, ultimately sourcing all water for parks and public gardens from a diverse range of non-potable sources, with a preference for stormwater

Status: ✓

### Implement - take action

1. Work with Housing NSW to include sustainable water management in social housing, including:

- Extensive rainwater harvesting
- Use of recycled water for irrigation
- Water sensitive urban design
- The use of water efficient fixtures

Status: ✗

2. Investigate opportunities for the development of a Sustainable House to demonstrate and promote best practice domestic water management to the community. Utilise this as a site for workshops and courses

Status: ✓

3. Develop a rainwater tank incentive scheme for Marrickville residents, separate and in addition to the Sydney Water rebate program, with rebates based on the size of the tank and whether or not it is plumbed for internal use

Status: ✓

4. Wherever possible install dual municipal water supply pipelines for potable water and treated wastewater during capital works, particularly where there is a high water use requirement such as in industrial areas and parks

Status: ✗

### Promote - encourage and publicise - internally and externally

1. Promote all available rainwater tank incentive schemes, highlighting that rainwater harvesting is a means of reducing stormwater pressure on Cooks River, through local media coverage, newsletters and on Council's website

Status: ✓

2. Report to Senior Staff and Council annually regarding in-house water savings achieved following retrofitting to maintain enthusiasm and commitment across Council

Status: ✓

3. Promote the activities of the Sustainable Water Ambassadors to illustrate the benefits of sustainable water management at the domestic level

Status: ✓

4. Ensure information, resources and project outputs relating to sustainable water management are shared and distributed widely both to the public and to other councils and land management agencies

Status: ✓

5. Develop a promotional strategy for the Illawarra Road Community Water Vision and Goals and report results of uptake to the community

Status: ✓

Key: ✓ = implemented; ✗ = yet to be tackled

## Educate - develop and deliver key programs to bring about change

1. Produce and distribute fact sheets for renovators and developers on the use of rainwater for internal and external purposes, dual plumbing systems, greywater treatment systems and the regulations applicable to them

Status: ✓

2. Develop and run a program of hands-on workshops that focus on residential retrofitting for sustainable water management. Topics could include:

- Installing the right rainwater tank to meet your needs
- Risks and issues with using greywater
- Water saving appliances and fixtures
- Stormwater management

Status: ✓

3. Review and strengthen the Target Sustainability @ Marrickville program to create further incentives for environmental stewardship and to align with subcatchment boundaries. Expand the program to include both commercial and industrial properties, free water auditing and comprehensive reporting on potential water savings actions that could be implemented by the businesses

Status: ✓

4. Implement a stormwater education program targeting residents of multi unit dwellings, similar to the Sustainable Streets program, where the residents are mobilised as a group to foster pride in their local community

Status: ✓

5. Undertake a Community Leadership program to reach residents and business owners from culturally and linguistically diverse backgrounds. The program should be underpinned by the concept of developing an understanding of the water cycle and the impacts of domestic water management habits on the entire catchment

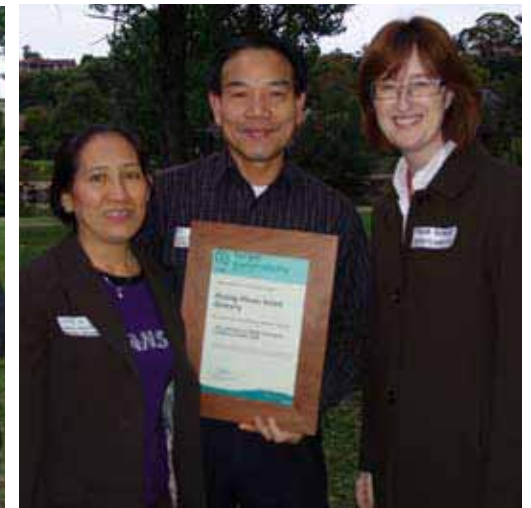
Status: ✓

6. Encourage water conservation practices in the community through giveaways of water efficient showerheads and other water saving fixtures

Status: ✓



Participants of WSUD tour at Hill Street Rain Garden on corner of Illawarra Rd, June 2009.



Recipients of 2008 Target Sustainability @ Marrickville program Environmental Awards Sustainable Water Ambassadors receiving award from Deputy Mayor, Cllr Fiona Byrne.

Key: ✓ = implemented; ✗ = yet to be tackled

## Goal 3

Integrated water management and planning is in place where the urban streetscape is reconnected with the natural water cycle and we have:

- completed a number of demonstration projects including at least one large-scale Water Sensitive Urban Design (WSUD) demonstration site and developed one Sustainable Street project
- established in-house expertise within Council on the application of WSUD and Integrated Urban Water Management (IUWM)
- mapped the process of householder engagement in the design of new streetscapes
- created a network of neighbourhood champions, directly involved in change for better urban water management

### Measure - assess status, gather data, evaluate

1. Assess improvements in sustainable water management in the Illawarra Road Subcatchment by collecting and comparing gross pollutant trap data including:

- Tonnes of litter removed
- Tonnes of organic waste removed
- Tonnes of sediment removed
- Regularity of maintenance schedules

Status: ✓

2. Conduct monitoring of existing WSUD elements to determine their effectiveness in slowing, filtering and harvesting water. Include assessments of:

- Water quality before and after treatment within the WSUD system
- Potential for flooding
- Quantity of polluted water still entering Cooks River
- Cost effectiveness – installation and maintenance
- Integration with the environment
- Amenity value
- Open space required for effective functioning of the device/system

Status: ✗

3. Track Council's financial commitment to sustainable water management through records of budget allocations (education, communication, engineering, landscaping, project management) and grant funding sought and obtained

Status: ✓

4. Carry out a needs assessment of relevant Council staff to determine requirements for training in integrated water cycle management and water sensitive urban design

Status: ✗

### Guide - set policy directions, develop systems and methodologies

1. Establish a training program to up-skill Council staff and contractors in best practice stormwater management, water sensitive urban design and compliance with new planning requirements. Training should be specific to each division including Monitoring, Planning and Engineering Services, Parks and Reserves, Business Units (Waste, Works and Parks), Property Services, Facilities Management (libraries, childcare centres etc) and Environmental Services

Status: ✗

2. Develop a sustainable water management policy for design of all capital works that outlines minimum standards for:

- Use of permeable pavement
- Minimum area effective permeable surface area
- Reduction in impact by X% on previous system
- Rainwater and stormwater harvesting

Status: ✓

3. Establish a methodology for community engagement in streetscape design, construction and maintenance

Status: ✗



Hill Street rain gardens built in October 2007 as a result of the Illawarra Road Subcatchment Planning. Photos April 2008.

Key: ✓ = implemented; ✗ = yet to be tackled





Lower Hill Street Rain Garden built in October 2007 as a result of the Illawarra Road Subcatchment Planning. Photo June 2009.



Sustainable Water Ambassadors Jan and Michael Kerans taking part in the Sustainable Water Showcase at the 2009 Cooks River Eco Fest.

## Implement – take action

1. Develop expertise in Water Sensitive Urban Design through its incorporation into in-house design and construction of local public infrastructure projects

Status: ✓

2. Install biofiltration systems under all newly planted street trees where feasible and as per the Illawarra Road Masterplan

Status: ✗

## Promote - encourage and publicise - internally and externally

1. Ensure all Council capital works incorporating water sensitive urban design are publicised widely to increase public exposure to these important concepts and promote the efficacy of the technology

Status: ✓

2. Encourage internal Council enthusiasm for water sensitive urban design by including regular updates / hints in internal newsletters and publicising the successful outcomes of the project

Status: ✓

3. Use the Sustainable Water Ambassadors program to promote and celebrate the efforts of citizens and show how to manage water sustainably on their properties

Status: ✓

## Educate - develop and deliver key programs to bring about change

1. Incorporate water conservation, harvesting and reuse messages into Council Induction and SAFE training programs

Status: ✓

2. Promote existing and upcoming water sensitive urban design projects as demonstration sites through interpretive signage where appropriate and by incorporating the sites into tours, workshops and activities

Status: ✓

3. Provide information on techniques and technologies that assist in controlling pollution on residential and commercial properties

Status: ✓

4. Involve the community in WSUD through the Bush Pockets, Landcare and other participatory programs

Status: ✓

Key: ✓ = implemented; ✗ = yet to be tackled

## Goal 4

Planning instruments for all new and redeveloped buildings require:

- Dual plumbing system for three sources of water (treated rainwater, treated greywater and potable water)
- Treatment of stormwater runoff

Guidelines have been developed for complying with Integrated Urban Water Management (IUWM) and Water Sensitive Urban Design (WSUD) planning requirements

Council's capacity for advising and assessing compliance to IUWM planning requirements has been developed

Planning instruments for installation of rainwater tanks and connection to appropriate hot water systems in established dwellings at point of sale are in place

### Measure - assess status, gather data, evaluate

1. Assess the feasibility of installing dual plumbing systems in all Council buildings

Status: ✘

2. Research appropriate techniques and technologies for the treatment of stormwater in urban areas, including an assessment of feasibility based on the space required for the technology and storage of water and a cost benefit analysis

Status: ✔



Rain garden built by Catriona Pyner, participant in Illawarra Road Sustainable Water Working Group and a Sustainable Water Ambassador, on her property.

### Guide - set policy directions, develop systems and methodologies

1. Coordinate the Integrated Urban Water Management (IUWM) Group within Council to deal specifically with:

- the implementation of this Action Plan
- the development of a culture within Council that values and respects water
- capacity building and training of staff in Water Sensitive Urban Design
- conducting ongoing research into Water Sensitive Urban Design
- the development of partnerships and joint projects across Council
- the review of policy and planning tools relating to sustainable water management

Status: ✔

### Implement - take action

1. Continue and strengthen the enforcement of existing regulations designed to prevent stormwater pollution

Status: ✔

2. Run a 'Sustainable Streets' program in the subcatchment to engage the community in active lifestyle change for sustainability

Status: ✔

### Promote - encourage and publicise - internally and externally

1. Promote the installation of dual plumbing for alternative water sources through workshops, Council newsletters, on Council's website and through the local media

Status: ✘

### Educate - develop and deliver key programs to bring about change

1. Investigate opportunities with external consultants to provide planning and development assessment staff with on-call expert advice on Water Sensitive Urban Design

Status: ✘

2. Develop a Sustainable House demonstration project in the Illawarra Road Subcatchment that incorporates dual plumbing and other sustainable water management features. These should include:

- Rainwater tanks harvesting all roof runoff, connected to drip irrigation plus laundry and toilet
- A drought tolerant garden incorporating drip irrigation, mulched beds and swales where appropriate
- Pocket wetland or domestic scale GPT unit
- Water efficient fixtures and appliances
- Stormwater harvesting for irrigation and car washing
- Greywater recycling

Status: ✘

Key: ✔ = implemented; ✘ = yet to be tackled

## Goal 5

The Illawarra Road community is a leader in wastewater reuse in ultra-urban areas and the reuse of wastewater has been adopted as the accepted practice, where:

- sewer mining is used to irrigate Steel Park - a sewer mining facility for reuse of treated wastewater for public open space irrigation has been established
- wastewater is treated locally for reuse within the subcatchments - the location of Sewage Treatment Plants (STP) for local treatment of wastewater has been identified
- the laying of pipes for recycled wastewater has commenced - treated wastewater supply pipes are installed when opportunities present themselves

### Measure - assess status, gather data, evaluate

1. Review the Illawarra Road Subcatchment water budget every five years, modelling the impact of on-ground works on public land and actions on private land

Status: ✘

2. Obtain records of water consumption for Council properties and assets in the Illawarra Road Subcatchment to gauge potable and reclaimed water requirements including:

- Recreation/community facilities including the Debbie and Abby Borgia Recreation Centre
- Parks and open space irrigation
- May Murray Childcare Centre
- Amenities blocks

Status: ✔

3. Assess opportunities for filtering and harvesting stormwater, conserving potable water and reusing greywater on Council properties

Status: ✔

4. Open up discussion with privately owned community facilities in the subcatchment, including schools, churches and childcare centres, to investigate opportunities for water saving retrofits

Status: ✔

5. Establish a monitoring system to accurately calculate financial and water savings of Council-led water reuse and retrofit projects in the subcatchment

Status: ✔

### Implement - take on-ground action

1. Conduct a feasibility study into sewer mining with a possible trial to be undertaken in the Illawarra Road Subcatchment

Status: ✔

2. Develop Steel Park as a demonstration site for best practice stormwater management while still maintaining the recreational and amenity values of the park. The project should investigate the following components:

- Harvesting of all rainwater from the Debbie and Abbey Borgia Recreation Centre for toilet flushing
- Harvesting and treatment of stormwater from the Debbie and Abbey Borgia Centre car park for irrigation of playing fields
- Harvesting of stormwater from the surrounding residential catchment for irrigation of playing fields
- Establishment of riparian buffer zones along the foreshore wherever possible

Status: ✔

3. Implement an annual Streamwatch event for schools to monitor sewer and industrial discharge to Cooks River

Status: ✔

4. Urge Sydney Water to accelerate efforts to reduce sewer overflow to Cooks River

Status: ✘

5. Commence laying of a treated wastewater supply line and dual water supply pipeline in the subcatchment when opportunities present themselves, i.e. to coincide with road renewal program

Status: ✔

6. Address site specific stormwater infrastructure design issues in the subcatchment, e.g. redesigning stormwater inlets so that litter and child safety bars do not contribute to drain blockage and resultant flooding

Status: ✔

7. Ensure all gross pollutant traps are regularly maintained

Status: ✔

8. Target illegal dumping hotspots in the subcatchment, which could include educating residents, conducting regular night time inspections and issuing penalty infringement notices and other pollution prevention notices where possible

Status: ✔

### Promote - encourage and publicise - internally and externally

1. Promote the Illawarra Road Subcatchment as a model of best practice by holding workshops and tours, publicising each new achievement through the local media and highlighting the efforts of local residents and businesses

Status: ✔

2. Promote WSUD technologies and practices to show other councils and communities ways to implement sustainable water management

Status: ✔

Key: ✔ = implemented; ✘ = yet to be tackled



## Educate - develop and deliver key programs to bring about change

1. Promote the advantages of the new development controls through the local media, highlighting the potential for increased property values

Status: ✖

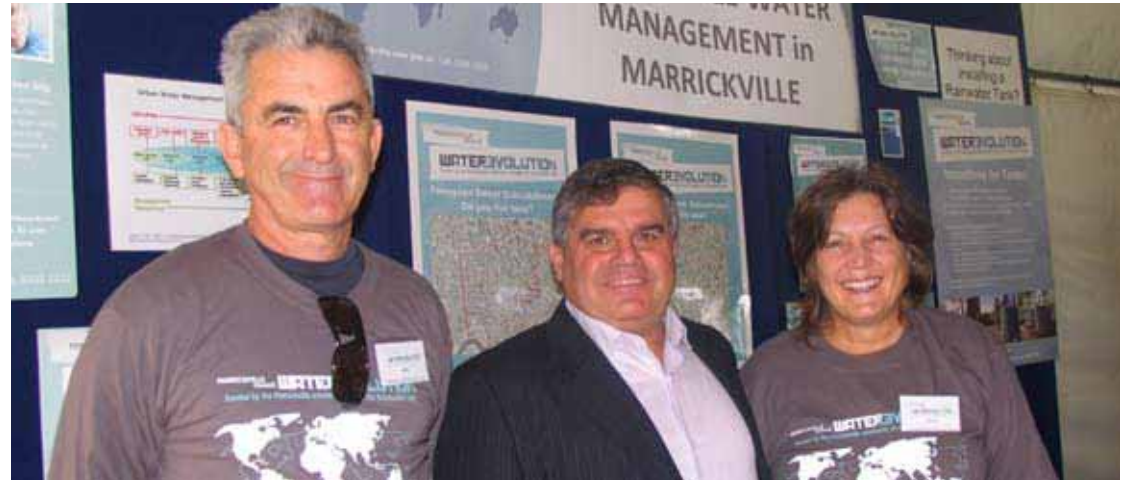
2. Conduct an education campaign focused on dispelling the myths associated with wastewater reuse, incorporating:

- Brochures produced in a number of community languages
- A Community Leadership program aimed at residents from culturally and linguistically diverse backgrounds
- Information on Council's website
- Promotion and information in local media

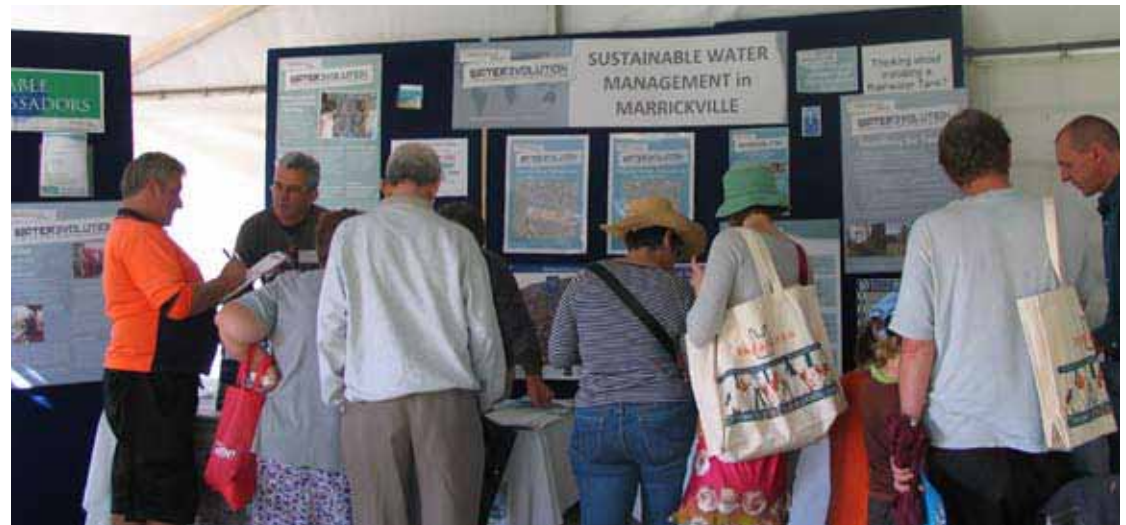
Status: ✓

3. Promote successful projects and regulatory/policy development on Council's website that acts as a hub for community information.

Status: ✓



Jenny and John Whitmarsh, participants of a subcatchment working group, discuss subcatchment planning with Mayor, Cllr Sam Iskander at the Sustainable Water Showcase at the 2009 Cooks River Eco Fest.



Citizens finding out about Marrickville Council Sustainable water Management programs at the Sustainable Water Showcase at the 2009 Cooks River Eco Fest.

Key: ✓ = implemented; ✖ = yet to be tackled

## 4. Masterplan for On-ground Works

### Illawarra Road Stormwater Masterplan

Marrickville Council in conjunction with Ecological Engineering prepared the *Illawarra Road Stormwater Masterplan* in 2004 (Ecological Engineering, 2004a). The Masterplan presents a concept design to improve the quality of stormwater entering Cooks River from the subcatchment and options to reuse stormwater to reduce the amount of mains water brought into the subcatchment.

The various options presented were derived from a number of sources. The original strategy was developed at the Illawarra Road Subcatchment Planning Forum where various community, local and State Government organisations and research groups mapped out a strategy for the Illawarra Road Subcatchment. This concept was further enhanced and developed by Marrickville Council staff and detailed modelling and analysis was undertaken to assess the concept design.

### Stormwater Quality Improvement Options

Stormwater quality options were influenced by the existing stormwater infrastructure within the subcatchment and the available open space for treatment measures. For this reason the stormwater quality options were split into two tiers to differentiate between those options that require no extra stormwater infrastructure (Tier One) and those that require extra stormwater infrastructure (Tier Two). Tier One options were sized to fit the available land area while Tier Two options were sized to meet, in conjunction with Tier One options, the best practice for new developments current at the time – 80% reduction in the average annual load of Total Suspended Solids, and a 45% reduction in Total Nitrogen and Total Phosphorous.

### Stormwater Reuse and Water Conservation Option

While the major water users within the catchment are residential dwellings, Marrickville Council has a large concentrated water demand for irrigation at Steel Park where there are a number of sports ovals. A range of alternate scenarios have been modelled to reuse rainwater for irrigation of the sports ovals including reusing roof water and treated stormwater from the car park at the Debbie and Abbey Borgia Community Recreation Centre as well as treated stormwater from a large residential area within the Illawarra Road Subcatchment.

A range of scenarios were also modelled for the residential water users to achieve the BASIX target of 40% water reduction. This included the adoption of demand management measures, such as water efficient fixtures and appliances and the use of rainwater tanks for individual dwellings and multi-unit dwellings.








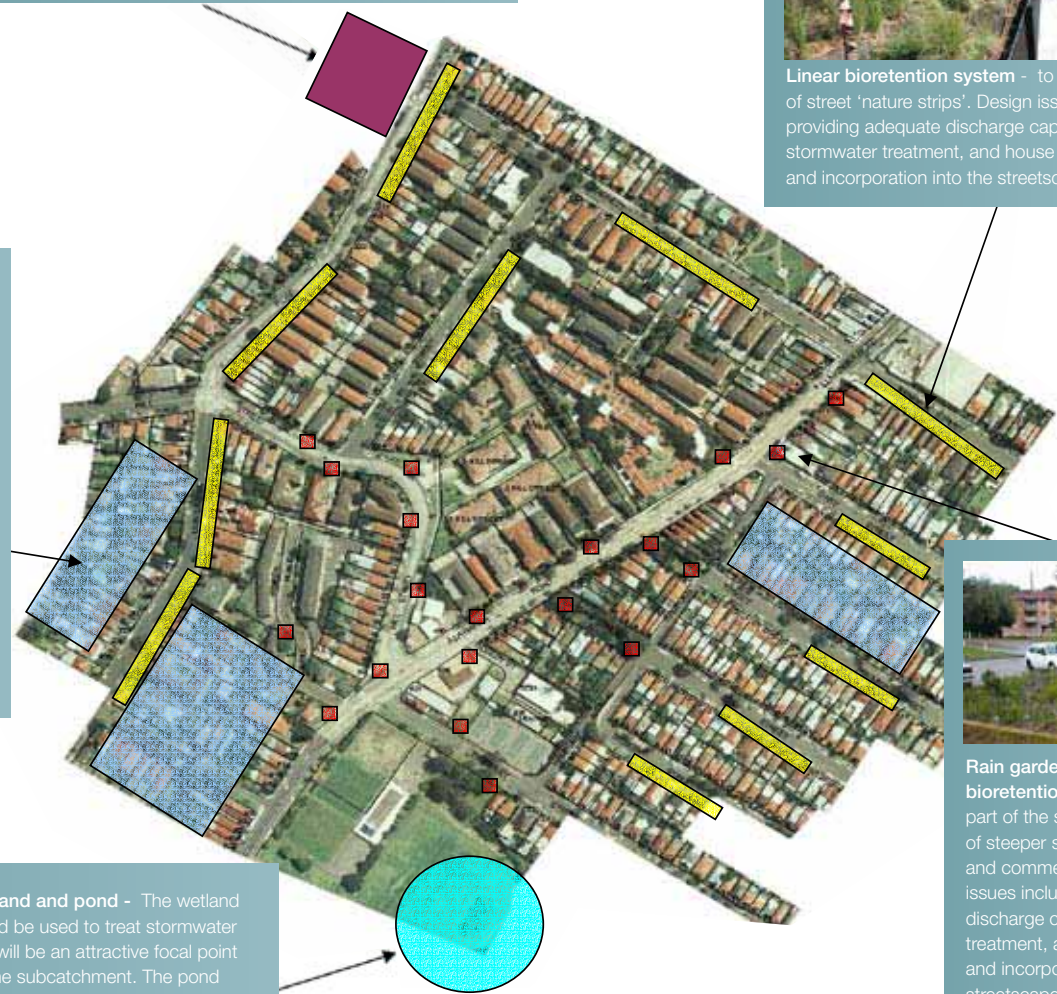
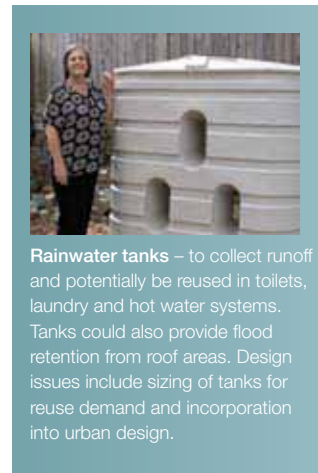
# Masterplan for On-ground Works

## Illawarra Road Subcatchment WSUD Opportunities

A summary of possible options for improving stormwater quality and harvesting stormwater, prepared by Ecological Engineering in 2004 (2004b) is presented here.. These options are among technologies that are now commonly referred to as Water Sensitive Urban design (WSUD). They can include rain gardens, swales (biofiltration and bioretention systems), wetlands, ponds, rainwater tanks, vegetated roofs and walls, and porous paving. The complete Masterplan document can be downloaded from Marrickville Council's website: <http://www.marrickville.nsw.gov.au/environment/water/sustainablewaterplanning.htm>

Options for improving stormwater quality in public areas of the Illawarra Road Subcatchment include:

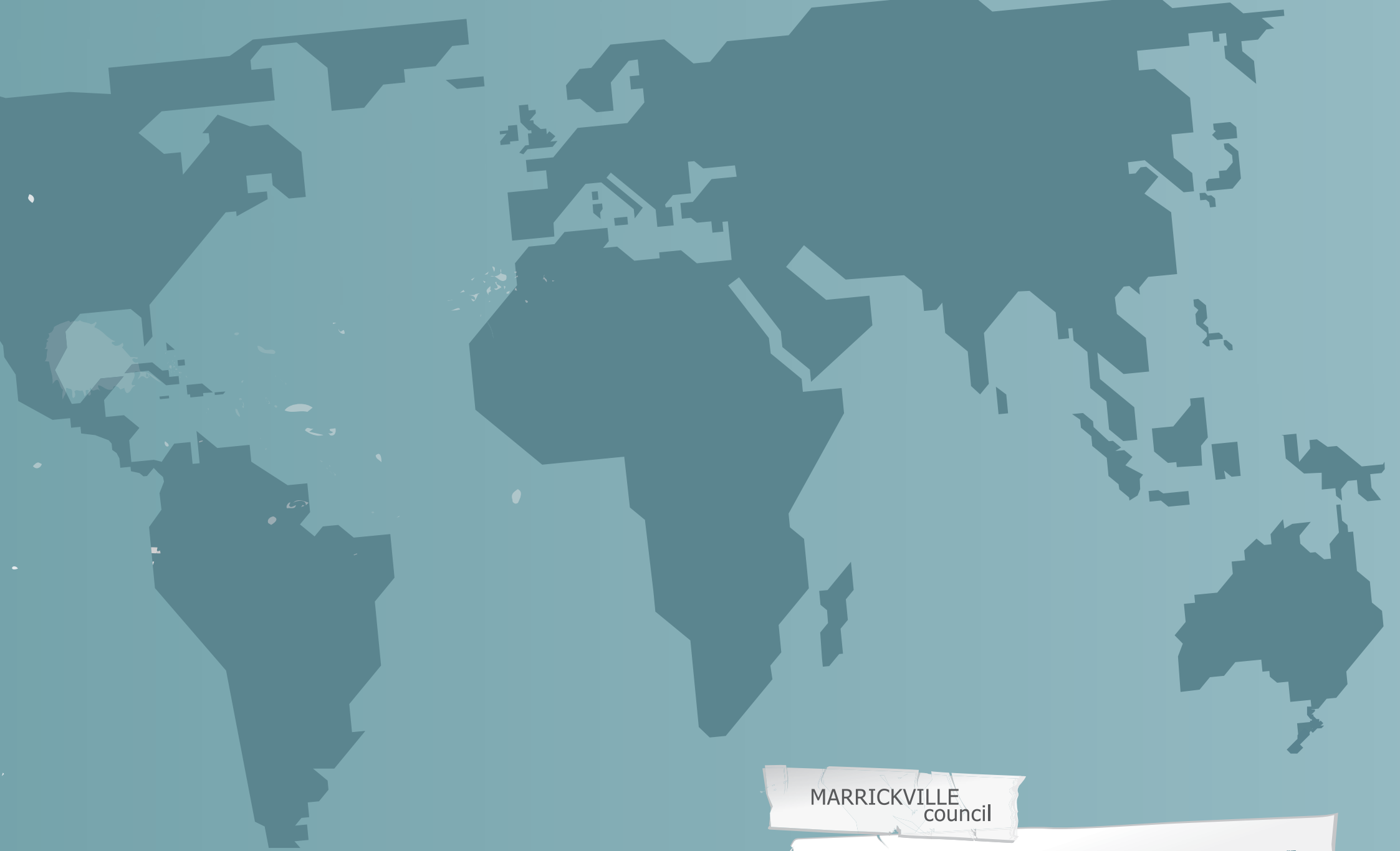
- Possible locations for linear bioretention swales / rain gardens 
- Possible location for WSUD feature at school 
- Possible location for wetland or pond 
- Possible locations for rain gardens (bioretention / biofiltration) 
- Possible areas for rainwater tanks 





## 5. References

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2. Brown, R., 2003, *Institutionalisation of integrated urban stormwater management: multiple-case analysis* of local management reform across metropolitan Sydney, PhD Thesis, School of Civil and Environmental Engineering, UNSW.
3. Ecological Engineering, 2004<sup>a</sup>, *Illawarra Road Stormwater Masterplan*. Draft report prepared for Marrickville Council with options and explanations for on-ground works.
4. Ecological Engineering, 2004<sup>b</sup>, *Illawarra Road Catchment WSUD Opportunities*; Summary document of options for on-ground works.
5. Equatica, Equatica, 2009, *Draft Tennyson Street Subcatchment Management Plan* Draft report prepared for Marrickville Council with detailed physical profile, strategy and explanations for on-ground options.
6. International Association for Public Participation (IAP2), 2004, *IAP2 Public Participation Spectrum* available online; <http://www.iap2.org.au/sitebuilder/resources/knowledge/asset/files/36/iap2spectrum.pdf>
7. Marrickville Council, 2005, *Riverlife – Sustainable Water Environments, Planning Illawarra Road Water Futures*; booklet prepared by Marrickville Council for planning the Illawarra Road Subcatchment. Available online: <http://www.marrickville.nsw.gov.au/environment/water/sustainablewaterplanning.htm>
8. Marrickville Council, 2006, *Sustainable Water Action Plan, Illawarra Road Subcatchment*; available online at: <http://www.marrickville.nsw.gov.au/environment/water/sustainablewaterplanning.htm>
9. Marrickville Council, 2007, *Subcatchment Planning for Sustainable Water Management – Guidelines for Councils*. Available online: <http://www.marrickville.nsw.gov.au/environment/water/sustainablewaterplanning.htm>
10. Marrickville Council, 2008, *Stormwater Management Service Charge Management Framework*.
11. Marsalek, J., Rochfort, Q., and Savic, D., 2001 “Urban Water as a part of Integrated Catchment Management”, in Maksimovic, C., and Tejada-Guibert, J.A., eds, *Integrated Catchment Management and Frontiers in Urban Water Management: Deadlock or Hope*, IWA Urban Water.



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