A

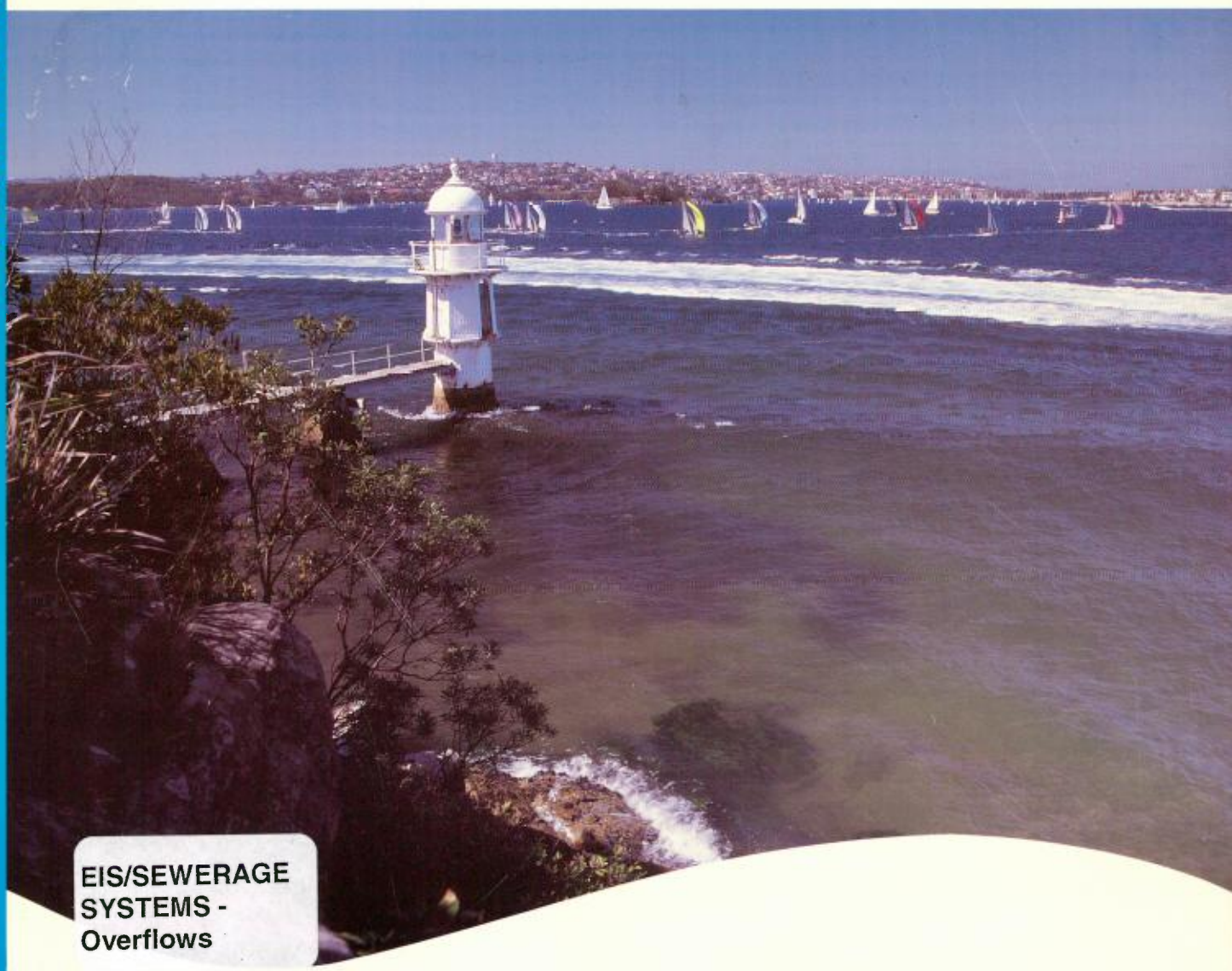
Sydney Harbour and Northern Beaches Geographic Area

Licensing Sewerage Overflows

ENVIRONMENTAL IMPACT STATEMENT – JUNE 1998

Appendices – Part A

Sydney Harbour and Northern Beaches Geographic Area



Sydney WATER

waterplan 21

Living waterways for a living city.

Licensing Sewerage Overflows – Environmental Impact Statements

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Part A

JUNE 1998

AWT AUSTRALIAN WATER TECHNOLOGIES

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Appendix A

Glossary

Glossary

average dry weather flow (ADWF)	The flow of sewage produced on a typical day in dry weather.
average wet weather flow (AWWF)	The flow of sewage produced on a typical day in dry weather.
base case	minimum performance standard proposed for sewerage systems in 2021
biochemical oxygen demand	The quantity of oxygen utilised in the biochemical oxidation of organic matter. Measures the presence of organic pollutants in a water sample.
boundary trap	Water trap that isolates Sydney Water sewers from private sewers.
carrier	A large sewer which collects sewage from a number of smaller reticulation sewers. Also referred to as trunk main.
catchment	The area drained by a stream or body of water or the area of land from which water, stormwater or sewage is collected.
chlorophyll-a	Green pigmentation in plants, essential for photosynthesis.
choke	Full or partial blockage in sewer pipe. May be caused by tree roots, debris, siltation, or structural collapse. If the blockage is solid and semi-solid rubbish (eg. rags and string), the term 'soft choke' is used.
closed circuit television (CCTV)	A technology used for visual inspection of sewers.
combined sewers	Sewage and stormwater are transported in the same pipe.
customer contract	A document setting out the terms, rights and responsibilities of the customer and Sydney Water.
demand management	Aims to reduce the demand for water, through a planned program.
designed overflow	A designed overflow is an actual physical structure in the sewer system that is designed to direct the sewer overflow discharge to a known location.
detention time	Amount of time it takes sewage to travel in the pipeline from its origin to the treatment plant.
determining authority	The Minister or Public Authority by or on whose behalf a proposed development/activity is to be carried out; or whose approval is required in order to enable the activity to be carried out. For the Overflows EIS the Determining Authority is the EPA.
directed overflow	To minimise impacts on public health and recreation, spillage of wastewater is directed to the environment by designed sewer overflow points.
disinfection	The distruction of disease causing micro-organisms. Most Sewerage Treatment Plants (STPs) use chlorine, bromine or ultraviolet (UV) radiation for disinfection.
dry weather overflow	Discharges of sewage in dry weather. These are typically caused by tree roots or debris blocking the sewer, silt build-up, collapsed sewers or operational failure of pumping equipment. (See choke)
due diligence	Exercising reasonable precautions to prevent the commission of an offence; as defined by *Environmental Offences and Penalties Act* (1989).
economic evaluation	An analysis of the economic costs and benefits of a proposed activity. Compare with 'financial evaluation'.
effluent	The liquid end product of a sewage treatment process that is discharged into the environment. The quality of effluent will depend on the treatment processes used (see primary, secondary, tertiary).
event	An overflow occurrence either for a whole sewerage system or at a single overflow location.
environmental impact assessment	In NSW, a statutory process under the provisions of the *Environmental Planning & Assessment Act* (1979), by which an individual, corporation or

	government instrumentality is legally obliged to consider the potential environmental impact of activities that it undertakes.
environmental impact statement	A formal description of a project and an assessment of its likely impact on the environment. It includes an evaluation of alternatives and an economic justification for the project. An EIS is required when an activity is deemed likely to cause significant environmental harm. The EIS is used to facilitate public comment and as the basis for analysing the project with respect to granting approval under relevant legislation.
environment plan	A strategic document which outlines how Sydney Water will implement its environmental objectives enshrined in the *Water Board (Corporatisation) Act* and the Operating License.
eutrophication	Abundance of nutrients resulting in excessive growth of algae in waterways.
exfiltration	Leakage of sewage from faults in sewer pipes to the surrounding soil and environment.
faecal coliforms	Bacteria present in faeces, produced from the gut of warm-blooded animals. *Escherichia coli* is generally the dominant species. Faecal coliforms are measured to indicate potential sewage contamination of water.
financial evaluation	A traditional financial evaluation measures costs and benefits from the perspective of the organisation undertaking a project. It does not take into account impacts on other individuals, organisations or the environment.
geographic area	The second level of geographic unit used in this impact analysis (the third level being receiving environment zones). The Sydney/ Blue Mountains/ Illawarra region has been divided into seven geographic areas; on the basis of waterways, topographic drainage, sewerage system boundaries, and environmental and socio economic uses and values.
gravity main	A sewer main in which sewage travels under the effects of gravity.
gully trap	A fitting on a private sewer which traps water. Used for odour control and as a relief point for surcharge.
incident management	Devised plan of action in the event of an emergency or an incident.
infiltration	Groundwater entering the sewerage system through cracked pipes or faulty joints.
integrated facilities information system (IFIS)	Sydney Water's geographic information system which contains attributes on the Corporations facilities and assets, such as their location, pipe width, type and age. Sewer overflows are included.
interceptors	A design feature of the sewerage system which redirects flow when it reaches a certain level, and transfers it between mains.
leakage	Sewage which escapes from cracked sewer pipes and faulty joints.
MOUSE	Collective term for Sydney Water's computer models which are used to simulate pipe flows.
node	a point in a sewer model or a water quality model where information is collected and performance assessed eg an overflow.
non-point source pollution	Pollution that enters receiving waters from dispersed sources (such as surface run-off) rather than through 'point sources', such as pipes.
Northside storage tunnel	This tunnel will intercept, store, and transport stormflow to North Head STP. Sewerage overflows from Lane Cove siphon, Tunks Park, Scotts Creek and Quakers Hat Bay will be captured.
operating licence	Defines Sydney Water's performance standards. The licence is granted under Section 12 of the *Water Board (Corporatisation) Act*.
overflow	Untreated discharges of liquid and odour from the sewerage system; during either wet or dry weather. Overflows may occur from designed overflow structures or from non-designed locations. In the case of the

	latter, the term 'surcharge' is adopted for these EISs. Overflows may be caused by chokes, sewage pumping station failure, lack of capacity or hydraulic overload. Includes exfiltration and odour emissions.
pathogen	A micro-organism capable of causing diseases in humans, animals, or plants. They may be bacteria, virus or parasites found in sewage.
peak dry weather flow	Maximum flow of sewage produced due to diurnal variations in flow on a typical day in dry weather.
peak wet weather flow	Maximum flow during wet weather.
pollution reduction programme (PRP)	An instrument used by EPA in conjunction with licences to discharge. It sets out a timetable for improvements which will reduce pollution of the environment.
pollution control licence	A licence that allows pollution of the environment but under controlled conditions regulated by the EPA, as outlined in the *Pollution Control Act* (1970).
primary treatment	Wastewater treatment which involves screening, settling and skimming to remove larger solids and floating materials from wastewater.
private sewer	The section of sewer owned and maintained by the private house owner previously called house service line.
proponent	The person or body proposing to carry out a development or activity.
receiving environment zone (REZ)	The third level of geographic unit used in this impact analysis. This allows local impact investigation and strategy formation on the basis of receiving environment types. There are 26 REZs within the study area. These are grouped into seven geographic areas.
RECOS	A Sydney Water data base for recording customer calls. It records the occurrence of choke-related overflows and odour problems by suburb and identifies the component or section of Sydney Water's sewerage system where the problem originated.
residuals	The solid remnants from a treatment process, for example materials collected from screens, settled materials and sludge.
reticulation overflow	A modelled reticulation overflow is a point in the sewer model which represents a sewer inflow catchment. The discharge can occur within the catchment from both designed overflow structures or other locations such as undirected discharges from access chambers.
reticulation sewer	The network of smaller size pipes in the sewerage system, which convey sewerage from private sewers to larger carriers.
rising main	A pipeline in which fluids rise in elevation due to pumping.
SEEKER	A computer model used by Sydney Water to calculate the least cost option combination of source reduction (inflow/infiltration reduction), transport, overflow storage and treatment facility upgrade for a selected design sewer flow event.
secondary treatment	A second stage in wastewater treatment that usually adds biological treatment to the screening, settling and skimming provided by primary treatment.
sensitive areas	A site which may: contain high biological diversity; be a habitat for rare or threatened species; be a breeding area for animals and birds; be a recreation area; be important for commercial and industrial economic development, be recognised and protected in legislation.
sewerage system	The system of pipes and pumping station through which sewage flows from its origin to the treatment plants.
source control	The control of pollution from wastewater at its source. Involves industry and individuals taking responsibility for preventing matter entering the sewerage system.
species impact statement	An SIS is required when an activity is likely to give rise to a significant effect on rare or threatened flora/fauna; as defined by *the Threatened Species Conservation Act (1995).*

surcharge	An uncontrolled spillage of wastewater that does not occur at a designed sewer overflow point. (See uncontrolled overflow)
swimmability	A description of the water quality at any location in terms of suitability of primary contact recreation criterion. Uses faecal coliforms as a basis.
ten year time series	measured rainfall from 1985 to 1994
tertiary treatment	A sewage treatment process which incorporates a 'polishing' stage. It produces effluent of higher quality than that produced by secondary treatment.
trade waste	Liquid waste from industry discharged into the sewerage system.
uncontrolled overflow	Uncontrolled overflows are not directed in a manner that minimises impacts. They occur on properties and inside buildings and dwellings as well as from structures that are not designed to overflow such as access chamber lids and private sewers. These are also known as surcharges.
vent shaft	Vent shafts ventilate the sewerage system. They provide oxygen, minimising the risk of sewage septicity. They also allow the dispersal of odours at planned locations.
WaterPlan 21	Sydney Water's 20 year plan of early actions and longer term strategies for protecting rivers; beaches and oceans; recycling water and biosolids; and reducing wet weather sewerage overflows to protect the rivers, ocean and harbour.
Waterways package	State Government's 20 year strategy for harbours, rivers and beaches, released May 1997.
wet-weather overflows	Overflows which occur during or as a result of excess stormwater inflow and infiltration to the sewerage system.
wet-weather treatment	During heavy rain, larger than normal waste water flows are transported to sewerage treatment plants where they receive partial treatment appropriate to the conditions, prior to being discharged into a waterway.

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Appendix B

Abbreviations

Abbreviations

ADWF	Average dry weather flow
AHD	Australian height datum
ANZECC	Australian & New Zealand Environment & Conservation Council
BOD	Biochemical oxygen demand
BMP	Best management practice
CCTV	Closed circuit television
cfu	Colony forming units (of faecal coliforms)
CICL	Cast iron cement lined (pipes)
COC	Chemicals of concern
COPC	Chemicals of potential concern
CRG	Community reference group
CMC	Catchment Management Committee
CWAct	Clean Waters Act
DICL	Ductile iron cement lined (pipes)
DLWC	Department of Land and Water Conservation
DO	Dissolved oxygen
DUAP	Department of Urban Affairs and Planning.
EAP	Early action programme
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EPA	Environment Protection Authority
ERA	Ecological and human health risk assessment
ESD	Ecologically sustainable development
FC	Faecal coliforms
GA	Geographic Area
GI	Galvanised iron (pipes)
GIS	Geographical information system
IFIS	Integrated facilities information system.
I/E	Infiltration/Exfiltration (reduction by sewer rehabilitation)
IICATS	Integrated Instrumentation Control , Automation and Telemetry System
IPART	Independent Pricing and Regulatory Tribunal
L/P/d	Litres per person per day
L/s	Litres per second
LADS	Land availability data system
LEP	Local environment plan
LGA	Local government area
MOST	Model for optimisation of storage / treatment
mg/L	Milligrams per litre
ML/d	Megalitres per day
MSCL	Mild steel cement lined (pipes)
N	Nitrogen
NPV	Net present value
NPWS	National Parks and Wildlife Service
NFR	Non filterable residue
NHMRC	National Health and Medical Research Council
P	Phosphorus
PDWF	Peak dry weather flow
PWWF	Peak wet weather flow
ppm	Parts per million
PRP	Pollution reduction programme
QESA	Quantitative environmental severity analysis
REP	Regional environment plan
REZ	Receiving environment zone
ROTAP	Rare or threatened Australian plants
SIS	Species Impact Statement
SOLP	Sewerage overflows licensing project
SPS	Sewage pumping station
SEPP	State environmental planning policy
SS	Suspended solids
STP	Sewage treatment plant
SWC	Sydney Water Corporation
TCM	Total catchment management
TKN	Total kjeldahl-nitrogen
VC	Vitrified clay (pipes)
VMS	Value management study
WC	Water consumption
µg/L	Micrograms per litre

Sewerage Overflows Licensing Project
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Appendix C

Director General's requirements

New South Wales Government
Department of Urban Affairs and Planning

Mr Paul Broad
Managing Director
Sydney Water
PO Box A53
SYDNEY SOUTH NSW 2000

Contact: Chris Masters

Our Reference: S94/00994/002

Your Reference:

4 JUL 1997

Dear Mr Broad

Sewerage Overflows Licensing Project

Thank you for your letter of 20 June 1997 indicating that you are reconsulting with the Director-General regarding the preparation of environmental impact statements (EISs) for the above proposal.

Attachment No. 1 lists the matters that the Director-General, pursuant to clause 85 of the *Environmental Planning and Assessment Regulation 1994*, requires be specifically addressed in each EIS.

Attachment No. 2 outlines the statutory requirements for the form and content of an EIS prepared under Parts 4 and 5 of the *Environmental Planning and Assessment Act 1979*, together with requirements for public exhibition and seeking approval.

Should you have any enquiries regarding this matter please contact Chris Masters on (02) 9391 2026 or via email (masterc@waratah.www.nsw.gov.au).

Yours sincerely

David Mutton
A/Manager
Major Assessments and Hazards Branch
As Delegate for the Director-General

Governor Macquarie Tower
1 Farrer Place, Sydney 2000
Box 3927 GPO, Sydney 2001

Telephone: (02) 9391 2000
Facsimile: (02) 9391 2111

Department of Urban Affairs and Planning

ATTACHMENT NO. 1

DIRECTOR-GENERAL'S REQUIREMENTS

SEWERAGE OVERFLOWS LICENSING PROJECT

STRATEGIC ISSUES

- Background and purpose of the Sewerage Overflows Licensing Project.
- Overview of impacts of past and present operational regimes. General description of impact mitigation activities (structural and/or non-structural) undertaken to date across Sydney Water's area of operations.
- Description of the goals and targets of the strategies for improving the quality of receiving environments. Where relevant, specific reference should be made to recognised environmental standards and/or guidelines. Reference should also be made to how the proposed courses of action would accord with the principles of ecologically sustainable development.
- Outline of timetable for implementation of proposed strategies. Justification for the preferred prioritising of individual sewerage catchments or groups of catchments in the context of Sydney Water's overall area of operations. Specific reference should be made to the potential consequences of delayed action in sewerage catchments designated as being of relatively lower priority.
- Consideration of how the proposed wastewater management strategies could be integrated into a total water cycle management framework.

CATCHMENT-SPECIFIC ISSUES

1: <u>Description of existing sewerage reticulation system</u>

For each system, the following shall be provided:

- A description of the size and nature of the sewerage catchment reticulation system with particular emphasis given to its major functional components. This shall be supported by maps identifying:
  - the locations of all major components of the system including sewage pumping stations, storages, sewer mains and designed overflows;
  - the pathways followed by discharges from all overflows having a significant impact;
  - the approximate locations of those overflows whose precise locations are unknown;
  - any affected classified waters (as per the *Clean Waters Act 1970*); and
  - any sensitive conservation and/or land use areas through or into which overflows discharge.
- Quantification and description of the types of designed overflow structures within the sewerage catchment.
- An assessment of the present physical condition of the sewer mains. Identify any problems associated with the operation of the system particularly in relation to stormwater infiltration and dry weather exfiltration.

- A description of the management procedures presently employed to operate the sewerage system. Particular reference should be made to the operation of overflows and to how operation of the STP is integrated with that of upstream infrastructure.
- A description of the overflow characteristics in terms of their physical, chemical and biological properties. Where known, reference should be made to the nature of existing temporal (short and long term) and spatial variations in sewage effluent composition across the sewerage catchment.
- A quantitative analysis of the present performance of sewer overflows in terms of frequency, duration, volume and quality of discharges for both dry and wet weather periods. Estimates of these parameters should be provided for unmonitored sewers. An indication of the considered level of accuracy of these estimates should also be given.

2: Analysis of impacts of current operational regime

- Description of the receiving environments presently affected (directly and/or indirectly) by sewer overflows. Particular reference should be made to those elements of the environment considered sensitive in terms of (a) human health, amenity and aesthetics, and (b) terrestrial and aquatic ecosystem maintenance requirements.
- Identification and assessment of the nature and significance of existing impacts within the identified receiving environment. A distinction should be made between those impacts which are relatively temporary/short-term in effect and those which are effectively permanent/long term.
- Identification of parameters/standards against which future environmental performance of the sewerage system will be assessed. Justification of selected parameters/standards.
- Description of the methodologies employed to estimate wet weather infiltration and dry weather exfiltration rates and associated volumes and impacts. Any assumptions adopted should be clearly described and the extent of their influence on results discussed.
- Assessment of the relative contribution of sewer overflows to pollution during both dry and wet weather periods making specific reference to:
  - the quantity and quality of sewage effluent discharged; and
  - the relative contributions of other major sources of pollution such as stormwater and sewage treatment plant discharges.
- Consideration of cumulative impacts of wet and dry weather sewer overflows in relation to other factors (such as stormwater) contributing to significant degradation of receiving environments. Reference should be made to the relative contributions of these factors to the decline in environmental quality and the extent of their possible influence on the efficacy of proposed impact mitigation strategies.

3: Identification and consideration of impact mitigation options

- Identification and consideration of feasible structural and/or non-structural options to address existing shortcomings in the sewerage system for both wet and dry weather overflows. Reference should be made (but not limited) to:
  - interim/short-term options to mitigate/eliminate impacts in the immediate future;
  - removal and/or relocation of designed overflow structures;

  - the provision of supplementary on-line and/or off-line storage;
  - alternatives for managing sewage during periods of pump failure;
  - in-line treatment options;
  - options for reducing impacts from interaction between the sewerage reticulation system and stormwater systems;
  - increasing the capacity of sewer mains;
  - reducing infiltration to and/or exfiltration from sewer mains; and
  - sewage and wastewater reduction strategies.
- Description of the option evaluation process.
- Identification and consideration of management options for dry weather, wet weather and emergency events. This should be in the context of the overall management of the system including the STP.
- Consideration of likely land use changes within the sewerage catchment and their possible effects (in terms of both water quality and quantity) on the operation of the system.

4: <u>System environmental management plan</u>

Outline of an environmental management plan (EMP) for both the sewerage catchment and its receiving environment addressing:

- Description of the identified impact mitigation strategies including interim/short-term works/measures for immediate implementation.
- Prioritisation of works/strategies and the timing of their implementation. Justification of the timetable should make specific reference to the environmental elements identified under the first dot point from *2: Analysis of impacts of current operational regime*.
- Description of a program to determine the locations of overflows whose locations are presently indeterminate/unknown. Reference should also be made to the manner in which these will/could be incorporated into the proposed overflow management program.
- Description of contingency program for implementation during non-standard periods of operation such as equipment breakdown, blockages or system failure.
- Adopted performance criteria for assessing both short and long term effectiveness of impact mitigation strategies.
- Environmental monitoring program(s) to provide information on (but not limited to):
  - the frequency, duration, volume and quality of wet weather sewerage overflows;
  - rate, spatial extent and quality of dry weather exfiltration;
  - frequency and extent of odour escapes (associated both with overflows and directly from the sewerage system); and
  - environmental conditions in localities presently impacted by system escapes (wet weather overflows, dry weather exfiltration, odours) especially where identified impacts relate to human health.
- Mechanisms/procedures for periodic auditing and reporting including:
  - expected frequency and nature of auditing and its integration into existing or proposed system management programs;

  - the objectivity and credibility of the auditing process;
  - preliminary identification of relevant agencies and other stakeholders; and
  - anticipated frequency and nature of reporting.
- Amendments/additions to existing infrastructure maintenance program(s) and how the associated reporting mechanisms would be integrated into the overall EMP reporting regime.

5: Justification of proposed strategies

- Justification of the impact mitigation strategies proposed for each sewerage catchment with particular reference to how they meet the objectives of the government's Waterways Package. Where relevant, consideration should also be given to how the impact mitigation strategies accord with the objectives of other complementary strategies such as Water Plan 2021.

CONSULTATION

Results of consultation with relevant State and local government authorities, service providers and community groups including

- Environment Protection Authority
- NSW Fisheries
- Department of Land and Water Conservation
- National Parks and Wildlife Service
- Department of Health
- NSW Public Works and Services
- the relevant local councils
- Hawkesbury-Nepean Catchment Management Trust
- Catchment Management Committees and other relevant Trusts

are to be reported in the EIS. It should be noted that the onus is on the proponent to identify all parties with an interest in the proposal.

DEPARTMENT OF URBAN AFFAIRS AND PLANNING

Attachment No. 2

STATUTORY REQUIREMENTS FOR THE PREPARATION AND EXHIBITION OF AN ENVIRONMENTAL IMPACT STATEMENT UNDER PARTS 4 AND 5 OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

In accordance with the *Environmental Planning and Assessment Act 1979* (the Act), an environmental impact statement (EIS) must meet the following requirements.

Content of EIS

Pursuant to Schedule 2 and clauses 51 and 84 of the *Environmental Planning and Assessment Regulation 1994* (the Regulation), an EIS must include:

1. A summary of the environmental impact statement.
2. A statement of the objectives of the development or activity.
3. An analysis of any feasible alternatives to the carrying out of the development or activity, having regard to its objectives, including:
   (a) the consequences of not carrying out the development or activity; and
   (b) the reasons justifying the carrying out of the development or activity.
4. An analysis of the development or activity, including:
   (a) a full description of the development or activity; and
   (b) a general description of the environment likely to be affected by the development or activity, together with a detailed description of those aspects of the environment that are likely to be significantly affected; and
   (c) the likely impact on the environment of the development or activity, having regard to:
      (i) the nature and extent of the development or activity; and
      (ii) the nature and extent of any building or work associated with the development or activity; and
      (iii) the way in which any such building or work is to be designed, constructed and operated; and
      (iv) any rehabilitation measures to be undertaken in connection with the development or activity; and
   (d) a full description of the measures proposed to mitigate any adverse effects of the development or activity on the environment.
5. The reasons justifying the carrying out of the development or activity in the manner proposed, having regard to biophysical, economic and social considerations and the principles of ecologically sustainable development.
6. Compilation, (in a single section of the environmental impact statement) of the measures referred to in item 4(d).
7. A list of any approvals that must be obtained under any other Act or law before the development or activity may lawfully be carried out.
8. For the purposes of Schedule 2, the principles of **ecologically sustainable development** are as follows:
   (a) The precautionary principle - namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
   (b) Inter-generational equity - namely, that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.
   (c) Conservation of biological diversity and ecological integrity.
   (d) Improved valuation and pricing of environmental resources.

Note

The matters to be included in item (4)(c) might include such of the following as are relevant to the development or activity:

(a) the likelihood of soil contamination arising from the development or activity;
(b) the impact of the development or activity on flora and fauna;

(c) the likelihood of air, noise or water pollution arising from the development or activity;
(d) the impact of the development or activity on the health of people in the neighbourhood of the development or activity;
(e) any hazards arising from the development or activity;
(f) the impact of the development or activity on traffic in the neighbourhood of the development or activity;
(g) the effect of the development or activity on local climate;
(h) the social and economic impact of the development or activity;
(i) the visual impact of the development or activity on the scenic quality of land in the neighbourhood of the development or activity;
(j) the effect of the development or activity on soil erosion and the silting up of rivers or lakes;
(k) the effect of the development or activity on the cultural and heritage significance of the land.

An environmental impact statement referred to in Sections 77(3)(d) and 112(1) of the Act shall be prepared in written form and shall be accompanied by a copy of Form 2 or Form 8 (as appropriate) signed by the person who has prepared it.

The EIS must also take into account any matters required by the Director-General of Urban Affairs and Planning pursuant to clauses 52 and 85 of the Regulation, which may be included in the attached letter. A copy of the Director-General's Requirements should be included as an appendix to the EIS.

Attention is also drawn to clause 115 of the Regulation regarding false or misleading statements in EISs.

Nominated Determining Authority
Where there are a number of determining authorities (as defined under Part 5 of the Act), Section 110A of the Act provides for the Minister to make one of them the nominated determining authority. This avoids duplication of procedures and simplifies the exhibition of the EIS.

It is recommended that you discuss with the other determining authorities which one should become the nominated determining authority and advise the department accordingly. Normally it is the proponent agency that becomes the nominated determining authority. The written agreements of all other determining authorities must be forwarded with the request to be made the nominated determining authority.

It should be noted that the onus is on the proponent agency to identify all other potential determining authorities.

Public Exhibition
When the EIS has been completed, four (4) copies should be forwarded to the Secretary (Attention: Manager, Major Assessments and Hazards Branch) pursuant to Sections 77(5) and 112(2) of the Act, together with details of the exhibition period and public display locations.

This should occur prior to public exhibition of the EIS in order that simultaneous exhibition of the EIS occurs in the offices of the Department, council and determining authority as required by Sections 86 and 113 of the Act and clauses 55 and 88 of the Regulation.

It is requested that a copy of the text of the EIS also be supplied on a 1.44 MB floppy disk. This should be in a format readable by MS Word for Windows® Version 6 or as plain text (ASCII). Inclusion of files of supporting maps and diagrams is optional.

Procedures for public exhibition of the EIS are set down in clauses 55 to 57 and 87 to 88 (under Parts 4 and 5 respectively) of the Regulation.

Note
Should the EIS not be exhibited within 2 years from the date of issue of the Director-General's requirements, under clauses 52(5) and 85(5) of the Regulation the proponent is required to reconsult with the Director-General.

Submissions and Representations
Any submissions (Part 4) and representations (Part 5) made in response to public exhibition of the EIS should, as soon as practicable and not less than 21 days before determining the activity, be forwarded to the Secretary in accordance with Sections 87 and 113(3) of the Act.

Seeking the Minister's Approval
If Division 4 of Part 5 of the Act applies to the proposal, the proponent, pursuant to

Section 115B, should seek the Minister's approval once it has obtained and exhibited an EIS, examined and considered any representations, and forwarded copies of all representations to the Department.

If a Species Impact Statement (SIS) has been prepared, the Proponent must have complied with Sections 112B and/or 112C of the Act (i.e. concurrence and/or consultation requirements) before seeking the Minister's approval.

The Department's *Best Practice Guidelines* encourage proponents when seeking approval to provide:

- a comprehensive report which addresses in detail its consideration of issues raised in representations;
- any proposed changes to the activity, and any further measures to mitigate impacts; and,
- all relevant technical information relating to the proposed activity.

Table C: Compliance with DUAP Director-General's Requirements

DUAP Director-General's Requirements	Relevant Volume / Chapter of EIS Document	
	Volume	Chapter
STRATEGIC ISSUES		
Background of the Sewerage Licensing Project	1	1
Overview of impacts	1	3
Description of goals and targets	1	4
	2	4
Consideration of ESD in selection of proposed actions	1	6
	2	5 & 6
	3	5
Timetable for implementation and justification for prioritisation of proposed strategies	1	4
	2	6
	3	4
Consequences of delayed action on low priority areas	1	4
Integration of proposed management strategies into the total water cycle management framework.	1	4
	1	5
CATCHMENT SPECIFIC ISSUES		
Description of the existing sewerage reticulation system		
Size and nature of catchment reticulation system.	3	2
Locations of major components of system.	3	2
Overflow discharge pathways.	3	2
Approx. locations of unknown overflows.	1	2
Affected classified waters.	2	3
	3	3
Sensitive conservation and land use areas.	2	3
	3	3
Types of designed overflow structures.	1	2
Present physical condition of the sewer mains inc. stormwater infiltration and dry weather exfiltration.	2	2
	3	2
Description of management procedures presently employed to operate sewerage system.	1	2
Description of overflow characteristics inc. physical, chemical and biological.	3	2

DUAP Director-General's Requirements	Relevant Volume / Chapter of EIS Document	
	Volume	Chapter
A quantitative analyses of present performance of overflows in terms of frequency, duration, volume and quality of discharges. Estimates of unmonitored sewers.	2 3	2 2
Analysis of Impacts of Current Operational Regime		
Description of receiving environment affected by overflows.	2	3
Nature and significance of existing impacts.	2	3
Identification of temporary/short term impacts.	1 2	3 3
Identification of permanent/long term impacts.	2	3
Parameters/standards against which future environmental performance will be assessed.	2	4
Description of methods used to estimate wet weather infiltration and dry weather exfiltration rates and associated volumes and impacts.	Methods	Attachments I & E
Relative contribution of overflows to pollution in dry and wet weather periods.	2	3
Inc. quantity and quality of sewage effluent discharged	2 3	2 2
Inc. other sources e.g. stormwater and STP discharges.	2	2
Cumulative impacts of wet and dry weather overflows in relation to other factors.	2	3
Identification and Consideration of Impact Mitigation Options		
Identification and consideration of structural and /or non structural options for wet and dry weather overflows.	1	4
Interim short term options.	1 3	4 4
Removal relocation options.	3	4
On-line or off-line storage.	3	4
Options for reducing interaction between sewerage and stormwater systems.	Methods 2	 3
Increasing capacity of sewer mains.	Methods 3	 4
Reducing I/I or exfiltration.	Methods 1 3	 4 4

DUAP Director-General's Requirements	Relevant Volume / Chapter of EIS Document	
	Volume	Chapter
Sewage and wastewater reduction strategies.	1	4
	2	4
	3	4
Option evaluation process.	2	4
	3	4
Management options for dry & wet weather and emergency events.	1	2
	3	4
Consideration of land use changes and possible effects on the system.	2	3
	2	4
4. System Environmental Management Plan		
Description of identified mitigative strategies inc. short-term measures.	1	4
Prioritisation of works strategies and timing for implementation.	1	4
Description of program to determine locations of unknown overflows.	3	4
Description of contingency program.	1	5
	3	4
Performance criteria for assessing short and long-term Effectiveness of strategies.	1	5
	2	4
Environmental monitoring program.	1	5
Methods and procedures for periodic auditing and reporting.	1	6
	3	4
Amendments/additions to existing infrastructure maintenance program	1	2
	1	6
	3	4
5. Justification of proposed strategies	2	6
	3	5
CONSULTATION		
Consultation with relevant authorities.	Methods	
	Appendix	2A

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Appendix D

Modelled system performance

Table D-1: Summary of wet weather overflow peformance by sewerage system

Geographic Area	Sewerage Systems	No of Events/10yrs	Volume (ML)/10yrs
Blue Mountains	Mt Victoria	6	1
	Blackheath	27	39
	Winmalee	51	583
Upper Nepean	West Camden	18	564
	Warragamba	25	60
Middle Hawkesbury Nepean	Penrith	25	567
	Glenbrook	10	83
	North Richmond	10	61
	Richmond	19	22
	St Marys	32	2,474
	Quakers Hill	19	3,469
	Riverstone	14	55
	Castle Hill	38	485
	Round Corner	28	15
	Rouse Hill	12	42
Lower Hawkesbury	Hornsby Heights	60	1,826
	West Hornsby	27	1,165
Sydney Harbour and	Warriewood	14	170
Northern Beaches	Northern Suburbs	237	181,790
	Bondi	157	4,313
Georges River and	Southern Suburbs	229	134,660
Southern Beaches	Cronulla	46	3,980
Illawarra	Bellambi	60	3,428
	Wollongong	106	5,466
	Port Kembla	110	1,552
	Shellharbour	71	3,664
	Kiama	32	331
Sydney Wide Total		**Range: 6 - 237**	**Total: 350,865**

Table D-2: Summary of wet weather partially treated STP discharge performance

Geographic Area	Sewerage Systems	No of Events/10yrs	Volume (ML)/10yrs
Blue Mountains	Mt Victoria	60	37
	Blackheath	30	29
	Winmalee	114	4,420
Upper Nepean	West Camden	70	990
	Warragamba	116	220
Middle Hawkesbury Nepean	Penrith	70 (48)	1,050 (52)
	Glenbrook	60	260
	North Richmond	0	0
	Richmond	85	540
	St Marys	180	8,610
	Quakers Hill	56	3,400
	Riverstone	0	0
	Castle Hill	115	1,450
	Round Corner	21	6
	Rouse Hill	0	0
Lower Hawkesbury	Hornsby Heights	100	430
	West Hornsby	110	2,640
Sydney Harbour and	Warriewood	70	990
Northern Beaches	Northern Suburbs	0	0
	Bondi	1	9
Georges River and	Southern Suburbs	7	430
Southern Beaches	Cronulla	19	900
Illawarra	Bellambi	147	2,740
	Wollongong	120	900
	Port Kembla	83	1,790
	Shellharbour	275	6,760
	Kiama	45	1,610
Sydney Wide Total		**Range: 0 - 275**	**Total: 40,263**

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Appendix E

Water quality modelling data

Table E-1: Pollutant Loads (Tonnes/year) by REZ Total Phosphorus (TP) Loads

Geographic Area	REZ	STP treated discharge	STP partially treated discharge	Wet weather overflow	Diffuse	Total
Blue Mountains	Blue Mountains	8.44	0.76	0.14	8.88	18.22
	Lake Burragorang	na	na	na	na	na
Upper Nepean	Upper Nepean River	0.42	0.08	0.22	14.0	14.72
	Warragamba- Nepean	0.68	0.32	0.02	5.52	6.54
Middle Hawkesbury Nepean	Lower Nepean River	11.4	1.0	0.25	8.19	20.84
	Hawkesbury River	0.52	0.08	0.03	6.83	7.46
	South Creek	7.88	1.72	2.39	54.5	66.49
	Cattai Creek	0.36	0.47	0.26	0.91	2.0
Lower Hawkesbury	Berowra Creek	2.18	1.42	1.0	7.53	12.13
	Cowan Creek	0	0	3.61	10.01	13.62
Sydney Harbour and Northern Beaches	Upper Parramatta River	0	0	5.0	11.09	16.09
	Upper Lane Cove River	0	0	4.65	1.68	6.33
	Sydney Harbour	0	0	28.96	21.57	50.53
	Pittwater	0	0	0.04	2.05	2.09
	Northern Lagoons	0	0	1.15	2.1	3.25
	Northern and Eastern Sydney Beaches	na	na	na	na	na
Georges River and Southern Beaches	Upper Georges River	0	0	1.26	13.99	15.25
	Central Georges River	0	0	8.72	27.97	36.69
	Lower Georges River	0	0	2.07	22.61	24.68
	Cooks River	0	0	15.27	14.99	30.26
	Port Hacking	0	0	0.48	5.58	6.06
	Southern Sydney Beaches	na	na	na	na	na
Illawarra	Lake Illawarra	0	0	0.74	12.68	13.42
	Port Kembla	0	0	1.28	6.74	8.02
	Minnamurra River	0	0	0.03	3.45	3.48
	Illawarra Beaches	na	na	na	na	na

na = not modelled

Table E-2: Pollutant Loads (Tonnes/year) by REZ Total Nitrogen (TN) Loads

Geographic Area	REZ	STP treated discharge	STP partially treated discharge	Wet weather overflow	Diffuse	Total
Blue Mountains	Blue Mountains	49.4	5.2	0.6	120.6	175.8
	Lake Burragorang	na	na	na	na	na
Upper Nepean	Upper Nepean River	25.8	1.2	1	131	159
	Warragamba- Nepean	3.3	1.7	0.1	20	25.1
Middle Hawkesbury Nepean	Lower Nepean River	89.5	10.5	1.1	39.3	140.4
	Hawkesbury River	1.9	0.1	0.1	81	83.1
	South Creek	349.4	33.6	10.2	257	650.2
	Cattai Creek	45.5	5.4	1.1	125	177.0
Lower Hawkesbury	Berowra Creek	196.2	26.7	5	117	344.9
	Cowan Creek	0	0	15.3	114	129.3
Sydney Harbour and Northern Beaches	Upper Parramatta River	0	0	36.6	64.1	100.7
	Upper Lane Cove River	0	0	34	22.9	56.9
	Sydney Harbour	0	0	211.9	144.2	356.1
	Pittwater	0	0	0.3	15.3	15.6
	Northern Lagoons	0	0	8.4	18.5	26.9
	Northern and Eastern Sydney Beaches	na	na	na	na	na
Georges River and Southern Beaches	Upper Georges River	0	0	9.2	98.1	107.3
	Central Georges River	0	0	63.8	159.2	223.0
	Lower Georges River	0	0	15.2	139.5	154.7
	Cooks River	0	0	111.8	84.9	196.7
	Port Hacking	0	0	3.5	209.9	213.4
	Southern Sydney Beaches	na	na	na	na	na
Illawarra	Lake Illawarra	0	0	5.4	73.7	79.1
	Port Kembla	0	0	9.3	38.6	48.0
	Minnamurra River	0	0	0.2	21.9	22.1
	Illawarra Beaches	na	na	na	na	na

na = not modelled

Table E-3: Water Quality Modelling Summary Table - Faecal Coliforms < 150cfu/100ml (Primary Contact Recreation)

Geographic Area	Assessment Site	Existing Days/yr compliance	Days/ yr recovered for preferred option	Days/yr recovered for no overflows
Blue Mountains	DAS-13 - d/s Winmalee STP discharge	277	14	15
	DAS-15 - Grose River below Blackheath/ North Katoomba	145	9	9
	DAS-16 - Tributary of Grose below Wentworth Falls	214	2	2
Upper Nepean	DAS-2 - Nepean at MacQuarie Grove Rd.	323	0	1
	DAS-6 - Nepean below Warragamba River	280	33	33
Middle Hawkesbury Nepean	DAS-11 - Nepean at Mitchell Pass	265	7	7
	DAS-22 - Eastern Creek below Quakers Hill	11	7	8
	DAS-26 - Cattai Creek below Castle Hill	48	0	5
	DAS-30 - Hawkesbury River at Wisemans Ferry	333	1	1
Lower Hawkesbury	DAS-32 - Waitara Creek below West Hornsby	243	8	8
	DAS-33 - Berowra Creek at Ferry	299	34	49
	DAS-36 - Hawkesbury at Flint and Steel Point	364	0	1
Sydney Harbour and Northern Beaches	Sydney Heads	355	7	9
	Long Bay - Middle Harbour	316	42	49
	Manly Lagoon	20	0	0
Georges River and Southern Beaches	Milperra Road Bridge - Central Georges River	304	37	37
	Frenchmans Beach - Botany Bay	365	0	0
	Prospect Creek - Central Georges River	74	0	0
Illawarra	Outer Harbour - Port Kembla Harbour	341	13	13
	Mid Northern Lake - Lake Illawarra	363	0	0
	Minnamurra River - estuary	273	11	12

Sites selected include sites with lowest compliance, highest compliance and most days recovered as a result of prefered option within each Geographic Area.

Table E-4: Water Quality Modelling Summary Table - Chlorophyll-a < 20μg/l (freshwater); 10μg/l (estuarine)

Geographic Area	Assessment Site	Existing Days/yr compliance	Days/ yr recovered for preferred option 2021 conditions	Days/yr recovered for no overflows 2021 conditions
Upper Nepean	DAS-3 - Nepean at Matahil Creek confluence	307	58	58
	DAS-9 - Nepean below Glenbrook Creek	365	0	0
Middle Hawkesbury Nepean	DAS-23 - Eastern Creek below Riverstone	263	79	79
	DAS-24 - Hawkesbury River at Windsor Bridge	237	111	112
	DAS-26 - Cattai Creek below Castle Hill	365	0	0
Lower Hawkesbury	DAS-33a - Berowra Creek at Oakey Point	286	77	77
	DAS-33 - Berowra Creek at Ferry	180	164	172
	DAS-34 - Hawkesbury River below Mooney Mooney Bridge	365	0	0
Sydney Harbour and Northern Beaches	Sydney Heads	364	1	1
	Roseville Bridge - Middle Harbour	315	23	34
	Bennelong Point - Sydney Harbour	287	31	42
	James Ruse Drive - Parramatta River estuary	191	8	124
Georges River and Southern Beaches	Milperra Road Bridge - Central Georges River	365	0	0
	Frenchmans Beach - Botany Bay	365	0	0
	Prospect Creek - Central Georges River	365	0	0

Sites selected include sites with lowest compliance, highest compliance and most days recovered as a result of prefered option within each Geographic Area.

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Appendix F

Measured system performance data

Table F-1: Summary of overflows due to SPS failures 1996/97

Geographic Area	Sewerage systems	No of SPS	No of SPS failures	Overflows due to failure
Blue Mountains	Mt Victoria	1	na	6
	Blackheath	7	na	67
	Winmalee	61	na	214
Upper Nepean	West Camden	6	30	0
	Warragamba	1	0	0
Middle Hawkesbury Nepean	Penrith	22	206	18
	Glenbrook	29	158	9
	North Richmond	3	14	na
	Richmond	10	98	>18
	St Marys	8	73	2
	Quakers Hill	6	30	na
	Riverstone	3	26	1
	Castle Hill	0	0	0
	Round Corner	1	0	0
	Rouse Hill	4	na	0
Lower Hawkesbury	Hornsby Heights	14	135	2
	West Hornsby	7	47	3
Sydney Harbour and	Warriewood	48	453	1
Northern Beaches	Northern Suburbs	87	655	22
	Bondi	40	7	0
Georges River and	Southern Suburbs	153	na	1
Southern Beaches	Cronulla	59	na	0
Illawarra	Bellambi	7	1	1
	Wollongong	15	4	na
	Port Kembla	13	1	1
	Shellharbour	17	2	2
	Kiama	14	4	4

na: information not available

Table F-2: Summary of Leakage Performance by sewerage system

Geographic Area	Sewerage Systems	Number of exfiltration candidates	Number of infiltration candidates	Number of unknown leakage catchments	Number of nil leakage catchments
Blue Mountains	Mt Victoria	1 (100%)	0 (0%)	0 (0%)	0 (0%)
	Blackheath	0 (0%)	0 (0%)	0 (0%)	1 (100%)
	Winmalee	3 (38%)	2 (25%)	0 (0%)	3 (38%)
Upper Nepean	West Camden	3 (50%)	0 (0%)	1 (17%)	2 (33%)
	Warragamba	0 (0%)	1 (100%)	0 (0%)	0 (0%)
Middle Hawkesbury Nepean	Penrith (Mt Riverview)	5 (50%)	1 (10%)	1 (10%)	3 (30%)
	Glenbrook	1 (100%)	0 (0%)	0 (0%)	0 (0%)
	North Richmond	0 (0%)	0 (0%)	0 (0%)	1 (100%)
	Richmond	1 (100%)	0 (0%)	0 (0%)	0 (0%)
	St Marys	6 (46%)	0 (0%)	1 (8%)	6 (46%)
	Quakers Hill	4 (40%)	1 (10%)	1 (10%)	4 (40%)
	Riverstone	1 (100%)	0 (0%)	0 (0%)	0 (0%)
	Castle Hill	2 (33%)	0 (0%)	1 (17%)	3 (50%)
	Round Corner	1 (100%)	0 (0%)	0 (0%)	0 (0%)
	Rouse Hill	1 (17%)	0 (0%)	3 (50%)	2 (33%)
Lower Hawkesbury	Hornsby Heights	2 (50%)	0 (0%)	0 (0%)	2 (50%)
	West Hornsby	6 (60%)	3 (30%)	1 (10%)	0 (0%)
Sydney Harbour and	Warriewood	1(17%)	1 (17%)	1 (17%)	3 (50%)
Northern Beaches	Northern Suburbs	22 (15%)	23 (16%)	24 (16%)	77 (53%)
	Bondi	1 (4%	13 (52%)	4 (16%)	7 (28%)
Georges River and	Southern Suburbs	33 (24%)	28 (21%)	22 (16%)	53 (39%)
Southern Beaches	Cronulla	5 (24%)	4 (19%)	4 (19%)	8 (38%)
Illawarra	Bellambi	1 (6%)	2 (13%)	3 (19%)	10 (63%)
	Wollongong	3 (43%)	1 (14%)	1 (14%)	2 (29%)
	Port Kembla	3 (27%)	2 (18%)	3 (27%)	3 (27%)
	Shellharbour	2 (18%)	3 (27%)	2 (18%)	4 (36%)
	Kiama	0 (6%)	0 (0%)	1 (25%)	3 (75%)
Sydney Wide Total		**108 (23%)**	**85 (18%)**	**74 (16%)**	**197 (42%)**

Table F-3: Summary of overflows in each system caused by chokes

Geographic Area	Sewerage systems	High	Medium	Low
Blue Mountains	Mt Victoria	0	0	1
	Blackheath	0	0	1
	Winmalee	0	7	4
Upper Nepean	West Camden	0	2	3
	Warragamba	0	1	0
Middle Hawkesbury Nepean	Penrith	0	4	4
	Glenbrook	0	4	1
	North Richmond	0	0	1
	Richmond	0	1	0
	St Marys	3	12	5
	Quakers Hill	1	5	11
	Riverstone	0	0	4
	Castle Hill	0	1	0
	Round Corner	0	0	3
	Rouse Hill	0	2	4
Lower Hawkesbury	Hornsby Heights	0	2	3
	West Hornsby	1	6	2
Sydney Harbour and	Warriewood	0	7	9
Northern Beaches	Northern Suburbs	16	74	38
	Bondi	6	12	15
Georges River and	Southern Suburbs	15	92	115
Southern Beaches	Cronulla	4	22	11
Illawarra	Bellambi	3	13	5
	Wollongong	1	6	0
	Port Kembla	1	5	5
	Shellharbour	0	7	3
	Kiama	0	1	2

Chokes data for 1996/97 has been normalised into number per 100km of sewer and the suburbs affected ranked into high, medium and low categories. The classification criteria is: -

High	more than 180 chokes per 100 km
Medium	61 to 180 chokes per 100 km
Low	up to 60 chokes per 100 km

Table F-4: Number of odour complaints per suburb by sewerage system

Geographic Area	Sewerage Systems	No of Complaints
Blue Mountains	Mt Victoria	1
	Blackheath	1
	Winmalee	27
Upper Nepean	West Camden	6
	Warragamba	2
Middle Hawkesbury Nepean	Penrith	22
	Glenbrook	9
	North Richmond	0
	Richmond	1
	St Marys	7
	Quakers Hill	3
	Riverstone	0
	Castle Hill	1
	Round Corner	3
	Rouse Hill	0
Lower Hawkesbury	Hornsby Heights	21
	West Hornsby	6
Sydney Harbour and	Warriewood	30
Northern Beaches	Northern Suburbs	176
	Bondi	84
Georges River and	Southern Suburbs	161
Southern Beaches	Cronulla	47
Illawarra	Bellambi	13
	Wollongong	17
	Port Kembla	17
	Shellharbour	15
	Kiama	6

Odour emissions complaints data for 1996/97 per suburb for each system is presented above.

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Appendix G

Overflow ranking results

Table G-1: Sydney-Wide Ranking Results For Designed Structure Wet Weather Overflows

Designed Structure Wet Weather Overflows

Sydney-Wide Rank	Model Node No.	Sewerage System	Geographic Area (GA)	Receiving Environment Zone (REZ)	Overflow Discharge Score	Aquatic Ecosystem Score	Terrestrial Ecosystem Score	Human Health Score	Environmt. Sensitivity Score	Overflow Ranking Score	System Rank	REZ Rank	GA Rank	Overflow Flags#
1	03LUGA	SWSOOS	Georges River	Lower Georges (& Central Georges)**	20	5	na	32	32	52	1	1	1	CWA2
2	NW22	Bellambi	Illawarra	Illawarra Beaches	10	40	17	16	40	50	2	2	1	TSCA1
2	SPS498	Shellharbour	Illawarra	Illawarra Beaches	10	40	34	4	40	50	1	1	1	TSCA1
2	Muddy Crk*	SWSOOS	Georges River	Lower Georges (& Cooks River)**	32	18	na	16	18	50	1	1	1	TSCA2
5	BU82	Bellambi	Illawarra	Illawarra Beaches	9	40	na	16	40	49	3	3	3	TSCA1
5	SD101	SWSOOS	Georges River	Lower Georges River	16	33	na	16	33	49	2	3	3	TSCA1
7	WM1-17	NSOOS	Sydney Harbour	Sydney Harbour	32	6	na	16	16	48	1	1	1	na
8	Perimeter Rd*	SWSOOS	Georges River	Lower Georges River	12	33	na	16	33	45	4	4	4	TSCA1
9	EC2-02	Quakers Hill	Middle Hawkesbury Nepean	South Creek	8	10	36	4	36	44	1	1	1	TSCA1
9	04EAST	SWSOOS	Georges River	Lower Georges (& Central)**	12	5	na	32	32	44	5	5	5	CWA2
11	BA95	Bellambi	Illawarra	Illawarra Beaches	3	40	na	16	40	43	3	4	4	TSCA1
12	BA83	Shellharbour	Illawarra	Illawarra Beaches	2.5	40	34	16	40	42.5	2	5	5	TSCA1
13	820203	NSOOS	Sydney Harbour	Sydney Harbour	32	6	2.5	10	10	42	2	2	2	na
14	Shelly Beach*	NSOOS	Sydney Harbour	N/E Sydney Beaches	8	32.5	na	16	32.5	40.5	3	na	3	TSCA1
15	820052U	NSOOS	Sydney Harbour	Sydney Harbour	24	6	na	16	16	40	4	3	4	na
15	SPS500	Shellharbour	Illawarra	Lake Illawarra	8	32	na	16	32	40	6	6	6	TSCA2
15	MW12	Shellharbour	Illawarra	Lake Illawarra	6	32	34	16	34	40	6	6	6	TSCA2
15	02P162	SWSOOS	Georges River	Lower Georges River	8	6	na	32	32	40	3	1	6	CWA2
15	03ROBE	SWSOOS	Georges River	Lower Georges River	8	18	na	32	32	40	3	1	6	TSCA2, CWA2
20	BC3-03	Quakers Hill	Middle Hawkesbury Nepean	South Creek	5	4	34	5	34	39	1	2	2	TCSA1
20	RC1-06	St Marys	Middle Hawkesbury Nepean	South Creek	6	3	33	2	33	39	2	2	2	TSCA1
20	CC43	Castle Hill	Middle Hawkesbury Nepean	Cattai Creek	6	8	33	6	33	39	8	1	2	TSCA1
20	802424	SWSOOS	Georges River	Central Georges River	6	33	na	4	33	39	1	1	8	TSCA1
24	03LIME	SWSOOS	Georges River	Lower Georges River	6	18	na	32	32	38	9	8	9	TSCA2, CWA2
24	DI-STR	SWSOOS	Georges River	Central Georges River	32	6	na	6	6	38	9	2	9	na
26	EC2-06	Quakers Hill	Middle Hawkesbury Nepean	South Creek	4	4	33	4	33	37	3	4	5	TSCA1
26	EC2-12	Quakers Hill	Middle Hawkesbury Nepean	South Creek	3	4	34	3	34	37	3	4	5	TSCA1
26	SP289	Port Kembla	Illawarra	Lake Illawarra	5	32	na	16	32	37	1	3	8	TSCA2
26	LH14	Port Kembla	Illawarra	Lake Illawarra	5	32	na	16	32	37	1	3	8	TSCA2
26	SP308	Port Kembla	Illawarra	Lake Illawarra	5	32	na	16	32	37	1	3	8	TSCA2
26	LA55	Port Kembla	Illawarra	Lake Illawarra	5	32	na	16	32	37	1	3	8	TSCA2
32	EJ1	NSOOS	Sydney Harbour	Upper Lane Cove River	24	12	5	12	12	36	5	1	5	na
32	3120	NSOOS	Sydney Harbour	Sydney Harbour	24	6	na	12	12	36	5	4	5	na
32	03GUNG	SWSOOS	Georges River	Lower Georges River	4	5	na	32	32	36	11	9	11	CWA2

Designed Structure Wet Weather Overflows

Sydney-Wide Rank	Model Node No.	Sewerage System	Geographic Area (GA)	Receiving Environment Zone (REZ)	Overflow Discharge Score	Aquatic Ecosystem Score	Terrestrial Ecosystem Score	Human Health Score	Environmt. Sensitivity Score	Overflow Ranking Score	System Rank	REZ Rank	GA Rank	Overflow Flags[#]
32	LPTW	SWSOOS	Georges River	Central Georges River	24	12	na	12	12	36	11	3	11	na
36	HC84	Port Kembla	Illawarra	Lake Illawarra	2.5	32	na	16	32	34.5	5	7	12	TSCA2
37	FFTW	SWSOOS	Georges River	Central Georges River	16	18	na	12	18	34	13	4	13	TSCA2
38	LA511	Port Kembla	Illawarra	Lake Illawarra	1.5	32	na	16	32	33.5	6	8	13	TSCA2
39	MWIN1	SWSOOS	Georges River	Cooks River	16	17	na	6	17	33	14	1	14	TSCA2
40	WM1-30	NSOOS	Sydney Harbour	Sydney Harbour	20	8	5	12	12	32	7	5	7	na
41	Kissing Pt Rd*	NSOOS	Sydney Harbour	Sydney Harbour	24	2	na	6	6	30	8	6	8	na
41	BS-DILN	BOOS	Sydney Harbour	Sydney Harbour	20	5	na	10	10	30	1	6	8	na
41	SU115	Cronulla	Georges River	Lower Georges River	6	5	na	24	24	30	1	10	15	CWA2
41	SU127	Cronulla	Georges River	Lower Georges River	6	10	na	24	24	30	1	10	15	CWA2
41	SU128	Cronulla	Georges River	Lower Georges River	6	10	na	24	24	30	1	10	15	CWA2
41	802413U	SWSOOS	Georges River	Central Georges River	12	18	na	4	18	30	15	5	15	TSCA2
41	FW1-04	SWSOOS	Georges River	Central Georges River	12	18	na	12	18	30	15	5	15	TSCA2
48	820405	NSOOS	Sydney Harbour	Sydney Harbour	12	6	17	12	17	29	9	8	10	TSCA2
48	SU111	Cronulla	Georges River	Lower Georges River	5	5	na	24	24	29	4	13	20	CWA2
48	SU15	Cronulla	Georges River	Lower Georges River	5	17	na	24	24	29	4	13	20	TSCA2, CWA2
48	M1	SWSOOS	Georges River	Cooks River	12	17	na	6	17	29	17	2	20	TSCA2
48	M2	SWSOOS	Georges River	Cooks River	12	17	na	6	17	29	17	2	20	TSCA2
48	MWIN2	SWSOOS	Georges River	Cooks River	12	17	na	6	17	29	17	2	20	TSCA2
48	VI3-05	SWSOOS	Georges River	Central Georges River	10	18	na	6	18	28	20	7	25	TSCA2
55	SPS-16	BOOS	Sydney Harbour	Sydney Harbour	9	2	na	18	18	27	2	9	11	na
55	HH1-01	Hornsby Heights	Lower Hawkesbury	Berowra Creek	10	6	17	3	17	27	21	5	1	TSCA2
55	CC2-16	SWSOOS	Georges River	Cooks River	24	3	na	3	3	27	21	5	26	na
55	WC3-05	SWSOOS	Georges River	Cooks River	24	3	na	3	3	27	1	1	26	na
59	820054	NSOOS	Sydney Harbour	Upper Parramatta River	16	6	na	10	10	26	10	1	12	na
59	WM1-9	NSOOS	Sydney Harbour	Sydney Harbour	16	6	2.5	10	10	26	10	10	12	na
59	820682	NSOOS	Sydney Harbour	Sydney Harbour	10	3	na	16	16	26	10	10	12	na
59	KR1-03	SWSOOS	Georges River	Central Georges River	8	18	na	4	18	26	23	8	28	TSCA2
63	ME37	Cronulla	Georges River	Lower Georges River	1.5	10	na	24	24	25.5	6	15	29	CWA2
64	SWC4B	NSOOS	Sydney Harbour	Sydney Harbour	20	3	na	4	4	24	24	12	15	na
64	3021	NSOOS	Sydney Harbour	Sydney Harbour	12	6	na	12	12	24	13	12	15	na
64	DI1-06	SWSOOS	Sydney Harbour	Sydney Harbour	12	5	na	12	12	24	13	12	15	na
64	CO21	Wollongong	Illawarra	Port Kembla	16	8	na	4	8	24	1	1	14	na
64	BE68	Shellharbour	Illawarra	Illawarra Beaches	6	18	na	16	18	24	5	6	14	TSCA2

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64	KR1-01	SWSOOS	Georges River	Central Georges River	6	18	na	4	18	24	24	9	30	TSCA2
70	SW32A	Cronulla	Georges River	Port Hacking	6	17	na	12	17	23	7	1	31	TSCA2
70	CS8-05	SWSOOS	Georges River	Cooks River	20	3	na	3	3	23	26	7	31	na
70	VI3-09	SWSOOS	Georges River	Central Georges River	5	18	na	4	18	23	26	10	31	TSCA2
73	32	NSOOS	Sydney Harbour	Upper Parramatta River	12	6	na	10	10	22	15	2	18	na
73	820055	NSOOS	Sydney Harbour	Upper Parramatta River	12	6	1	10	10	22	15	2	18	na
73	802533	SWSOOS	Sydney Harbour	Sydney Harbour	10	5	na	12	12	22	28	1	18	na
73	CMH-72	SWSOOS	Sydney Harbour	Sydney Harbour	10	5	na	12	12	22	28	15	18	na
73	NM-EDNA	BOOS	Sydney Harbour	Sydney Harbour	10	3	na	12	12	22	28	15	18	na
73	WE2-02	SWSOOS	Sydney Harbour	Sydney Harbour	10	5	na	12	12	22	28	15	18	na
73	BE66	Shellharbour	Illawarra	Illawarra Beaches	10	4	na	16	12	22	3	15	16	na
73	BR2-02	SWSOOS	Georges River	Upper Georges River	12	6	na	10	10	22	8	2	34	na
73	BU610	Cronulla	Georges River	Port Hacking	12	9	na	10	10	22	6	7	34	na
82	WC81	Bellambi	Illawarra	Illawarra Beaches	1.5	20	3	16	20	21.5	4	8	17	TSCA2
83	SPS568	Bombo	Illawarra	Illawarra Beaches	5	8.5	na	16	16	21	1	9	18	na
83	CMH213	SWSOOS	Georges River	Central Georges River	3	18	na	4	18	21	32	11	36	TSCA2
85	SPS569	Bombo	Illawarra	Illawarra Beaches	4.5	1.5	6	16	16	20.5	2	10	19	na
86	WD2	NSOOS	Sydney Harbour	Sydney Harbour	10	6	na	10	10	20	17	19	24	na
86	01GLAD	SWSOOS	Georges River	Cooks River	3	17	na	6	17	20	33	8	37	TSCA2
86	T4MCOF2	SWSOOS	Georges River	Cooks River	3	17	na	6	17	20	33	8	37	TSCA2
89	BE64	Shellharbour	Illawarra	Illawarra Beaches	1.5	18	na	16	18	19.5	7	11	20	TSCA2
90	CT1	Warriewood	Sydney Harbour	Pittwater	2.5	5	na	16	16	18.5	1	1	25	na
91	W14	NSOOS	Sydney Harbour	Sydney Harbour	12	5	na	6	6	18	35	2	26	na
91	DV121	NSOOS	Sydney Harbour	Sydney Harbour	12	2	na	6	6	18	18	20	26	na
91	3015	NSOOS	Sydney Harbour	Sydney Harbour	6	6	na	12	12	18	18	20	26	na
91	WW-2B4	BOOS	Sydney Harbour	Sydney Harbour	6	5	na	12	12	18	18	20	26	na
91	SP14434	Wollongong	Illawarra	Illawarra Beaches	10	8	na	4	8	18	4	20	21	na
91	SPS150	Wollongong	Illawarra	Illawarra Beaches	10	8	na	4	8	18	9	3	21	na
91	GL1-03	SWSOOS	Georges River	Upper Georges River	8	6	na	10	10	18	2	12	39	na
91	PH18	Cronulla	Georges River	Port Hacking	8	5	na	10	10	18	2	12	39	na
99	HC2	NSOOS	Sydney Harbour	Sydney Harbour	12	5	na	4	5	17	36	24	30	na
99	WE2-11	SWSOOS	Sydney Harbour	Sydney Harbour	12	5	na	4	5	17	36	24	30	na
99	WM1-35	NSOOS	Sydney Harbour	Sydney Harbour	12	5	na	4	5	17	21	24	30	na
99	CMH-41	SWSOOS	Sydney Harbour	Sydney Harbour	12	5	na	4	5	17	21	24	30	na

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99	SPS-27	BOOS	Sydney Harbour	Sydney Harbour	5	3	na	12	12	17	21	24	30	na
99	820011	NSOOS	Sydney Harbour	Sydney Harbour	5	5	na	12	12	17	5	24	30	na
99	RE22	Bellambi	Illawarra	Illawarra Beaches	5	12	na	4	12	17	5	14	23	na
99	CC2-30A	SWSOOS	Georges River	Cooks River	12	5	na	3	5	17	36	10	41	na
99	CMH-84	SWSOOS	Georges River	Cooks River	12	5	na	3	5	17	36	10	41	na
108	WB23	NSOOS	Sydney Harbour	Upper Parramatta River	12	3	na	4	4	16	24	4	36	na
108	FS4-02	NSOOS	Sydney Harbour	Sydney Harbour	10	6	na	4	6	16	40	30	36	na
108	SPS-17	BOOS	Sydney Harbour	Sydney Harbour	10	2	na	6	6	16	40	30	36	na
108	8A-2	NSOOS	Sydney Harbour	Sydney Harbour	10	6	na	6	6	16	24	30	36	na
108	DC1A	NSOOS	Sydney Harbour	Sydney Harbour	12	4	na	4	4	16	24	30	36	na
108	CMH-22	SWSOOS	Sydney Harbour	Sydney Harbour	6	5	na	10	10	16	24	30	36	na
108	DA204-1	SWSOOS	Sydney Harbour	Sydney Harbour	6	5	na	10	10	16	6	30	36	na
108	NM-PIPE	BOOS	Sydney Harbour	Sydney Harbour	10	3	na	6	6	16	6	30	36	na
108	BC114	SWSOOS	Georges River	Cooks River	12	4	na	3	4	16	40	12	43	na
108	WC3-23	SWSOOS	Georges River	Cooks River	12	4	na	3	4	16	40	12	43	na
108	WC3-38	SWSOOS	Georges River	Cooks River	12	4	na	3	4	16	40	12	43	na
119	EI2	NSOOS	Sydney Harbour	Upper Lane Cove River	5	6	5	10	10	15	28	2	44	na
119	ES1	NSOOS	Sydney Harbour	Sydney Harbour	10	5	na	4	5	15	28	37	44	na
119	WR508	NSOOS	Sydney Harbour	Sydney Harbour	10	5	na	4	5	15	28	37	44	na
119	IC1-03	NSOOS	Sydney Harbour	Sydney Harbour	12	3	na	2	3	15	28	37	44	na
119	BU1-BA1	NSOOS	Sydney Harbour	Sydney Harbour	5	6	na	10	10	15	28	37	44	na
119	TWW8	Warriewood	Sydney Harbour	Pittwater	3	4	na	12	12	15	2	2	44	na
119	CMH-82	SWSOOS	Georges River	Cooks River	10	5	na	3	5	15	45	15	46	na
119	CMH86	SWSOOS	Georges River	Cooks River	10	5	na	3	5	15	45	15	46	na
127	LP1-02	Quakers Hill	Middle Hawkesbury Nepean	South Creek	5	9	1	3	9	14	5	6	7	na
127	LP1-07	Quakers Hill	Middle Hawkesbury Nepean	South Creek	5	9	na	3	9	14	5	6	7	na
127	TH1ML37	West Hornsby	Lower Hawkesbury	Berowra Creek	8	6	5	4	6	14	10	4	2	na
127	PH116	Cronulla	Georges River	Port Hacking	4	6	na	10	10	14	47	12	48	na
127	WE5-03	SWSOOS	Georges River	Central Georges River	10	4	na	3	4	14	1	2	48	na
132	BW-14	BOOS	Sydney Harbour	Sydney Harbour	1.5	6	na	12	12	13.5	8	41	50	na
133	LDC12	NSOOS	Sydney Harbour	Sydney Harbour	9	2	na	4	4	13	48	42	51	na
133	CMH-26	SWSOOS	Sydney Harbour	Sydney Harbour	3	5	na	10	10	13	33	42	51	na
133	SC4-04	St Marys	Middle Hawkesbury Nepean	South Creek	8	3	5	4	5	13	2	8	9	na
133	PH113	Cronulla	Georges River	Port Hacking	3	5	na	10	10	13	11	5	50	na

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137	WMA1	NSOOS	Sydney Harbour	Upper Parramatta River	2	3	na	10	10	12	34	5	53	na
137	820579	NSOOS	Sydney Harbour	Sydney Harbour	6	6	na	4	6	12	34	44	53	na
137	WC10	NSOOS	Sydney Harbour	Sydney Harbour	6	5	na	6	6	12	34	44	53	na
137	BC124	SWSOOS	Georges River	Cooks River	8	4	na	3	4	12	49	17	51	na
141	EN1-01	West Camden	Upper Nepean	Upper Nepean River	5	6	na	4	6	11	1	1	1	na
141	SP440	West Camden	Upper Nepean	Upper Nepean River	6	2.5	na	5	5	11	1	1	1	na
141	820571U	NSOOS	Sydney Harbour	Sydney Harbour	8	1.5	na	3	3	11	37	46	56	na
141	SPS-477	NSOOS	Sydney Harbour	Sydney Harbour	6	5	na	2	5	11	37	46	56	na
141	ST1-11	St Marys	Middle Hawkesbury Nepean	South Creek	5	4	na	6	6	11	3	9	10	na
141	ST1-07	St Marys	Middle Hawkesbury Nepean	South Creek	5	6	4	4	6	11	3	9	10	na
141	MR3-03	St Marys	Middle Hawkesbury Nepean	South Creek	2	6	na	9	9	11	3	9	10	na
141	BU852	Bellambi	Illawarra	Illawarra Beaches	2	5	3	16	9	11	6	15	24	na
149	CS3-01	West Camden	Upper Nepean	Upper Nepean River	5	3	1.5	5	5	10	39	6	3	na
149	11-2	NSOOS	Sydney Harbour	Upper Parramatta River	8	2	na	2	2	10	3	3	58	na
149	820621	NSOOS	Sydney Harbour	Sydney Harbour	6	3	na	4	4	10	39	48	58	na
149	MR6-04A	Quakers Hill	Middle Hawkesbury Nepean	South Creek	6	1	1	4	4	10	7	12	13	na
149	WC1-03	Quakers Hill	Middle Hawkesbury Nepean	South Creek	6	1.5	1	4	4	10	7	12	13	na
149	BC7-09	Quakers Hill	Middle Hawkesbury Nepean	South Creek	6	1.5	1	4	4	10	7	12	13	na
149	BC7-02	Quakers Hill	Middle Hawkesbury Nepean	South Creek	4	6	na	4	6	10	7	12	13	na
149	TH1OF01	West Hornsby	Lower Hawkesbury	Berowra Creek	5	5	5	3	5	10	2	3	3	na
157	WB29	NSOOS	Sydney Harbour	Upper Parramatta River	5	3	na	4	4	9	41	7	60	na
157	LAG4	NSOOS	Sydney Harbour	Sydney Harbour	5	3	na	4	4	9	50	49	60	na
157	PS3	SWSOOS	Sydney Harbour	Sydney Harbour	5	3	na	4	4	9	41	49	60	na
157	BC7-06	Quakers Hill	Middle Hawkesbury Nepean	South Creek	6	1	1	3	3	9	6	16	17	na
157	ST1-14	St Marys	Middle Hawkesbury Nepean	South Creek	5	3	na	4	4	9	11	16	17	na
157	BC7-12	Quakers Hill	Middle Hawkesbury Nepean	South Creek	5	3	1	4	4	9	11	16	17	na
157	RH1-02	Quakers Hill	Middle Hawkesbury Nepean	South Creek	3	6	na	4	6	9	11	16	17	na
157	BC3-07	Quakers Hill	Middle Hawkesbury Nepean	South Creek	3	6	na	4	6	9	11	16	17	na
157	CH22	Castle Hill	Middle Hawkesbury Nepean	Cattai Creek	3	6	na	6	6	9	7	16	17	na
157	CR85	Castle Hill	Middle Hawkesbury Nepean	Cattai Creek	3	6	na	4	6	9	7	16	17	na
157	GL28	Castle Hill	Middle Hawkesbury Nepean	Cattai Creek	3	6	na	4	6	9	7	16	17	na
157	RA59	Castle Hill	Middle Hawkesbury Nepean	Cattai Creek	3	6	na	4	6	9	50	18	17	na
157	MK12	Bellambi	Illawarra	Illawarra Beaches	5	4	na	4	4	9	50	13	25	na
157	FC44	Bellambi	Illawarra	Illawarra Beaches	5	4	na	4	4	9	2	2	25	na

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157	CT232	Bellambi	Illawarra	Illawarra Beaches	5	4	na	4	4	9	2	2	25	na
157	AA105	SWSOOS	Georges River	Cooks River	5	2	na	4	4	9	2	2	52	na
157	CA1-19	SWSOOS	Georges River	Central Georges River	6	3	na	2	3	9	2	2	52	na
174	CH211	Castle Hill	Middle Hawkesbury Nepean	Cattai Creek	2.5	6	na	4	6	8.5	6	6	26	na
174	ER33	Castle Hill	Middle Hawkesbury Nepean	Cattai Creek	2.5	6	na	4	6	8.5	6	6	26	na
176	CS3-03	West Camden	Upper Nepean	Upper Nepean River	3	2	na	5	5	8	4	4	4	na
176	CMH-91	SWSOOS	Sydney Harbour	Sydney Harbour	3	5	na	4	5	8	53	51	63	na
176	BC3-04	Quakers Hill	Middle Hawkesbury Nepean	South Creek	5	3	na	2	3	8	15	21	28	na
176	NO1-07	West Hornsby	Lower Hawkesbury	Berowra Creek	3	5	na	3	5	8	53	14	4	na
176	CMH287	SWSOOS	Georges River	Central Georges River	2	6	na	4	6	8	53	14	54	na
176	CA1-25	SWSOOS	Georges River	Central Georges River	5	3	na	2	3	8	3	4	54	na
182	TWW17	Warriewood	Sydney Harbour	Pittwater	2.5	5	1	4	5	7.5	3	3	64	na
182	CC48	Castle Hill	Middle Hawkesbury Nepean	Cattai Creek	1.5	5	na	6	6	7.5	8	8	29	na
182	CC1-1A	Hornsby Heights	Lower Hawkesbury	Berowra Creek	3	4.5	na	3	4.5	7.5	4	5	5	na
182	CC1-06	Hornsby Heights	Lower Hawkesbury	Berowra Creek	3	4.5	na	3	4.5	7.5	4	5	5	na
182	WP1-06	West Hornsby	Lower Hawkesbury	Berowra Creek	3	4.5	na	4	4.5	7.5	2	5	5	na
182	SR3-12	West Hornsby	Lower Hawkesbury	Berowra Creek	3	4.5	na	3	4.5	7.5	2	5	5	na
188	WC1-10	Quakers Hill	Middle Hawkesbury Nepean	South Creek	5	1	na	2	2	7	16	22	30	na
188	NO1-21	West Hornsby	Lower Hawkesbury	Berowra Creek	2.5	4.5	na	3	4.5	7	10	19	9	na
188	CT23	Bellambi	Illawarra	Illawarra Beaches	3	4	na	4	4	7	6	9	28	na
191	EC11-5	West Camden	Upper Nepean	Upper Nepean River	2.5	3	1.5	4	4	6.5	5	5	5	na
191	RC1-10	St Marys	Middle Hawkesbury Nepean	South Creek	2.5	4	na	4	4	6.5	7	23	31	na
191	WP1-09	West Hornsby	Lower Hawkesbury	Berowra Creek	2	4.5	na	4	4.5	6.5	7	10	10	na
194	NO1-23	West Hornsby	Lower Hawkesbury	Berowra Creek	1.5	4.5	na	3	4.5	6	56	16	11	na
194	CA1-11	SWSOOS	Georges River	Central Georges River	3	3	na	2	3	6	56	16	56	na
194	SM1-07	SWSOOS	Georges River	Central Georges River	3	2	na	3	3	6	56	16	56	na
194	SPS187B	SWSOOS	Georges River	Central Georges River	3	3	na	2	3	6	8	11	56	na
198	DR3-20	NSOOS	Sydney Harbour	Sydney Harbour	1.5	2	na	4	4	5.5	43	52	65	na
198	MD3-04	St Marys	Middle Hawkesbury Nepean	South Creek	3	1.5	na	2.5	2.5	5.5	8	24	32	na
198	MD3-08	St Marys	Middle Hawkesbury Nepean	South Creek	3	1.5	na	2.5	2.5	5.5	8	24	32	na
198	LP1-10	Quakers Hill	Middle Hawkesbury Nepean	South Creek	2.5	3	na	3	3	5.5	17	24	32	na
198	LP1-11	Quakers Hill	Middle Hawkesbury Nepean	South Creek	1.5	3	1	4	4	5.5	17	24	32	na
198	BC3-06	Quakers Hill	Middle Hawkesbury Nepean	South Creek	1.5	2.5	na	4	4	5.5	17	24	32	na
198	CR812	Castle Hill	Middle Hawkesbury Nepean	Cattai Creek	2.5	3	na	2	3	5.5	9	9	32	na

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205	CS3-06	West Camden	Upper Nepean	Upper Nepean River	1.5	3	na	3	3	4.5	6	6	6	na
205	MR6-02A	Quakers Hill	Middle Hawkesbury Nepean	South Creek	3	1	na	1.5	1.5	4.5	20	29	38	na
207	RR3-02	West Camden	Upper Nepean	Upper Nepean River	2.5	1	na	1.5	1.5	4	7	7	7	na
207	ST1-01	St Marys	Middle Hawkesbury Nepean	South Creek	2.5	1.5	na	na	1.5	4	59	3	39	na
207	MD3-01A	St Marys	Middle Hawkesbury Nepean	South Creek	1.5	2.5	na	2	2.5	4	10	30	39	na
207	OS1-02	St Marys	Middle Hawkesbury Nepean	South Creek	2	2	na	2	2	4	10	30	39	na
207	BC3-08	Quakers Hill	Middle Hawkesbury Nepean	South Creek	1.5	2.5	na	1	2.5	4	10	30	39	na
207	OM2-01	West Hornsby	Lower Hawkesbury	Berowra Creek	1	2.5	na	3	3	4	21	30	12	na
207	BU3-03	SWSOOS	Georges River	Upper Georges River	1	3	na	2	3	4	9	12	59	na
214	BC7-05	Quakers Hill	Middle Hawkesbury Nepean	South Creek	1.5	1.5	na	2	2	3.5	22	34	43	na
214	01BANK	SWSOOS	Georges River	Cooks River	1.5	1.5	na	2	2	3.5	60	19	60	na
216	S176101	Port Kembla	Illawarra	Port Kembla	1.5	1	na	na	1	2.5	7	2	29	na

Legend

* Muddy Creek Overflow = T4MCOF1, 01MERG, N2MCOF1 & S2MCOF1; Perimeter Road Overflow = T3SYP2, N2SYP2 & S2SYP2; Shelly Beach Overflow = 820951a & 820951b; Kissing Point Road Overflow = 7-4a & 7-4b (G8-A)

** Overflows impact on more than one REZ: ranking scores are based on the most environmentally sensitive REZ (which is listed first) - the lower scoring REZ is given in brackets.

\# Overflow Flags: **TSCA1** = Species, population, or ecological community (or critical habitat) protected under the Threatened Species Conservation Act 1995 occurs within the boundaries of the potentially impacted area and has the potential to be adversely impacted by an overflow; **TSCA2** = Species, population, or ecological community (or critical habitat) protected under the Threatened Species Conservation Act 1995 occurs within the boundaries of the potentially impacted area but is unlikely to be adversely affected by an overflow; **CWA1** = Overflows from the SPS would discharge directly to a waterway classified S or P under the Clean Waters Act 1970; **CWA2** = Overflows from the SPS would not discharge directly to a waterway classified S or P under the Clean Waters Act 1970 but have the potential to adversely impact such a waterway; **PRP1** = Overflows from the SPS would discharge directly into a private residential property; **PRP2** = SPS does not discharge directly into a private residential property but has the potential to adversely impact a private residential property.

Table G-2: Sydney-Wide Ranking Results For Wet Weather Reticulation Overflows

Wet Weather Reticulation Overflows

SWC Rank	Model Node No.	Sewerage System	Geographic Area (GA)	Receiving Environment Zone (REZ)	Overflow Discharge Score	Aquatic Ecosystem Score	Terrestrial Ecosystem Score	Human Health Score	Environmnt. Sensitivity Score	Overflow Ranking Score	System Rank	REZ Rank	GA Rank	Overflow Flags*
1	EH2-08	SWSOOS	Georges River	Central Georges River (& Lower Georges)**	20	9	48	16	48	68	1	1	1	TSCA1
2	SPSX177	Port Kembla	Illawarra	Lake Illawarra	12	48	2	12	48	60	1	1	1	TSCA1, PRP2
2	CC2-34	SWSOOS	Georges River	Cooks River	12	36	48	6	48	60	2	1	2	TSCA1
2	802945	SWSOOS	Georges River	Cooks River	12	34	48	4	48	60	2	1	2	TSCA1
2	802252	SWSOOS	Georges River	Central Georges River	12	36	48	32	48	60	2	2	2	TSCA1, CWA2
2	802470	SWSOOS	Georges River	Central Georges River	12	6	48	4	48	60	2	2	2	TCSA1
7	NK	Win-Tunnel	Blue Mountains	Blue Mountains	10	32	48	40	48	58	1	1	1	TSCA1, CWA1
8	SU121	Cronulla	Georges River	Lower Georges River	8	9	2.5	48	48	56	1	1	6	CWA1
8	802203	SWSOOS	Georges River	Central Georges River	8	10	48	12	48	56	6	4	6	TSCA1, CWA2
10	KB11	Shellharbour	Illawarra	Lake Illawarra	6	48	34	12	48	54	1	2	2	TSCA1, PRP2
10	SK	Win-Tunnel	Blue Mountains	Lake Burragorang	6	32	48	40	48	54	2	na	2	TSCA1, CWA1
10	802681	SWSOOS	Georges River	Cooks River	6	3	48	4	48	54	7	3	8	TSCA1
10	802204	SWSOOS	Georges River	Central Georges River	6	10	48	12	48	54	7	5	8	TSCA1, CWA2
10	802412	SWSOOS	Georges River	Central Georges River	6	2	48	4	48	54	7	5	8	TSCA1
10	802465	SWSOOS	Georges River	Central Georges River	6	3	48	4	48	54	7	5	8	TSCA1
16	BH	Blackheath	Blue Mountains	Blue Mts & Lake Burragorang	5	32	48	40	48	53	na	1	3	TSCA1, CWA1
17	BA93	Bellambi	Illawarra	Illawarra Beaches	12	40	1	10	40	52	1	1	3	TSCA1, PRP2
17	VI1-01	SWSOOS	Georges River	Central Georges River	4	4	48	4	48	52	11	8	12	TSCA1
19	WF	Win-Tunnel	Blue Mountains	Blue Mts & Lake Burragorang	3	32	48	40	48	51	3	2	4	TSCA1, CWA1
19	HB	Win-Tunnel	Blue Mountains	Blue Mountains	3	32	48	40	48	51	3	2	4	TSCA1, CWA1
21	MV	Mt Victoria	Blue Mountains	Blue Mts & Lake Burragorang	2.5	32	48	40	48	50.5	na	3	6	TSCA1, CWA1
22	AP412	Shellharbour	Illawarra	Lake Illawarra	10	40	34	10	40	50	2	3	4	TSCA1, PRP2
23	FP1-08	SWSOOS	Georges River	Central Georges River	1.5	1.5	48	3	48	49.5	12	9	13	TSCA1
24	WM	Win-Tunnel	Blue Mountains	Blue Mountains	6	32	36	40	40	46	5	3	7	TSCA1, CWA1
25	VH	Win-Tunnel	Blue Mountains	Blue Mountains	5	32	36	40	40	45	6	4	8	TSCA1, CWA1
26	820694	NSOOS	Sydney Harbour	Sydney Harbour	12	6	32	12	32	44	1	1	1	TSCA2
27	820695	NSOOS	Sydney Harbour	Sydney Harbour	10	5	32	16	32	42	2	2	2	TSCA2
27	CO52	Cronulla	Georges River	Lower Georges River	2	9	16.5	40	40	42	2	2	14	TSCA2, CWA1
27	MP32	Shellharbour	Illawarra	Lake Illawarra	10	32	2.5	12	32	42	3	4	5	TSCA2, PRP2
27	BE114	Port Kembla	Illawarra	Lake Illawarra	10	32	2	12	32	42	2	4	5	TSCA2, PRP2
27	DSP343	Shellharbour	Illawarra	Illawarra Beaches	2	40	18	12	40	42	3	2	5	TSCA1, PRP2
32	SH51	Shellharbour	Illawarra	Illawarra Beaches	9	32	17	12	32	41	5	3	8	TSCA2, PRP2
33	DO1-01	Quakers Hill	Middle Hawkesbury Nepean	South Creek	6	4	33	8	33	39	na	1	1	TSCA1
33	SPSx569	Bombo	Illawarra	Minnamurra River	6	33	24	12	33	39	1	na	9	TSCA2
33	LU1-01	SWSOOS	Georges River	Central Georges River	3	17	32	36	36	39	13	10	15	TSCA2, CWA1

Wet Weather Reticulation Overflows

SWC Rank	Model Node No.	Sewerage System	Geographic Area (GA)	Receiving Environment Zone (REZ)	Overflow Discharge Score	Aquatic Ecosystem Score	Terrestrial Ecosystem Score	Human Health Score	Environmnt. Sensitivity Score	Overflow Ranking Score	System Rank	REZ Rank	GA Rank	Overflow Flags
36	RC1-05	St Marys	Middle Hawkesbury Nepean	South Creek	5	3	33	8	33	38	1	2	2	TSCA1
36	RS	Riverstone	Middle Hawkesbury Nepean	South Creek	5	4	33	6	33	38	na	2	2	TSCA1
36	EB303	SWSOOS	Georges River	Cooks River	6	3	32	3	32	38	14	4	16	TSCA2
36	RA51	Castle Hill	Middle Hawkesbury Nepean	Cattai Creek	5	3	33	6	33	38	1	1	2	TSCA1
40	820620	NSOOS	Sydney Harbour	Sydney Harbour	5	2.5	32	12	32	37	3	3	3	TSCA2
40	HE11	Cronulla	Georges River	Lower Georges River	3	34	32	3	34	37	3	3	17	TSCA1, TSCA2
40	MP33	Shellharbour	Illawarra	Lake Illawarra	5	32	2.5	12	32	37	6	6	10	TSCA2, PRP2
43	PC42	Port Kembla	Illawarra	Lake Illawarra	4.5	32	na	12	32	36.5	3	7	11	TSCA2, PRP2
44	EL0	NSOOS	Sydney Harbour	Upper Lane Cove River	16	3	20	6	20	36	4	1	4	TSCA2
44	820019U	NSOOS	Sydney Harbour	Sydney Harbour	16	20	2.5	10	20	36	4	4	4	na
44	PH16	Cronulla	Georges River	Port Hacking	4	10	32	12	32	36	4	1	18	TSCA2
44	820114	NSOOS	Sydney Harbour	Northern Lagoons	16	18	20	12	20	36	4	1	4	TSCA2
44	802720	SWSOOS	Georges River	Cooks River	3	33	1.5	4	33	36	15	5	18	TSCA1
44	CH21	Castle Hill	Middle Hawkesbury Nepean	Cattai Creek	3	6	33	6	33	36	2	2	5	TSCA1
50	802940	SWSOOS	Georges River	Lower Georges River	2.5	33	2.5	6	33	35.5	16	4	20	TSCA1
50	KC2-01	SWSOOS	Georges River	Lower Georges River	1.5	1.5	2.5	34	34	35.5	16	4	20	TSCA1, CWA1
52	802159	SWSOOS	Georges River	Central Georges River	3	17	32	20	32	35	18	11	22	TSCA2, CWA2
53	CM23G	Cronulla	Georges River	Sthn Sydney Beaches (& Port Hacking)**	10	17	1.5	24	24	34	5	1	23	TSCA2
54	WI34	Port Kembla	Illawarra	Lake Illawarra	1.5	32	2	12	32	33.5	4	8	12	TSCA2, PRP2
54	09CAR	SWSOOS	Georges River	Central Georges River	1.5	1	32	2.5	32	33.5	19	12	24	TSCA2
56	820274*	NSOOS	Sydney Harbour	Sydney Harbour	16	5	17	6	17	33	7	5	7	TSCA2
56	820275	NSOOS	Sydney Harbour	Sydney Harbour	16	5	17	10	17	33	7	5	7	TSCA2
56	BL4-01	SWSOOS	Georges River	Lower Georges River	1	1	32	2.5	32	33	20	6	25	TSCA2
59	820321	NSOOS	Sydney Harbour	Upper Lane Cove River	12	3	20	8	20	32	9	2	9	TSCA2
59	820213	NSOOS	Sydney Harbour	Sydney Harbour	12	6	20	12	20	32	9	7	9	TSCA2
61	820548	NSOOS	Sydney Harbour	Upper Parramatta River	12	2	18	8	18	30	11	1	11	TSCA2
61	820680	NSOOS	Sydney Harbour	Upper Parramatta River	12	6	18	6	18	30	11	1	11	TSCA2
61	820335	NSOOS	Sydney Harbour	Upper Lane Cove River	10	3	20	6	20	30	11	3	11	TSCA2
61	820312	NSOOS	Sydney Harbour	Upper Lane Cove River	12	3	18	6	18	30	11	3	11	TSCA2
61	820255	NSOOS	Sydney Harbour	Sydney Harbour	12	3	18	6	18	30	11	8	11	TSCA2
61	SWC4A	NSOOS	Sydney Harbour	Sydney Harbour	10	5	20	6	20	30	11	8	11	TSCA2
61	7-3	NSOOS	Sydney Harbour	Sydney Harbour	10	4.5	20	12	20	30	11	8	11	TSCA2
61	WB-203A	BOOS	Sydney Harbour	Sydney Harbour	6	2.5	17	24	24	30	1	8	11	TSCA2
61	NB66	NSOOS	Sydney Harbour	Northern Lagoons	12	17	18	6	18	30	11	2	11	TSCA2
61	BE62	Shellharbour	Illawarra	Illawarra Beaches	12	18	1.5	12	18	30	7	4	13	PRP2

Wet Weather Reticulation Overflows

SWC Rank	Model Node No.	Sewerage System	Geographic Area (GA)	Receiving Environment Zone (REZ)	Overflow Discharge Score	Aquatic Ecosystem Score	Terrestrial Ecosystem Score	Human Health Score	Environmnt. Sensitivity Score	Overflow Ranking Score	System Rank	REZ Rank	GA Rank	Overflow Flags
61	CE3-10	SWSOOS	Georges River	Cooks River	12	3	18	6	18	30	21	6	26	na
72	820420	NSOOS	Sydney Harbour	Sydney Harbour	12	5	17	12	17	29	19	12	20	TSCA2
72	BE-13	BOOS	Sydney Harbour	Sydney Harbour	12	6	17	16	17	29	2	12	20	TSCA2
72	NM1-B8	BOOS	Sydney Harbour	Sydney Harbour	12	2	17	12	17	29	2	12	20	TSCA2
72	MR7-03	Hornsby Heights	Lower Hawkesbury	Berowra Creek	12	6	17	5	17	29	1	1	1	TSCA2
76	WM1-55	NSOOS	Sydney Harbour	Sydney Harbour	8	6	20	6	20	28	20	15	23	TSCA2
76	820221	NSOOS	Sydney Harbour	Sydney Harbour	8	3	20	6	20	28	20	15	23	TSCA2
76	RB-1B14	BOOS	Sydney Harbour	Sydney Harbour	10	4.5	18	16	18	28	4	15	23	TSCA2
76	820113	NSOOS	Sydney Harbour	Northern Lagoons	8	18	20	12	20	28	20	3	23	TSCA2
76	ME31	Cronulla	Georges River	Lower Georges River	4	10	8.5	24	24	28	6	7	27	CWA2
76	820205D	NSOOS	Lower Hawkesbury	Cowan Creek	16	8	6	12	12	28	20	1	2	PRP2
82	WO42A	Cronulla	Georges River	Lower Georges River	3	10	8.5	24	24	27	7	8	28	CWA2
82	MR7-02	Hornsby Heights	Lower Hawkesbury	Berowra Creek	10	6	17	5	17	27	2	2	3	TSCA2
84	820350	NSOOS	Sydney Harbour	Upper Lane Cove River	6	3	20	6	20	26	24	5	27	TSCA2
84	820303U	NSOOS	Sydney Harbour	Upper Lane Cove River	6	3	20	6	20	26	24	5	27	TSCA2
84	820330	NSOOS	Sydney Harbour	Upper Lane Cove River	6	3	20	8	20	26	24	5	27	TSCA2
84	820345	NSOOS	Sydney Harbour	Upper Lane Cove River	6	3	20	6	20	26	24	5	27	TSCA2
84	823350	SWSOOS	Georges River	Upper Georges River	6	4	20	4	20	26	22	1	29	na
84	820201	NSOOS	Sydney Harbour	Sydney Harbour	8	6	18	6	18	26	24	18	27	TSCA2
84	820700	NSOOS	Sydney Harbour	Sydney Harbour	6	5	20	12	20	26	24	18	27	TSCA2
84	820005	NSOOS	Sydney Harbour	Sydney Harbour	8	6	18	12	18	26	24	18	27	TSCA2
84	820265	NSOOS	Sydney Harbour	Sydney Harbour	8	5	18	12	18	26	24	18	27	TSCA2
84	820631	NSOOS	Sydney Harbour	Sydney Harbour	6	2.5	20	6	20	26	24	18	27	TSCA2
84	820260	NSOOS	Sydney Harbour	Sydney Harbour	6	3	20	6	20	26	24	18	27	TSCA2
84	EF	NSOOS	Sydney Harbour	Sydney Harbour	6	5	20	10	20	26	24	18	27	TSCA2
84	820662U	NSOOS	Sydney Harbour	Sydney Harbour	6	4.5	20	12	20	26	24	18	27	TSCA2
84	820220	NSOOS	Sydney Harbour	Sydney Harbour	6	3	20	6	20	26	24	18	27	TSCA2
84	KS-107	BOOS	Sydney Harbour	Sydney Harbour	6	3	1.5	20	20	26	5	18	27	na
84	820130	NSOOS	Sydney Harbour	Northern Lagoons	6	20	18	12	20	26	24	4	27	TSCA2
84	spsx568	Bombo	Illawarra	Illawarra Beaches	6	10	20	16	20	26	2	5	14	PRP2
101	820549	NSOOS	Sydney Harbour	Upper Parramatta River	8	6	17	6	17	25	38	3	42	TSCA2
101	EM	NSOOS	Sydney Harbour	Upper Lane Cove River	8	3	17	8	17	25	38	9	42	TSCA2
101	820307	NSOOS	Sydney Harbour	Sydney Harbour	8	5	17	8	17	25	38	28	42	TSCA2
101	820273	NSOOS	Sydney Harbour	Sydney Harbour	8	5	17	6	17	25	38	28	42	TSCA2
101	820581	NSOOS	Sydney Harbour	Sydney Harbour	8	2	17	6	17	25	38	28	42	TSCA2

Wet Weather Reticulation Overflows

SWC Rank	Model Node No.	Sewerage System	Geographic Area (GA)	Receiving Environment Zone (REZ)	Overflow Discharge Score	Aquatic Ecosystem Score	Terrestrial Ecosystem Score	Human Health Score	Environmnt. Sensitivity Score	Overflow Ranking Score	System Rank	REZ Rank	GA Rank	Overflow Flags
101	820297	NSOOS	Sydney Harbour	Sydney Harbour	8	6	17	6	17	25	38	28	42	TSCA2
101	820505	NSOOS	Sydney Harbour	Sydney Harbour	5	2.5	20	6	20	25	38	28	42	TSCA2
101	MS-12B6	BOOS	Sydney Harbour	Sydney Harbour	5	2	2.5	20	20	25	6	28	42	na
101	LC23	Cronulla	Georges River	Port Hacking	5	5	20	3	20	25	8	2	30	TSCA2
101	820155	NSOOS	Sydney Harbour	Northern Lagoons	5	18	20	8	20	25	38	5	42	TSCA2
101	820121	NSOOS	Sydney Harbour	Northern Lagoons	5	20	20	16	20	25	38	5	42	TSCA2
101	GB	Glenbrook	Middle Hawkesbury Nepean	Lower Nepean River	5	12	9	20	20	25	na	1	6	CWA2
113	820760	NSOOS	Sydney Harbour	Upper Parramatta River	6	3	18	6	18	24	47	4	52	TSCA2
113	820821	NSOOS	Sydney Harbour	Upper Parramatta River	6	3	18	6	18	24	47	4	52	TSCA2
113	820308U	NSOOS	Sydney Harbour	Upper Lane Cove River	12	3	9	12	12	24	47	10	52	na
113	820600	NSOOS	Sydney Harbour	Sydney Harbour	16	5	4	8	8	24	47	34	52	na
113	820628	NSOOS	Sydney Harbour	Sydney Harbour	6	2.5	18	12	18	24	47	34	52	TSCA2
113	820409	NSOOS	Sydney Harbour	Sydney Harbour	6	5	18	6	18	24	47	34	52	TSCA2
113	820245	NSOOS	Lower Hawkesbury	Cowan Creek	12	6	5	12	12	24	47	2	4	PRP2
113	802417	SWSOOS	Georges River	Central Georges River	6	18	1.5	4	18	24	23	13	31	TSCA2
121	820713	NSOOS	Sydney Harbour	Upper Parramatta River	3	2.5	20	6	20	23	54	6	58	TSCA2
121	820769	NSOOS	Sydney Harbour	Upper Parramatta River	3	2.5	20	6	20	23	54	6	58	TSCA2
121	820295	NSOOS	Sydney Harbour	Sydney Harbour	6	5	17	8	17	23	54	37	58	TSCA2
121	820290	NSOOS	Sydney Harbour	Sydney Harbour	6	3	17	6	17	23	54	37	58	TSCA2
121	820580	NSOOS	Sydney Harbour	Sydney Harbour	6	5	17	6	17	23	54	37	58	TSCA2
121	820697	NSOOS	Sydney Harbour	Sydney Harbour	6	2.5	17	16	17	23	54	37	58	TSCA2
121	820626	NSOOS	Sydney Harbour	Sydney Harbour	6	4.5	17	12	17	23	54	37	58	TSCA2
121	CA4-10	BOOS	Sydney Harbour	Sydney Harbour	6	3	17	12	17	23	7	37	58	TSCA2
121	FC422	Bellambi	Illawarra	Illawarra Beaches	5	4	18	10	18	23	2	6	15	PRP2
121	HH1-02	Hornsby Heights	Lower Hawkesbury	Berowra Creek	6	5	17	5	17	23	3	3	5	TSCA2
131	GLEN	SWSOOS	Georges River	Upper Georges River	12	6	na	10	10	22	24	2	32	na
131	820598	NSOOS	Sydney Harbour	Sydney Harbour	12	5	4	10	10	22	61	43	66	na
131	CO26	Wollongong	Illawarra	Port Kembla	12	4	1	10	10	22	na	1	16	PRP2
134	BW-15	BOOS	Sydney Harbour	Sydney Harbour	5	4	2.5	16	16	21	8	44	67	na
134	820101	NSOOS	Sydney Harbour	Northern Lagoons	3	18	2.5	6	18	21	62	7	67	na
136	820413	NSOOS	Sydney Harbour	Upper Lane Cove River	12	5	1.5	8	8	20	63	11	69	na
136	802535	SWSOOS	Sydney Harbour	Sydney harbour	12	5	6	8	8	20	25	45	69	na
136	802537	SWSOOS	Sydney Harbour	Sydney Harbour	8	5	2.5	12	12	20	25	45	69	na
136	820208	NSOOS	Sydney Harbour	Sydney Harbour	3	5	17	10	17	20	63	45	69	TSCA2
136	SPSX176	Port Kembla	Illawarra	Port Kembla	10	1	1	10	10	20	5	2	17	PRP2

Wet Weather Reticulation Overflows

SWC Rank	Model Node No.	Sewerage System	Geographic Area (GA)	Receiving Environment Zone (REZ)	Overflow Discharge Score	Aquatic Ecosystem Score	Terrestrial Ecosystem Score	Human Health Score	Environrnnt. Sensitivity Score	Overflow Ranking Score	System Rank	REZ Rank	GA Rank	Overflow Flags
136	820140	NSOOS	Sydney Harbour	Northern Lagoons	2	18	2.5	12	18	20	63	8	69	na
136	KR3-01	SWSOOS	Georges River	Lower Georges River (& Cooks River)**	4	6	1.5	16	16	20	25	9	33	na
143	820172	NSOOS	Sydney Harbour	Northern Lagoons	1.5	18	2.5	6	18	19.5	66	9	74	na
144	10MCN	SWSOOS	Georges River	Central Georges River	2	17	2.5	10	17	19	28	14	34	TSCA2
145	820825	NSOOS	Sydney Harbour	Upper Parramatta River	12	4	1.5	6	6	18	67	8	75	na
145	11-3	NSOOS	Sydney Harbour	Upper Parramatta River	12	3	1.5	6	6	18	67	8	75	na
145	820811	NSOOS	Sydney Harbour	Upper Parramatta River	12	5	1.5	6	6	18	67	8	75	na
145	820843	NSOOS	Sydney Harbour	Upper Parramatta River	12	4	1.5	6	6	18	67	8	75	na
145	820822	NSOOS	Sydney Harbour	Upper Parramatta River	12	3	1.5	6	6	18	67	8	75	na
145	820016	NSOOS	Sydney Harbour	Upper Parramatta River	12	3	1.5	6	6	18	67	8	75	na
145	823611	SWSOOS	Georges River	Upper Georges River	12	4	2.5	6	6	18	29	3	35	na
145	802803	SWSOOS	Sydney Harbour	Sydney Harbour	6	5	2.5	12	12	18	29	48	75	na
145	CR6-10	SWSOOS	Sydney Harbour	Sydney Harbour	6	5	2.5	12	12	18	29	48	75	na
145	820625	NSOOS	Sydney Harbour	Sydney Harbour	6	5	1.5	12	12	18	67	48	75	na
145	820629	NSOOS	Sydney Harbour	Sydney Harbour	6	1	1.5	12	12	18	67	48	75	na
145	BU61	Cronulla	Georges River	Port Hacking	6	9	1.5	12	12	18	9	3	35	na
145	MO43	Bellambi	Illawarra	Illawarra Beaches	9	na	1	9	9	18	3	7	18	PRP2
145	820225	NSOOS	Lower Hawkesbury	Cowan Creek	8	10	5	6	10	18	67	3	6	na
145	820250	NSOOS	Lower Hawkesbury	Cowan Creek	8	10	10	6	10	18	67	3	6	na
145	820210	NSOOS	Lower Hawkesbury	Cowan Creek	8	5	5	10	10	18	67	3	6	na
145	802631	SWSOOS	Georges River	Cooks River	12	4	1.5	6	6	18	29	7	35	na
145	NB105	SWSOOS	Georges River	Cooks River	12	3	1.5	6	6	18	29	7	35	na
163	DF1-14	SWSOOS	Sydney Harbour	Sydney Harbour	5	5	2.5	12	12	17	34	52	85	na
163	820623	NSOOS	Sydney Harbour	Sydney Harbour	5	5	1.5	12	12	17	78	52	85	na
163	820627	NSOOS	Sydney Harbour	Sydney Harbour	5	2.5	1.5	12	12	17	78	52	85	na
163	MR	Mt Riverview	Middle Hawkesbury Nepean	Lower Nepean River	5	5	12	6	12	17	na	2	7	na
167	820057	NSOOS	Sydney Harbour	Upper Parramatta River	10	3	1.5	6	6	16	80	14	88	na
167	WW15A	NSOOS	Sydney Harbour	Upper Parramatta River	6	6	2.5	10	10	16	80	14	88	na
167	9A-1	NSOOS	Sydney Harbour	Upper Parramatta River	6	3	1	10	10	16	80	14	88	na
167	CA2-01	West Camden	Upper Nepean	Upper Nepean River	6	3	1.5	10	10	16	1	1	1	na
167	820311	NSOOS	Sydney Harbour	Upper Lane Cove River	10	3	1.5	6	6	16	80	12	88	na
167	802534	SWSOOS	Sydney Harbour	Sydney Harbour	10	5	2.5	6	6	16	35	55	88	na
167	820592	NSOOS	Sydney Harbour	Sydney Harbour	10	1	1	6	6	16	80	55	88	na
167	820594	NSOOS	Sydney Harbour	Sydney Harbour	10	2	1.5	6	6	16	80	55	88	na
167	CE3-03	SWSOOS	Georges River	Cooks River	12	3	1.5	4	4	16	35	9	39	na

Wet Weather Reticulation Overflows

SWC Rank	Model Node No.	Sewerage System	Geographic Area (GA)	Receiving Environment Zone (REZ)	Overflow Discharge Score	Aquatic Ecosystem Score	Terrestrial Ecosystem Score	Human Health Score	Environrnnt. Sensitivity Score	Overflow Ranking Score	System Rank	REZ Rank	GA Rank	Overflow Flags
167	CE3-08	SWSOOS	Georges River	Cooks River	12	3	1.5	4	4	16	35	9	39	na
167	802632	SWSOOS	Georges River	Cooks River	10	4	1.5	6	6	16	35	9	39	na
167	802660	SWSOOS	Georges River	Cooks River	12	na	1.5	4	4	16	35	9	39	na
167	802690	SWSOOS	Georges River	Cooks River	12	3	1.5	4	4	16	35	9	39	na
167	CC2-28	SWSOOS	Georges River	Cooks River	12	2	1.5	4	4	16	35	9	39	na
181	CA2-07	West Camden	Upper Nepean	Upper Nepean River	5	3	1.5	10	10	15	2	2	2	na
181	820407	NSOOS	Sydney Harbour	Upper Lane Cove River	10	3	1	5	5	15	86	13	95	na
181	LC1-01	St Marys	Middle Hawkesbury Nepean	South Creek	3	2	1.5	12	12	15	2	4	8	na
181	BA9101	Bellambi	Illawarra	Illawarra Beaches	5	8	6	10	10	15	4	8	19	PRP2
181	BA9113	Bellambi	Illawarra	Illawarra Beaches	5	8	10	3	10	15	4	8	19	na
181	RH	Rouse Hill	Middle Hawkesbury Nepean	Cattai Creek	5	6	10	5	10	15	na	3	8	na
187	Bombo	Bombo	Illawarra	Illawarra Beaches	4.5	9	1.5	10	10	14.5	3	10	21	PRP2
188	820755	NSOOS	Sydney Harbour	Upper Parramatta River	8	3	1.5	6	6	14	87	17	96	na
188	820455	NSOOS	Sydney Harbour	Upper Lane Cove River	6	3	1	8	8	14	87	14	96	na
188	820325	NSOOS	Sydney Harbour	Upper Lane Cove River	8	3	1.5	6	6	14	87	14	96	na
188	820693	NSOOS	Sydney Harbour	Sydney Harbour	6	5	1.5	8	8	14	87	58	96	na
188	00WPCP	SWSOOS	Georges River	Sthn Sydney Beaches	4	3	na	10	10	14	42	2	45	na
188	KW1-01	St Marys	Middle Hawkesbury Nepean	South Creek	6	4	2.5	8	8	14	3	5	10	na
188	SPS896	Penrith	Middle Hawkesbury Nepean	Lower Nepean River	6	3	1.5	8	8	14	1	3	10	na
188	PC302	Penrith	Middle Hawkesbury Nepean	Lower Nepean River	6	4	1	8	8	14	1	3	10	na
188	820240	NSOOS	Lower Hawkesbury	Cowan Creek	8	6	5	5	6	14	87	6	9	na
188	MR7-08	Hornsby Heights	Lower Hawkesbury	Berowra Creek	6	8	6	5	8	14	4	4	9	na
198	EK	NSOOS	Sydney Harbour	Upper Lane Cove River	3	3	10	6	10	13	92	16	100	na
198	ST1-12	St Marys	Middle Hawkesbury Nepean	South Creek	5	3	1.5	8	8	13	4	6	13	na
198	FC23	Cronulla	Georges River	Port Hacking	5	5	8	3	8	13	10	4	46	na
198	PH12	Cronulla	Georges River	Lower Georges River	3	9	8	10	10	13	10	10	46	na
198	BA9112	Bellambi	Illawarra	Illawarra Beaches	3	8	10	3	10	13	6	11	22	na
198	CT27	Bellambi	Illawarra	Illawarra Beaches	3	4	1.5	10	10	13	6	11	22	PRP2
198	RM	Richmond	Middle Hawkesbury Nepean	Hawkesbury River	5	8	1.5	8	8	13	na	1	13	na
198	BH4-09	Hornsby Heights	Lower Hawkesbury	Berowra Creek	5	8	5	6	8	13	5	5	11	na
206	820751	NSOOS	Sydney Harbour	Upper Parramatta River	6	3	1.5	6	6	12	93	18	101	na
206	11-8	NSOOS	Sydney Harbour	Upper Parramatta River	6	3	1.5	6	6	12	93	18	101	na
206	820765	NSOOS	Sydney Harbour	Upper Parramatta River	6	2.5	2.5	6	6	12	93	18	101	na
206	820015	NSOOS	Sydney Harbour	Upper Parramatta River	6	2.5	1.5	6	6	12	93	18	101	na
206	820322	NSOOS	Sydney Harbour	Upper Lane Cove River	6	3	1.5	6	6	12	93	17	101	na

Wet Weather Reticulation Overflows

SWC Rank	Model Node No.	Sewerage System	Geographic Area (GA)	Receiving Environment Zone (REZ)	Overflow Discharge Score	Aquatic Ecosystem Score	Terrestrial Ecosystem Score	Human Health Score	Environmnt. Sensitivity Score	Overflow Ranking Score	System Rank	REZ Rank	GA Rank	Overflow Flags
206	823610	SWSOOS	Georges River	Upper Georges River	6	3	2.5	6	6	12	43	4	48	na
206	823660	SWSOOS	Georges River	Upper Georges River	3	2	2.5	9	9	12	43	4	48	na
206	802530	SWSOOS	Sydney Harbour	Sydney Harbour	6	2	1.5	6	6	12	43	59	101	na
206	820585	NSOOS	Sydney Harbour	Sydney Harbour	6	4.5	2.5	6	6	12	93	59	101	na
206	820624	NSOOS	Sydney Harbour	Sydney Harbour	6	3	2.5	6	6	12	93	59	101	na
206	PR1-02	St Marys	Middle Hawkesbury Nepean	South Creek	4	4	5	8	8	12	5	7	15	na
206	WC3-40	SWSOOS	Georges River	Cooks River	8	4	1.5	4	4	12	43	15	48	na
206	809205	SWSOOS	Georges River	Central Georges River	8	3	2.5	4	4	12	43	15	48	na
219	OP11	Shellharbour	Illawarra	Illawarra Beaches	1.5	4	1	10	10	11.5	8	13	24	PRP2
220	WB	Warragamba	Upper Nepean	Warragamba-Nepean	5	4	2.5	6	6	11	na	na	3	na
220	SP484A	West Camden	Upper Nepean	Upper Nepean River	5	4.5	1	6	6	11	3	3	3	na
220	820618	NSOOS	Sydney Harbour	Sydney Harbour	5	5	1.5	6	6	11	100	62	109	na
220	FS4-03	NSOOS	Sydney Harbour	Sydney Harbour	5	2	1	6	6	11	100	62	109	na
220	BB2	NSOOS	Sydney Harbour	Sydney Harbour	5	1	1	6	6	11	100	62	109	na
220	820597	NSOOS	Sydney Harbour	Sydney Harbour	5	5	4	6	6	11	100	62	109	na
220	RC1-11	St Marys	Middle Hawkesbury Nepean	South Creek	3	2	5	8	8	11	6	8	16	na
220	ST1-02	St Marys	Middle Hawkesbury Nepean	South Creek	6	3	3	5	5	11	6	8	16	na
220	CE601	Penrith	Middle Hawkesbury Nepean	Lower Nepean River	5	na	1	6	6	11	3	5	16	na
220	MP202	Penrith	Middle Hawkesbury Nepean	Lower Nepean River	6	4	2.5	5	5	11	3	5	16	na
220	SP407	Penrith	Middle Hawkesbury Nepean	Lower Nepean River	5	1.5	1	6	6	11	3	5	16	na
220	NR	Nth Richmond	Middle Hawkesbury Nepean	Hawkesbury River	5	6	6	6	6	11	na	2	16	na
220	RC	Round Corner	Middle Hawkesbury Nepean	Cattai Creek	5	6	5	6	6	11	na	4	16	na
220	CC45	Castle Hill	Middle Hawkesbury Nepean	Cattai Creek	5	6	5	6	6	11	3	4	16	na
220	NO1-01	West Hornsby	Lower Hawkesbury	Berowra Creek	5	4	1	6	6	11	na	6	12	na
220	MR7-05	Hornsby Heights	Lower Hawkesbury	Berowra Creek	5	5	5	6	6	11	6	6	12	na
236	EI	NSOOS	Sydney Harbour	Upper Lane Cove River	5	3	2.5	5	5	10	104	18	113	na
236	EB312	SWSOOS	Sydney Harbour	Sydney Harbour	4	3	1.5	6	6	10	48	66	113	na
236	820634	NSOOS	Sydney Harbour	Sydney Harbour	4	2.5	1.5	6	6	10	104	66	113	na
236	820586	NSOOS	Sydney Harbour	Sydney Harbour	4	4.5	1.5	6	6	10	104	66	113	na
236	802640	SWSOOS	Georges River	Cooks River	6	3	1.5	4	4	10	48	16	52	na
236	SPS86	SWSOOS	Georges River	Cooks River	6	3	na	4	4	10	48	16	52	na
236	GL22	Castle Hill	Middle Hawkesbury Nepean	Cattai Creek	5	5	5	5	5	10	4	6	24	na
243	BO5-01	St Marys	Middle Hawkesbury Nepean	South Creek	1.5	2	1.5	8	8	9.5	8	10	25	na
243	SC4-08	St Marys	Middle Hawkesbury Nepean	South Creek	1.5	3	2.5	8	8	9.5	8	10	25	na
243	SPS895	Penrith	Middle Hawkesbury Nepean	Lower Nepean River	1.5	3	1.5	8	8	9.5	6	8	25	na

Wet Weather Reticulation Overflows

SWC Rank	Model Node No.	Sewerage System	Geographic Area (GA)	Receiving Environment Zone (REZ)	Overflow Discharge Score	Aquatic Ecosystem Score	Terrestrial Ecosystem Score	Human Health Score	Environmnt. Sensitivity Score	Overflow Ranking Score	System Rank	REZ Rank	GA Rank	Overflow Flags
243	CMH406	SWSOOS	Georges River	Central Georges River	3	4	6.5	4	6.5	9.5	51	16	54	na
247	820715	NSOOS	Sydney Harbour	Upper Parramatta River	3	2.5	2.5	6	6	9	107	22	117	na
247	823402	SWSOOS	Georges River	Upper Georges River	6	2.5	1.5	3	3	9	52	6	55	na
247	WM1-12	NSOOS	Sydney Harbour	Sydney Harbour	3	5	2.5	6	6	9	107	69	117	na
247	809180D	SWSOOS	Georges River	Central Georges River	5	2	2.5	4	4	9	52	17	55	na
251	823620	SWSOOS	Georges River	Upper Georges River	4	4	2.5	3	4	8	54	7	57	na
251	OB305	Penrith	Middle Hawkesbury Nepean	Lower Nepean River	2	2	1	6	6	8	7	9	28	na
251	809184	SWSOOS	Georges River	Central Georges River	5	2	2.5	3	3	8	54	18	57	na
251	SM1-19	SWSOOS	Georges River	Central Georges River	4	3	2.5	4	4	8	54	18	57	na
255	820017	NSOOS	Sydney Harbour	Upper Parramatta River	1.5	2.5	1.5	6	6	7.5	109	23	119	na
255	RR3-04	West Camden	Upper Nepean	Upper Nepean River	2.5	1	1	5	5	7.5	4	4	5	na
257	SWC3	NSOOS	Sydney Harbour	Sydney Harbour	1	4.5	2	6	6	7	110	70	120	na
257	EP205	Penrith	Middle Hawkesbury Nepean	Lower Nepean River	1	4.5	1.5	6	6	7	8	10	29	na
257	820235	NSOOS	Lower Hawkesbury	Cowan Creek	2	4.5	5	5	5	7	110	7	14	na
260	HR0-01	West Camden	Upper Nepean	Upper Nepean River	1.5	2	1	5	5	6.5	5	5	6	na
260	HR0-02	West Camden	Upper Nepean	Upper Nepean River	1.5	2	1	5	5	6.5	5	5	6	na
260	RP2-01	SWSOOS	Georges River	Lower Georges River	2.5	4	2.5	3	4	6.5	57	11	60	na
263	809206	SWSOOS	Georges River	Central Georges River	3	2	2.5	3	3	6	58	20	61	na
264	823510	SWSOOS	Georges River	Upper Georges River	2	1.5	2.5	3	3	5	59	8	62	na
264	823612	SWSOOS	Georges River	Upper Georges River	2	3	2.5	3	3	5	59	8	62	na
264	OB2-01	SWSOOS	Georges River	Lower Georges River	2.5	1	2.5	2.5	2.5	5	59	12	62	na
264	07G3	SWSOOS	Georges River	Central Georges River	2	2	2.5	3	3	5	59	21	62	na
268	OB1-01	SWSOOS	Georges River	Lower Georges River	1.5	1	2.5	2.5	2.5	4	63	13	66	na
268	SP2-01	SWSOOS	Georges River	Lower Georges River	1.5	1	2.5	2.5	2.5	4	63	13	66	na
268	GS2-01	SWSOOS	Georges River	Cooks River	1.5	1	2.5	2.5	2.5	4	63	18	66	na
268	SS10-01	SWSOOS	Georges River	Cooks River	1.5	1	2.5	2.5	2.5	4	63	18	66	na
272	WC3-25	SWSOOS	Georges River	Cooks River	1	1	2.5	2.5	2.5	3.5	67	20	70	na

Legend

* 820274 = Middle Harbour Reticulation Overflows 820274a & 820274b

** Overflows impact on more than one REZ: ranking scores are based on the most environmentally sensitive REZ (which is listed first) - the lower scoring REZ is given in brackets

\# Overflow Flags: **TSCA1** = Species, population, or ecological community (or critical habitat) protected under the Threatened Species Conservation Act 1995 occurs within the boundaries of the potentially impacted area and has the potential to be adversely impacted by an overflow; **TSCA2** = Species, population, or ecological community (or critical habitat) protected under the Threatened Species Conservation Act 1995 occurs within the boundaries of the potentially impacted area but is unlikely to be adversely affected by an overflow; **CWA1** = Overflows from the SPS would discharge directly to a waterway classified S or P under the Clean Waters Act 1970; **CWA2** = Overflows from the SPS would not discharge directly to a waterway classified S or P under the Clean Waters Act 1970 but have the potential to adversely impact such a waterway; **PRP1** = Overflows from the SPS would discharge directly into a private residential property; **PRP2** = SPS does not discharge directly into a private residential property but has the potential to adversely impact a private residential property.

Table G-3: Sydney-Wide Ranking Results For Partially Treated Wet Weather STP Discharges

Partially Treated Wet Weather STP Discharges

SWC Rank	Model Node No.	Sewerage System	Geographic Area (GA)	Receiving Environment Zone (REZ)	Overflow Discharge Score	Aquatic Ecosystem Score	Terrestrial Ecosystem Score	Human Health Score	Environmnt. Sensitivity Score	Overflow Ranking Score	System Rank	REZ Rank	GA Rank	Overflow Flags#
1	SM	St Marys	Middle Hawkesbury Nepean	South Creek	24	2	33	5	33	57	na	1	1	TSCA1
1	MV	Mt Victoria	Blue Mountains	Lake Burragorang	9	48	na	40	48	57	na	na	1	TSCA1, CWA1
3	WL	Win-Tunnel	Blue Mountains	Blue Mountains	16	32	na	16	32	48	na	1	2	TSCA2
4	BH	Blackheath	Blue Mountains	Blue Mountains	5	32	na	24	32	37	na	2	3	TSCA2, CWA2
5	PK	Port Kembla	Illawarra	Illawarra Beaches	24	8.5	na	12	12	36	na	1	1	na
6	SH	Shellharbour	Illawarra	Illawarra Beaches	24	8.5	na	10	10	34	na	2	2	na
6	BS	BOOS	Sydney Harbour	N/E Sydney Beaches	10	2.5	na	24	24	34	na	1	1	na
6	BL	Bellambi	Illawarra	Illawarra Beaches	24	8.5	na	10	10	34	na	2	2	na
9	WH	West Hornsby	Lower Hawkesbury	Berowra Creek	16	5	17	3	17	33	na	1	1	TSCA2
10	WG	Wollongong	Illawarra	Illawarra Beaches	20	8.5	na	4	8.5	28.5	na	4	4	na
11	WW	Warriewood	Sydney Harbour	N/E Sydney Beaches	12	2.5	na	16	16	28	na	2	2	na
12	WC	West Camden	Upper Nepean	Upper Nepean River	12	2	na	9	9	21	na	na	1	na
12	QH	Quakers Hill	Middle Hawkesbury Nepean	South Creek	16	2	3	5	5	21	na	2	2	na
14	BB	Bombo	Illawarra	Illawarra Beaches	10	8.5	na	10	10	20	na	5	5	na
15	PE	Penrith	Middle Hawkesbury Nepean	Lower Nepean River	12	2	3	5	5	17	na	1	3	na
16	GB	Glenbrook	Middle Hawkesbury Nepean	Lower Nepean River	10	6	3	3	6	16	na	2	4	na
17	HH	Hornsby Heights	Lower Hawkesbury	Berowra Creek	10	5	na	3	5	15	na	2	2	na
18	SS	SWSOOS	Georges River	Sthn Sydney Beaches	4	5	na	10	10	14	na	na	na	na
18	RM	Richmond	Middle Hawkesbury Nepean	Hawkesbury River	9	2	na	5	5	14	na	na	5	na
18	CH	Castle Hill	Middle Hawkesbury Nepean	Cattai Creek	8	3	3	6	6	14	na	1	5	na
21	WB	Warragamba	Upper Nepean	Warragamba-Nepean	10	2	na	3	3	13	na	na	2	na
22	MR	Mount Riverview	Middle Hawkesbury Nepean	Lower Nepean River	9	2	na	2	2	11	na	3	7	na
23	RC	Round Corner	Middle Hawkesbury Nepean	Cattai Creek	4.5	4	na	5	5	9.5	na	2	8	na

Legend

\# Overflow Flags: **TSCA1** = Species, population, or ecological community (or critical habitat) protected under the Threatened Species Conservation Act 1995 occurs within the boundaries of the potentially impacted area and has the potential to be adversely impacted by an overflow; **TSCA2** = Species, population, or ecological community (or critical habitat) protected under the Threatened Species Conservation Act 1995 occurs within the boundaries of the potentially impacted area but is unlikely to be adversely affected by an overflow; **CWA1** = Overflows from the SPS would discharge directly to a waterway classified S or P under the Clean Waters Act 1970; **CWA2** = Overflows from the SPS would not discharge directly to a waterway classified S or P under the Clean Waters Act 1970 but have the potential to adversely impact such a waterway; **PRP1** = Overflows from the SPS would discharge directly into a private residential property; **PRP2** = SPS does not discharge directly into a private residential property but has the potential to adversely impact a private residential property.

Table G-4: Sydney-Wide SPS Ranking Results

Sydney-Wide Rank	SPS	Sewerage System	Geographic Area (GA)	Asset Score	Overflow Score	Environmental Sensitivity Score	SPS Ranking Score	System Rank	GA Rank	Asset Flags	Environment Flags
1	877	Blackheath	Blue Mountains	18	34	96	148	1	1	A1, C1	TSCA1, CWA2
2	836	Winmalee	Blue Mountains	17	34	96	147	1	2	A1, C1	TSCA1, CWA2
2	872	Winmalee	Blue Mountains	17	34	96	147	1	2	A1	TSCA1
4	830	Winmalee	Blue Mountains	29	12	96	137	3	4	A1	TSCA1
5	857	Winmalee	Blue Mountains	29	10	96	135	4	5	A1	TSCA1
6	835	Winmalee	Blue Mountains	17	34	80	131	5	6	A1, C1	TSCA1, CWA2
6	837	Winmalee	Blue Mountains	29	6	96	131	5	6	A1, C1	TSCA1, CWA2
8	873	Winmalee	Blue Mountains	17	10	96	123	7	8	A1	TSCA1
8	878	Blackheath	Blue Mountains	17	10	96	123	2	8	A1, C1	TSCA1, CWA2
10	833	Winmalee	Blue Mountains	21	34	64	119	8	10	A1, C1	TSCA2
11	704	Winmalee	Blue Mountains	16	6	96	118	9	11	na	TSCA1, CWA2
12	871	Winmalee	Blue Mountains	16	3	96	115	10	12	na	TSCA1
12	879	Blackheath	Blue Mountains	17	34	64	115	3	12	A1	TSCA2, CWA2
12	880	Blackheath	Blue Mountains	17	34	64	115	3	12	A1	TSCA2, CWA2
12	881	Blackheath	Blue Mountains	17	34	64	115	3	12	A1	TSCA2, CWA2
16	291	Port Kembla	Illawarra	9	3	96	108	1	1	A1	TSCA1
17	146	Bellambi	Illawarra	15	9	80	104	1	2	A1, C1	TSCA1
17	40	SWSOOS	Georges River	27	5	72	104	1	1	C1	TSCA1
19	362	COOS	Georges River	10	9	80	99	1	2	C1	CWA1
20	117	NSOOS	Sydney Harbour	28	3	65	96	1	1		TSCA1
21	227	Richmond	Middle Hawkesbury-Nepean	20	34	40	94	2	1	A1	na
21	517	SWSOOS	Georges River	23	5	66	94	1	3	C1	TSCA1
23	498	Shellharbour	Illawarra	7	6	80	93	1	3	A1, C1	TSCA1
24	829	Winmalee	Blue Mountains	21	6	64	91	11	16	A1, C1	TSCA2, CWA2
25	343	Shellharbour	Illawarra	5	5	80	90	12	4	A1	TSCA1
25	860	Winmalee	Blue Mountains	20	6	64	90	2	17	C1	TSCA2
27	365	NSOOS	Sydney Harbour	16	8	65	89	2	2		TSCA1
28	262	St Marys	Middle Hawkesbury-Nepean	13	9	66	88	13	2	A1, C1	TSCA1
28	715	Winmalee	Blue Mountains	14	10	64	88	1	18	na	TSCA2
30	701	Winmalee	Blue Mountains	16	10	64	86	14	19	A1	TSCA2, CWA2
30	856	Winmalee	Blue Mountains	16	6	64	86	14	19	na	TSCA2
32	16	BOOS	Sydney Harbour	15	33	36	84	16	3		na
32	708	Winmalee	Blue Mountains	15	5	64	84	16	21	na	TSCA2
32	710	Winmalee	Blue Mountains	14	6	64	84	16	21	na	TSCA2
32	711	Winmalee	Blue Mountains	14	6	64	84	1	21	na	TSCA2
36	709	Winmalee	Blue Mountains	16	3	64	83	19	24	na	TSCA2
36	988	Blackheath	Blue Mountains	15	4	64	83	6	24	A1	TSCA2, CWA2
38	394	Quakers Hill	Middle Hawkesbury-Nepean	11	5	66	82	1	3	C1	TSCA1
39	713	Winmalee	Blue Mountains	9	6	64	79	20	26	na	TSCA2
40	2	BOOS	Sydney Harbour	21	33	24	78	2	4		na
40	407	St Marys	Middle Hawkesbury-Nepean	7	5	66	78	3	4	A1, C1	TSCA1
40	346	Shellharbour	Illawarra	9	5	64	78	3	5	A1	TSCA2
40	499	Shellharbour	Illawarra	9	5	64	78	2	5	A1	TSCA2, PRP2
44	954	Winmalee	Blue Mountains	9	3	64	76	21	27	na	TSCA2, CWA2
45	225	Richmond	Middle Hawkesbury-Nepean	21	10	40	71	2	5	A1	na

Sydney-Wide Rank	SPS	Sewerage System	Geographic Area (GA)	Asset Score	Overflow Score	Environmental Sensitivity Score	SPS Ranking Score	System Rank	GA Rank	Asset Flags	Environment Flags
46	334	SWSOOS	Georges River	19	3	48	70	3	4	na	CWA2, PRP2, TSCA2
46	557	COOS	Georges River	13	9	48	70	2	4	na	CWA2
48	388	Warriewood	Sydney Harbour	16	5	48	69	1	5		na
48	558	COOS	Georges River	12	9	48	69	3	6	na	CWA2, PRP2
50	226	Richmond	Middle Hawkesbury-Nepean	21	6	40	67	3	6	A1	na
51	810	Glenbrook	Middle Hawkesbury-Nepean	24	6	36	66	1	7	na	CWA2
51	559	COOS	Georges River	13	5	48	66	4	7	na	CWA2, PRP2
53	808	Glenbrook	Middle Hawkesbury-Nepean	25	4	36	65	2	8	C1	CWA2
53	812	Glenbrook	Middle Hawkesbury-Nepean	25	6	34	65	2	8	C1	CWA2
53	995	COOS	Georges River	14	3	48	65	5	8	C1	CWA2
56	103	NSOOS	Sydney Harbour	18	10	36	64	3	6		na
56	172	Kiama	Illawarra	18	6	40	64	1	7	A1	TSCA2
56	984	COOS	Georges River	13	3	48	64	6	9	na	CWA2, PRP2
56	985	COOS	Georges River	13	3	48	64	6	9	na	CWA2, PRP2
60	274	COOS	Georges River	12	3	48	63	8	11	na	CWA2, PRP2
60	1005	COOS	Georges River	12	3	48	63	8	11	na	CWA2, PRP2
62	18	BOOS	Sydney Harbour	17	33	12	62	22	7		na
62	228	Richmond	Middle Hawkesbury-Nepean	16	6	40	62	4	10	na	na
62	396	NSOOS	Lower Hawkesbury	25	5	32	62	4	1	A1, C1	na
62	832	Winmalee	Blue Mountains	29	33	na	62	3	28	A1	DATA
66	807	Glenbrook	Middle Hawkesbury-Nepean	22	4	34	60	2	11	A1	CWA2
66	809	Glenbrook	Middle Hawkesbury-Nepean	18	6	36	60	4	11	A1	CWA2
66	173	Kiama	Illawarra	14	6	40	60	4	8	A1	TSCA2
69	17	BOOS	Sydney Harbour	13	33	12	58	4	8		na
70	120	West Camden	Upper Nepean	11	6	40	57	1	1	A1	na
71	67	NSOOS	Sydney Harbour	11	33	12	56	5	9		na
71	811	Glenbrook	Middle Hawkesbury-Nepean	16	6	34	56	6	13	C1	CWA2
73	589	COOS	Georges River	14	5	36	55	10	13	C1	CWA2, PRP2
74	758	Glenbrook	Middle Hawkesbury-Nepean	14	4	36	54	7	14	na	CWA2
74	539	COOS	Georges River	13	5	36	54	11	14	na	CWA2. PRP2
76	490	West Hornsby	Lower Hawkesbury	24	5	24	53	1	2	A1	na
76	594	Hornsby Heights	Lower Hawkesbury	26	3	24	53	1	2	C1	na
76	596	Hornsby Heights	Lower Hawkesbury	26	3	24	53	1	2	A1, C1	na
76	640	Hornsby Heights	Lower Hawkesbury	26	3	24	53	1	2	A1, C1	na
80	484	West Camden	Upper Nepean	10	8	34	52	2	2	A1	na
80	240	NSOOS	Sydney Harbour	30	10	12	52	4	10		na
80	85	SWSOOS	Georges River	27	5	20	52	4	15	C1	PRP2
80	125	SWSOOS	Georges River	16	3	33	52	6	15	na	TSCA2
84	420	Warriewood	Sydney Harbour	18	9	24	51	2	11		na
84	430	COOS	Georges River	12	3	36	51	12	17	na	na
86	10	BOOS	Sydney Harbour	21	17	12	50	6	12		na
86	53	SWSOOS	Georges River	27	5	18	50	13	18	C1	PRP2
86	507	COOS	Georges River	13	3	34	50	5	18	na	CWA2, PRP2
89	338	SWSOOS	Sydney Harbour	20	5	24	49	7	13		na
89	987	BOOS	Sydney Harbour	16	9	24	49	7	13		na
89	825	Glenbrook	Middle Hawkesbury-Nepean	25	4	20	49	8	15	A1	na

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89	39	SWSOOS	Georges River	24	5	20	49	6	20	C1	
93	22	SWSOOS	Sydney Harbour	23	5	20	48	1	15		na
93	145	Wollongong	Illawarra	19	5	24	48	9	9	A1, C1	na
95	275	COOS	Georges River	8	5	34	47	14	21	C1	CWA2
96	375	SWSOOS	Sydney Harbour	21	5	20	46	10	16		na
96	7	BOOS	Sydney Harbour	21	17	8	46	4	16		na
96	553	Hornsby Heights	Lower Hawkesbury	18	4	24	46	7	6	C1	na
99	414	Warriewood	Sydney Harbour	12	9	24	45	3	18		na
99	492	Warriewood	Sydney Harbour	18	3	24	45	3	18		na
99	72	SWSOOS	Sydney Harbour	20	5	20	45	3	18		na
99	159	NSOOS	Sydney Harbour	18	3	24	45	11	18		na
99	477	NSOOS	Sydney Harbour	12	9	24	45	7	18		na
99	644	Warriewood	Lower Hawkesbury	8	5	32	45	7	7	na	na
105	265	NSOOS	Sydney Harbour	21	3	20	44	2	23		na
105	675	BOOS	Sydney Harbour	15	17	12	44	9	23		na
105	481	Wollongong	Illawarra	18	6	20	44	8	10	A1	PRP2
108	641	West Hornsby	Lower Hawkesbury	18	5	20	43	3	8	C1	na
108	480	Wollongong	Illawarra	18	5	20	43	23	11	A1	PRP2
108	444	SWSOOS	Georges River	21	2	20	43	2	22	C1	na
108	865	Winmalee	Blue Mountains	26	17	na	43	12	29	A1	DATA
112	453	West Camden	Upper Nepean	20	4	18	42	4	3	na	na
112	496	Warriewood	Sydney Harbour	13	5	24	42	3	25		na
112	911	Warriewood	Sydney Harbour	7	3	32	42	6	25		na
112	593	Hornsby Heights	Lower Hawkesbury	15	3	24	42	6	9	C1	na
112	482	Wollongong	Illawarra	19	3	20	42	13	12	A1, C1	PRP2
112	161	SWSOOS	Georges River	22	2	18	42	5	23	C1	PRP2
118	488	Warriewood	Sydney Harbour	14	3	24	41	8	27		na
118	495	Warriewood	Sydney Harbour	12	5	24	41	8	27		na
118	3	SWSOOS	Sydney Harbour	28	5	8	41	14	27		na
118	98	NSOOS	Sydney Harbour	22	9	10	41	14	27		na
118	48	BOOS	Sydney Harbour	14	3	24	41	10	27		na
118	802	Glenbrook	Middle Hawkesbury-Nepean	25	8	8	41	9	16	C1	na
118	514	Bellambi	Illawarra	18	3	20	41	9	13	A1	na
118	515	Bellambi	Illawarra	18	3	20	41	2	13	A1	na
118	378	SWSOOS	Georges River	21	2	18	41	2	24	C1	PRP2
127	350	SWSOOS	Sydney Harbour	13	3	24	40	3	32		na
127	467	NSOOS	Sydney Harbour	17	3	20	40	16	32		na
127	826	Glenbrook	Middle Hawkesbury-Nepean	26	4	10	40	11	17	A1, C1	na
127	536	West Hornsby	Lower Hawkesbury	25	3	12	40	3	10	A1, C1	na
127	643	Kiama	Illawarra	15	5	20	40	10	15	A1, C1	na
132	806	Glenbrook	Middle Hawkesbury-Nepean	25	6	8	39	5	18	C1	na
132	819	Glenbrook	Middle Hawkesbury-Nepean	25	4	10	39	17	18	C1	na
132	533	NSOOS	Lower Hawkesbury	24	3	12	39	12	11	A1	na
132	238	Wollongong	Illawarra	14	9	16	39	4	16	A1, C1	na
132	569	Kiama	Illawarra	14	5	20	39	4	16	A1	na
132	648	Kiama	Illawarra	18	3	18	39	4	16	A1	na

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132	650	Kiama	Illawarra	18	3	18	39	11	16	A1	na
132	403	SWSOOS	Georges River	17	2	20	39	11	25	na	PRP2
140	1	BOOS	Sydney Harbour	15	3	20	38	18	34		na
140	897	Penrith	Middle Hawkesbury-Nepean	20	8	10	38	1	20	A1	na
140	190	SWSOOS	Georges River	17	3	18	38	15	26	C1	PRP2
140	322	COOS	Georges River	15	3	20	38	10	26	na	na
144	523	Warriewood	Sydney Harbour	10	3	24	37	10	35		na
144	65	SWSOOS	Sydney Harbour	22	5	10	37	19	35		na
144	814	Glenbrook	Middle Hawkesbury-Nepean	24	4	9	37	19	21	na	na
144	665	NSOOS	Lower Hawkesbury	21	4	12	37	19	12	A1	na
144	113	SWSOOS	Georges River	14	3	20	37	13	28	na	na
144	119	SWSOOS	Georges River	27	5	5	37	13	28	C1	na
150	41	SWSOOS	Sydney Harbour	21	5	10	36	22	37		na
150	96	North Richmond	Middle Hawkesbury-Nepean	18	8	10	36	22	22	na	na
150	813	Glenbrook	Middle Hawkesbury-Nepean	24	4	8	36	14	22	na	na
150	824	Glenbrook	Middle Hawkesbury-Nepean	26	4	6	36	1	22	A1, C1	na
150	634	NSOOS	Lower Hawkesbury	17	3	16	36	6	13	na	na
150	661	Hornsby Heights	Lower Hawkesbury	21	3	12	36	14	13	A1	na
150	122	SWSOOS	Georges River	14	4	18	36	14	30	C1	PRP2
150	167	COOS	Georges River	13	3	20	36	16	30	na	na
158	393	Quakers Hill	Middle Hawkesbury-Nepean	20	3	12	35	24	25	C1	na
158	753	Glenbrook	Middle Hawkesbury-Nepean	25	4	6	35	24	25	A1	na
158	756	Glenbrook	Middle Hawkesbury-Nepean	23	6	6	35	2	25	na	na
158	818	Glenbrook	Middle Hawkesbury-Nepean	19	6	10	35	16	25	A1, C1	na
158	89	SWSOOS	Georges River	10	5	20	35	16	32	C1	PRP2
158	287	SWSOOS	Georges River	13	2	20	35	16	32	na	PRP2
158	635	COOS	Georges River	12	3	20	35	17	32	na	PRP2
165	231	NSOOS	Sydney Harbour	17	5	12	34	6	38		na
165	615	NSOOS	Sydney Harbour	15	3	16	34	24	38		na
165	892	Penrith	Middle Hawkesbury-Nepean	25	6	3	34	24	29	A1	na
165	815	Mt Riverview	Middle Hawkesbury-Nepean	22	6	6	34	26	29	A1	na
165	805	Glenbrook	Middle Hawkesbury-Nepean	24	4	6	34	2	29	na	na
165	803	Glenbrook	Middle Hawkesbury-Nepean	24	4	6	34	15	29	na	na
165	372	Wollongong	Illawarra	18	4	12	34	15	20	A1	na
165	77	SWSOOS	Georges River	24	5	5	34	1	35	C1	na
165	831	Winmalee	Blue Mountains	29	5	na	34	19	30	A1	DATA
165	838	Winmalee	Blue Mountains	29	5	na	34	19	30	A1	DATA
175	184	NSOOS	Sydney Harbour	16	5	12	33	27	40		na
175	208	NSOOS	Sydney Harbour	30	3	na	33	27	40		na
175	395	Quakers Hill	Middle Hawkesbury-Nepean	18	3	12	33	27	33	na	na
175	421	Quakers Hill	Middle Hawkesbury-Nepean	18	3	12	33	27	33	na	na
175	817	Mt Riverview	Middle Hawkesbury-Nepean	23	4	6	33	27	33	A1, C1	na
175	3	SWSOOS	Georges River	28	5	na	33	3	36	C1	PRP2
175	76	SWSOOS	Georges River	9	4	20	33	3	36	na	PRP2
175	84	SWSOOS	Georges River	16	5	12	33	17	36	C1	PRP2
175	326	SWSOOS	Georges River	9	4	20	33	17	36	C1	na

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175	377	SWSOOS	Georges River	9	4	20	33	2	36	C1	na
185	26	SWSOOS	Sydney Harbour	19	5	8	32	26	42		na
185	201	NSOOS	Sydney Harbour	27	5	na	32	32	42		na
185	9	BOOS	Sydney Harbour	21	3	8	32	2	42		na
185	11	BOOS	Sydney Harbour	21	3	8	32	19	42		na
185	133	BOOS	Sydney Harbour	30	2	na	32	3	42		na
185	816	Mt Riverview	Middle Hawkesbury-Nepean	22	4	6	32	7	36	A1	na
185	822	Glenbrook	Middle Hawkesbury-Nepean	22	4	6	32	7	36	A1, C1	na
185	547	Hornsby Heights	Lower Hawkesbury	17	3	12	32	21	15	na	na
185	556	Hornsby Heights	Lower Hawkesbury	17	3	12	32	11	15	na	na
185	410	Port Kembla	Illawarra	18	4	10	32	11	21	A1	na
185	839	Winmalee	Blue Mountains	29	3	na	32	11	32	A1	DATA
196	584	Warriewood	Sydney Harbour	12	3	16	31	11	47		na
196	230	NSOOS	Sydney Harbour	16	3	12	31	33	47		na
196	473	Quakers Hill	Middle Hawkesbury-Nepean	18	3	10	31	5	38	na	na
196	821	Glenbrook	Middle Hawkesbury-Nepean	21	4	6	31	20	38	A1	na
196	545	Hornsby Heights	Lower Hawkesbury	16	3	12	31	9	17	na	na
196	220	SWSOOS	Georges River	16	3	12	31	22	41	na	na
202	21	SWSOOS	Sydney Harbour	28	2	na	30	27	49		na
202	59	BOOS	Sydney Harbour	15	3	12	30	34	49		na
202	21	SWSOOS	Georges River	28	2	na	30	34	42	C1	PRP2
202	38	SWSOOS	Georges River	28	2	na	30	34	42	C1	na
202	112	SWSOOS	Georges River	28	2	na	30	34	42	C1	PRP2
202	182	SWSOOS	Georges River	10	2	18	30	34	42	na	na
202	236	SWSOOS	Georges River	17	3	10	30	34	42	C1	PRP2
202	630	SWSOOS	Georges River	14	4	12	30	34	42	C1	na
202	969	SWSOOS	Georges River	8	4	18	30	34	42	C1	na
202	970	SWSOOS	Georges River	8	4	18	30	34	42	C1	PRP2
202	861	Winmalee	Blue Mountains	21	9	na	30	14	33	A1, C1	DATA
213	1024	Warriewood	Sydney Harbour	27	2	na	29	12	51		na
213	97	NSOOS	Sydney Harbour	27	2	na	29	43	51		na
213	223	NSOOS	Sydney Harbour	27	2	na	29	43	51		na
213	801	Glenbrook	Middle Hawkesbury-Nepean	19	4	6	29	43	40	A1, C1	na
213	104	SWSOOS	Georges River	27	2	na	29	43	50	C1	na
213	134	SWSOOS	Georges River	27	2	na	29	43	50	C1	na
213	153	SWSOOS	Georges River	27	2	na	29	43	50	C1	na
213	197	SWSOOS	Georges River	27	2	na	29	21	50	C1	na
213	206	SWSOOS	Georges River	27	2	na	29	21	50	C1	na
213	258	SWSOOS	Georges River	21	8	na	29	23	50	C1	na
223	1017	Warriewood	Sydney Harbour	26	2	na	28	28	54		na
223	1016	NSOOS	Sydney Harbour	26	2	na	28	13	54		na
223	752	Glenbrook	Middle Hawkesbury-Nepean	18	4	6	28	49	41	A1	na
223	827	Glenbrook	Middle Hawkesbury-Nepean	25	3	na	28	49	41	A1	na
223	22	SWSOOS	Georges River	23	5	na	28	49	56	C1	na
223	74	SWSOOS	Georges River	26	2	na	28	49	56	na	na
223	80	SWSOOS	Georges River	26	2	na	28	49	56	na	na

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223	81	SWSOOS	Georges River	26	2	na	28	49	56	na	na
223	83	SWSOOS	Georges River	26	2	na	28	49	56	na	na
223	135	SWSOOS	Georges River	26	2	na	28	49	56	na	na
223	136	SWSOOS	Georges River	26	2	na	28	49	56	na	na
223	143	SWSOOS	Georges River	26	2	na	28	49	56	na	na
223	148	SWSOOS	Georges River	26	2	na	28	49	56	na	na
223	196	SWSOOS	Georges River	26	2	na	28	23	56	na	na
223	540	SWSOOS	Georges River	16	4	8	28	24	56	C1	na
223	875	Winmalee	Blue Mountains	26	2	na	28	24	34	C1	DATA
239	60	SWSOOS	Sydney Harbour	25	2	na	27	29	56		na
239	820	Glenbrook	Middle Hawkesbury-Nepean	24	3	na	27	29	43	A1	na
239	655	Kiama	Illawarra	14	3	10	27	60	22	A1	na
239	60	SWSOOS	Georges River	25	2	na	27	60	67	na	na
239	65	SWSOOS	Georges River	22	5	na	27	60	67	C1	na
239	384	SWSOOS	Georges River	19	8	na	27	60	67	C1	na
239	402	SWSOOS	Georges River	17	2	8	27	60	67	na	na
239	842	Winmalee	Blue Mountains	25	2	na	27	7	35	na	DATA
239	874	Winmalee	Blue Mountains	25	2	na	27	26	35	na	DATA
239	876	Blackheath	Blue Mountains	25	2	na	27	7	35	na	DATA
249	422	Warriewood	Sydney Harbour	24	2	na	26	31	57		na
249	15	SWSOOS	Sydney Harbour	15	3	8	26	14	57		na
249	127	NSOOS	Sydney Harbour	24	2	na	26	65	57		na
249	128	NSOOS	Sydney Harbour	24	2	na	26	65	57		na
249	465	NSOOS	Sydney Harbour	24	2	na	26	65	57		na
249	909	North Richmond	Middle Hawkesbury-Nepean	17	9	na	26	65	44	na	na
249	41	SWSOOS	Georges River	21	5	na	26	65	71	C1	na
249	86	SWSOOS	Georges River	13	5	8	26	24	71	C1	na
249	375	SWSOOS	Georges River	21	5	na	26	24	71	C1	na
249	381	SWSOOS	Georges River	14	4	8	26	24	71	C1	na
249	866	Winmalee	Blue Mountains	17	9	na	26	2	38	A1	DATA
260	61	SWSOOS	Sydney Harbour	23	2	na	25	7	62		na
260	150	Wollongong	Illawarra	5	4	16	25	32	23	A1	na
260	176	Port Kembla	Illawarra	14	3	8	25	70	23	A1	na
260	652	Kiama	Illawarra	9	6	10	25	70	23	A1	na
260	72	SWSOOS	Georges River	20	5	na	25	70	75	C1	na
260	187	SWSOOS	Georges River	17	8	na	25	70	75	C1	na
260	335	SWSOOS	Georges River	23	2	na	25	70	75	C1	na
260	338	SWSOOS	Georges River	20	5	na	25	70	75	C1	na
260	408	SWSOOS	Georges River	23	2	na	25	3	75	C1	na
260	870	Winmalee	Blue Mountains	16	9	na	25	8	39	na	DATA
270	614	West Camden	Upper Nepean	21	3	na	24	33	4	C1	na
270	58	SWSOOS	Sydney Harbour	22	2	na	24	4	63		na
270	24	NSOOS	Sydney Harbour	22	2	na	24	76	63		na
270	130	NSOOS	Sydney Harbour	22	2	na	24	76	63		na
270	131	NSOOS	Sydney Harbour	22	2	na	24	76	63		na
270	152	NSOOS	Sydney Harbour	22	2	na	24	76	63		na

Sydney-Wide Rank	SPS	Sewerage System	Geographic Area (GA)	Asset Score	Overflow Score	Environmental Sensitivity Score	SPS Ranking Score	System Rank	GA Rank	Asset Flags	Environment Flags
270	186	NSOOS	Sydney Harbour	22	2	na	24	76	63		na
270	583	Round Corner	Middle Hawkesbury-Nepean	15	3	6	24	76	45	na	na
270	903	Penrith	Middle Hawkesbury-Nepean	15	6	3	24	76	45	na	na
270	670	Kiama	Illawarra	24	na	na	24	76	26	A1	na
270	26	SWSOOS	Georges River	19	5	na	24	na	80	C1	na
270	58	SWSOOS	Georges River	22	2	na	24	3	80	C1	na
270	61	SWSOOS	Georges River	22	2	na	24	27	80	C1	na
270	68	SWSOOS	Georges River	22	2	na	24	27	80	na	na
270	75	SWSOOS	Georges River	22	2	na	24	27	80	na	na
270	336	SWSOOS	Georges River	22	2	na	24	27	80	na	na
270	441	SWSOOS	Georges River	22	2	na	24	27	80	na	na
270	734	Winmalee	Blue Mountains	15	9	na	24	9	40	A1	DATA
288	62	SWSOOS	Sydney Harbour	21	2	na	23	34	69		na
288	63	SWSOOS	Sydney Harbour	21	2	na	23	34	69		na
288	66	SWSOOS	Sydney Harbour	21	2	na	23	4	69		na
288	111	NSOOS	Sydney Harbour	21	2	na	23	4	69		na
288	151	NSOOS	Sydney Harbour	21	2	na	23	84	69		na
288	158	NSOOS	Sydney Harbour	21	2	na	23	84	69		na
288	266	NSOOS	Sydney Harbour	21	2	na	23	84	69		na
288	315	NSOOS	Sydney Harbour	21	2	na	23	84	69		na
288	435	NSOOS	Sydney Harbour	21	2	na	23	84	69		na
288	4	BOOS	Sydney Harbour	21	2	na	23	84	69		na
288	5	BOOS	Sydney Harbour	21	2	na	23	84	69		na
288	6	BOOS	Sydney Harbour	21	2	na	23	84	69		na
288	8	BOOS	Sydney Harbour	21	2	na	23	84	69		na
288	14	BOOS	Sydney Harbour	21	2	na	23	4	69		na
288	23	BOOS	Sydney Harbour	21	2	na	23	4	69		na
288	25	BOOS	Sydney Harbour	21	2	na	23	32	69		na
288	49	BOOS	Sydney Harbour	21	2	na	23	32	69		na
288	51	BOOS	Sydney Harbour	21	2	na	23	32	69		na
288	55	BOOS	Sydney Harbour	21	2	na	23	32	69		na
288	56	BOOS	Sydney Harbour	21	2	na	23	32	69		na
288	71	BOOS	Sydney Harbour	21	2	na	23	32	69		na
288	87	BOOS	Sydney Harbour	21	2	na	23	3	69		na
288	88	BOOS	Sydney Harbour	21	2	na	23	10	69		na
288	142	BOOS	Sydney Harbour	21	2	na	23	15	69		na
288	885	Penrith	Middle Hawkesbury-Nepean	20	3	na	23	15	47	na	na
288	889	Penrith	Middle Hawkesbury-Nepean	20	3	na	23	15	47	na	na
288	95	North Richmond	Middle Hawkesbury-Nepean	18	5	na	23	15	47	na	na
288	454	West Hornsby	Lower Hawkesbury	8	3	12	23	15	18	C1	na
288	541	West Hornsby	Lower Hawkesbury	21	2	na	23	15	18	na	na
288	666	Hornsby Heights	Lower Hawkesbury	21	2	na	23	15	18	A1	na
288	62	SWSOOS	Georges River	21	2	na	23	15	87	na	na
288	63	SWSOOS	Georges River	21	2	na	23	15	87	na	na
288	66	SWSOOS	Georges River	21	2	na	23	15	87	na	na
288	94	SWSOOS	Georges River	21	2	na	23	15	87	na	na

Sydney-Wide Rank	SPS	Sewerage System	Geographic Area (GA)	Asset Score	Overflow Score	Environmental Sensitivity Score	SPS Ranking Score	System Rank	GA Rank	Asset Flags	Environment Flags
288	567	SWSOOS	Georges River	15	2	6	23	15	87	C1	na
288	570	SWSOOS	Georges River	21	2	na	23	15	87	C1	na
288	722	Winmalee	Blue Mountains	14	9	na	23	15	41	na	DATA
288	733	Winmalee	Blue Mountains	14	9	na	23	15	41	na	DATA
326	423	Warriewood	Sydney Harbour	20	2	na	22	36	93		na
326	471	Warriewood	Sydney Harbour	20	2	na	22	15	93		na
326	478	Warriewood	Sydney Harbour	20	2	na	22	15	93		na
326	486	Warriewood	Sydney Harbour	20	2	na	22	15	93		na
326	671	Warriewood	Sydney Harbour	20	2	na	22	15	93		na
326	33	NSOOS	Sydney Harbour	20	2	na	22	15	93		na
326	288	NSOOS	Sydney Harbour	20	2	na	22	93	93		na
326	526	Richmond	Middle Hawkesbury-Nepean	20	2	na	22	93	47	A1	na
326	527	Richmond	Middle Hawkesbury-Nepean	20	2	na	22	93	47	A1	na
326	901	Penrith	Middle Hawkesbury-Nepean	19	3	na	22	5	47	C1	na
326	902	Penrith	Middle Hawkesbury-Nepean	19	3	na	22	5	47	na	na
326	804	Glenbrook	Middle Hawkesbury-Nepean	19	3	na	22	6	47	A1, C1	na
326	823	Glenbrook	Middle Hawkesbury-Nepean	19	3	na	22	6	47	A1, C1	na
326	309	SWSOOS	Georges River	21	1	na	22	38	93	C1	na
326	310	SWSOOS	Georges River	20	2	na	22	38	93	na	na
326	321	SWSOOS	Georges River	20	2	na	22	27	93	na	na
326	1058	Winmalee	Blue Mountains	17	5	na	22	27	43	A1	DATA
343	460	Warriewood	Sydney Harbour	19	2	na	21	6	100		na
343	436	NSOOS	Sydney Harbour	19	2	na	21	20	100		na
343	477	NSOOS	Sydney Harbour	12	9	na	21	96	100		na
343	28	BOOS	Sydney Harbour	19	2	na	21	96	100		na
343	241	St Marys	Middle Hawkesbury-Nepean	18	3	na	21	96	56	na	na
343	224	Richmond	Middle Hawkesbury-Nepean	19	2	na	21	96	56	na	na
343	383	Richmond	Middle Hawkesbury-Nepean	19	2	na	21	96	56	A1	na
343	900	Penrith	Middle Hawkesbury-Nepean	18	3	na	21	96	56	na	na
343	828	Glenbrook	Middle Hawkesbury-Nepean	18	3	na	21	96	56	A1	na
343	924	West Hornsby	Lower Hawkesbury	19	2	na	21	96	21	C1	na
343	542	Hornsby Heights	Lower Hawkesbury	10	5	6	21	96	21	A1, C1	na
343	90	SWSOOS	Georges River	19	2	na	21	96	96	C1	na
343	91	SWSOOS	Georges River	16	5	na	21	96	96	C1	na
343	207	SWSOOS	Georges River	20	1	na	21	96	96	na	na
343	211	SWSOOS	Georges River	20	1	na	21	96	96	na	na
343	215	SWSOOS	Georges River	20	1	na	21	96	96	na	na
343	216	SWSOOS	Georges River	20	1	na	21	96	96	na	na
343	284	SWSOOS	Georges River	20	1	na	21	96	96	na	na
343	323	SWSOOS	Georges River	20	1	na	21	96	96	na	na
343	325	SWSOOS	Georges River	20	1	na	21	96	96	na	na
343	328	SWSOOS	Georges River	20	1	na	21	96	96	na	na
343	329	SWSOOS	Georges River	20	1	na	21	96	96	na	na
343	352	SWSOOS	Georges River	19	2	na	21	3	96	C1	na
343	355	SWSOOS	Georges River	20	1	na	21	7	96	na	na
343	379	SWSOOS	Georges River	20	1	na	21	7	96	na	na

Sydney-Wide Rank	SPS	Sewerage System	Geographic Area (GA)	Asset Score	Overflow Score	Environmental Sensitivity Score	SPS Ranking Score	System Rank	GA Rank	Asset Flags	Environment Flags
343	385	SWSOOS	Georges River	20	1	na	21	8	96	na	na
343	400	SWSOOS	Georges River	20	1	na	21	40	96	na	na
343	404	SWSOOS	Georges River	16	5	na	21	40	96	na	na
343	443	SWSOOS	Georges River	20	1	na	21	na	96	na	na
343	476	SWSOOS	Georges River	20	1	na	21	11	96	na	na
343	563	SWSOOS	Georges River	20	1	na	21	29	96	na	na
343	882	Mt Victoria	Blue Mountains	12	9	na	21	30	44	A1	DATA
375	132	Warriewood	Sydney Harbour	18	2	na	20	37	104		na
375	108	NSOOS	Sydney Harbour	18	2	na	20	37	104		na
375	137	NSOOS	Sydney Harbour	18	2	na	20	21	104		na
375	141	NSOOS	Sydney Harbour	14	3	3	20	116	104		na
375	278	NSOOS	Sydney Harbour	18	2	na	20	4	104		na
375	27	BOOS	Sydney Harbour	18	2	na	20	1	104		na
375	203	St Marys	Middle Hawkesbury-Nepean	18	2	na	20	1	61	na	na
375	571	Riverstone	Middle Hawkesbury-Nepean	18	2	na	20	9	61	na	na
375	572	Riverstone	Middle Hawkesbury-Nepean	18	2	na	20	9	61	na	na
375	331	Richmond	Middle Hawkesbury-Nepean	18	2	na	20	42	61	na	na
375	1026	Penrith	Middle Hawkesbury-Nepean	17	3	na	20	42	61	A1, C1	na
375	382	SWSOOS	Georges River	18	2	na	20	42	116	na	na
375	1021	Winmalee	Blue Mountains	15	5	na	20	42	45	na	DATA
375	1090	Winmalee	Blue Mountains	17	3	na	20	31	45	A1	DATA
389	434	Warriewood	Sydney Harbour	17	2	na	19	39	110		na
389	450	Warriewood	Sydney Harbour	17	2	na	19	39	110		na
389	101	NSOOS	Sydney Harbour	17	2	na	19	39	110		na
389	109	NSOOS	Sydney Harbour	17	2	na	19	39	110		na
389	110	NSOOS	Sydney Harbour	17	2	na	19	39	110		na
389	660	NSOOS	Sydney Harbour	17	2	na	19	39	110		na
389	935	St Marys	Middle Hawkesbury-Nepean	17	2	na	19	39	66	A1	na
389	913	Richmond	Middle Hawkesbury-Nepean	17	2	na	19	39	66	A1	na
389	884	Penrith	Middle Hawkesbury-Nepean	16	3	na	19	22	66	na	na
389	886	Penrith	Middle Hawkesbury-Nepean	16	3	na	19	22	66	na	na
389	888	Penrith	Middle Hawkesbury-Nepean	16	3	na	19	117	66	na	na
389	904	Penrith	Middle Hawkesbury-Nepean	16	3	na	19	117	66	na	na
389	906	Penrith	Middle Hawkesbury-Nepean	16	3	na	19	117	66	A1	na
389	42	SWSOOS	Georges River	17	2	na	19	117	117	C1	na
389	193	SWSOOS	Georges River	17	2	na	19	117	117	C1	na
389	205	SWSOOS	Georges River	17	2	na	19	117	117	C1	na
389	213	SWSOOS	Georges River	11	8	na	19	117	117	C1	na
389	233	SWSOOS	Georges River	17	2	na	19	117	117	C1	na
389	245	SWSOOS	Georges River	17	2	na	19	5	117	C1	na
389	271	SWSOOS	Georges River	9	5	5	19	10	117	C1	na
389	376	SWSOOS	Georges River	9	4	6	19	10	117	C1	na
389	712	Winmalee	Blue Mountains	14	5	na	19	10	47	na	DATA
389	716	Winmalee	Blue Mountains	14	5	na	19	10	47	na	DATA
389	732	Winmalee	Blue Mountains	14	5	na	19	10	47	na	DATA
389	738	Winmalee	Blue Mountains	14	5	na	19	10	47	na	DATA

Sydney-Wide Rank	SPS	Sewerage System	Geographic Area (GA)	Asset Score	Overflow Score	Environmental Sensitivity Score	SPS Ranking Score	System Rank	GA Rank	Asset Flags	Environment Flags
389	834	Winmalee	Blue Mountains	16	3	na	19	46	47	na	DATA
389	869	Winmalee	Blue Mountains	17	2	na	19	46	47	C1	DATA
389	929	Winmalee	Blue Mountains	14	5	na	19	46	47	na	DATA
389	1004	Winmalee	Blue Mountains	17	2	na	19	46	47	A1	DATA
418	905	Warriewood	Sydney Harbour	16	2	na	18	8	116		na
418	31	SWSOOS	Sydney Harbour	16	2	na	18	8	116		na
418	980	SWSOOS	Sydney Harbour	16	2	na	18	47	116		na
418	92	NSOOS	Sydney Harbour	16	2	na	18	47	116		na
418	178	NSOOS	Sydney Harbour	16	2	na	18	24	116		na
418	179	NSOOS	Sydney Harbour	16	2	na	18	125	116		na
418	912	NSOOS	Sydney Harbour	16	2	na	18	125	116		na
418	366	St Marys	Middle Hawkesbury-Nepean	16	2	na	18	125	73	A1, C1	na
418	899	Penrith	Middle Hawkesbury-Nepean	15	3	na	18	125	73	na	na
418	244	Wollongong	Illawarra	18	na	na	18	125	27	A1	na
418	934	Wollongong	Illawarra	18	na	na	18	125	27	A1	na
418	341	Shellharbour	Illawarra	18	na	na	18	125	27	A1	na
418	604	Shellharbour	Illawarra	18	na	na	18	125	27	A1	na
418	293	Port Kembla	Illawarra	18	na	na	18	125	27	A1	na
418	308	Port Kembla	Illawarra	18	na	na	18	125	27	A1	na
418	411	Port Kembla	Illawarra	18	na	na	18	125	27	A1	na
418	448	Port Kembla	Illawarra	18	na	na	18	125	27	A1	na
418	649	Kiama	Illawarra	18	na	na	18	6	27	A1	na
418	513	Bellambi	Illawarra	18	na	na	18	5	27	A1	na
418	15	SWSOOS	Georges River	15	3	na	18	5	125	na	na
418	31	SWSOOS	Georges River	16	2	na	18	4	125	C1	na
418	82	SWSOOS	Georges River	16	2	na	18	4	125	C1	na
418	116	SWSOOS	Georges River	16	2	na	18	4	125	na	na
418	164	SWSOOS	Georges River	16	2	na	18	4	125	C1	na
418	406	SWSOOS	Georges River	10	8	na	18	15	125	C1	na
418	419	SWSOOS	Georges River	10	8	na	18	50	125	C1	na
418	606	SWSOOS	Georges River	17	1	na	18	50	125	na	na
418	609	SWSOOS	Georges River	8	2	8	18	50	125	na	na
418	980	SWSOOS	Georges River	16	2	na	18	50	125	na	na
418	299	COOS	Georges River	16	2	na	18	10	125	na	na
418	337	COOS	Georges River	16	2	na	18	18	125	C1	na
418	354	COOS	Georges River	16	2	na	18	18	125	na	na
418	380	COOS	Georges River	16	2	na	18	18	125	na	na
418	432	COOS	Georges River	16	2	na	18	18	125	na	na
418	445	COOS	Georges River	16	2	na	18	18	125	na	na
418	463	COOS	Georges River	16	2	na	18	18	125	na	na
418	464	COOS	Georges River	16	2	na	18	18	125	na	na
418	466	COOS	Georges River	16	2	na	18	18	125	na	na
418	468	COOS	Georges River	16	2	na	18	18	125	na	na
418	469	COOS	Georges River	16	2	na	18	18	125	na	na
418	731	Winmalee	Blue Mountains	13	5	na	18	18	55	na	DATA
418	863	Winmalee	Blue Mountains	16	2	na	18	4	55	na	DATA

Sydney-Wide Rank	SPS	Sewerage System	Geographic Area (GA)	Asset Score	Overflow Score	Environmental Sensitivity Score	SPS Ranking Score	System Rank	GA Rank	Asset Flags	Environment Flags
460	982	Warriewood	Sydney Harbour	15	2	na	17	49	123		na
460	30	SWSOOS	Sydney Harbour	15	2	na	17	25	123		na
460	106	NSOOS	Sydney Harbour	15	2	na	17	137	123		na
460	286	NSOOS	Sydney Harbour	14	3	na	17	137	123		na
460	613	NSOOS	Sydney Harbour	15	2	na	17	137	123		na
460	47	BOOS	Sydney Harbour	15	2	na	17	137	123		na
460	188	BOOS	Sydney Harbour	15	2	na	17	137	123		na
460	595	Hornsby Heights	Lower Hawkesbury	15	2	na	17	137	23	C1	na
460	252	Port Kembla	Illawarra	17	na	na	17	8	37	A1	na
460	30	SWSOOS	Georges River	15	2	na	17	54	146	na	na
460	121	SWSOOS	Georges River	9	2	6	17	54	146	na	na
460	180	SWSOOS	Georges River	15	2	na	17	54	146	na	na
460	194	SWSOOS	Georges River	15	2	na	17	12	146	na	na
460	248	SWSOOS	Georges River	15	2	na	17	29	146	C1	na
460	268	COOS	Georges River	15	2	na	17	29	146	na	na
460	298	COOS	Georges River	15	2	na	17	29	146	na	na
460	340	COOS	Georges River	15	2	na	17	29	146	na	na
460	363	COOS	Georges River	15	2	na	17	29	146	na	na
460	409	COOS	Georges River	15	2	na	17	29	146	na	na
460	412	COOS	Georges River	15	2	na	17	29	146	na	na
460	433	COOS	Georges River	15	2	na	17	29	146	na	na
460	461	COOS	Georges River	15	2	na	17	29	146	na	na
460	470	COOS	Georges River	15	2	na	17	32	146	na	na
460	936	Winmalee	Blue Mountains	15	2	na	17	32	57	A1	DATA
484	389	Warriewood	Sydney Harbour	14	2	na	16	26	130		na
484	451	Warriewood	Sydney Harbour	14	2	na	16	26	130		na
484	943	Warriewood	Sydney Harbour	14	2	na	16	26	130		na
484	57	NSOOS	Sydney Harbour	14	2	na	16	143	130		na
484	69	NSOOS	Sydney Harbour	14	2	na	16	143	130		na
484	79	NSOOS	Sydney Harbour	14	2	na	16	16	130		na
484	371	NSOOS	Sydney Harbour	14	2	na	16	16	130		na
484	114	BOOS	Sydney Harbour	14	2	na	16	57	130		na
484	895	Penrith	Middle Hawkesbury-Nepean	11	5	na	16	57	75	A1, C1	na
484	896	Penrith	Middle Hawkesbury-Nepean	11	5	na	16	57	75	A1, C1	na
484	162	SWSOOS	Georges River	14	2	na	16	57	160	C1	na
484	350	SWSOOS	Georges River	13	3	na	16	38	160	na	na
484	312	COOS	Georges River	14	2	na	16	34	160	na	na
497	493	Warriewood	Sydney Harbour	13	2	na	15	50	138		na
497	29	SWSOOS	Sydney Harbour	13	2	na	15	50	138		na
497	54	NSOOS	Sydney Harbour	13	2	na	15	50	138		na
497	13	BOOS	Sydney Harbour	13	2	na	15	29	138		na
497	20	BOOS	Sydney Harbour	13	2	na	15	145	138		na
497	46	BOOS	Sydney Harbour	13	2	na	15	145	138		na
497	50	BOOS	Sydney Harbour	13	2	na	15	145	138		na
497	345	Shellharbour	Illawarra	15	na	na	15	145	38	A1, C1	na
497	237	Bellambi	Illawarra	15	na	na	15	145	38	A1, C1	na

Sydney-Wide Rank	SPS	Sewerage System	Geographic Area (GA)	Asset Score	Overflow Score	Environmental Sensitivity Score	SPS Ranking Score	System Rank	GA Rank	Asset Flags	Environment Flags
497	29	SWSOOS	Georges River	13	2	na	15	145	163	na	na
497	45	SWSOOS	Georges River	13	2	na	15	145	163	na	na
497	99	SWSOOS	Georges River	13	2	na	15	7	163	na	na
497	330	SWSOOS	Georges River	14	1	na	15	61	163	na	na
497	415	SWSOOS	Georges River	13	2	na	15	39	163	na	na
497	566	SWSOOS	Georges River	13	2	na	15	39	163	na	na
497	166	COOS	Georges River	13	2	na	15	39	163	na	na
497	169	COOS	Georges River	13	2	na	15	39	163	na	na
497	171	COOS	Georges River	13	2	na	15	39	163	C1	na
497	360	COOS	Georges River	13	2	na	15	39	163	C1	na
497	390	COOS	Georges River	13	2	na	15	39	163	na	na
497	397	COOS	Georges River	13	2	na	15	39	163	na	na
497	605	COOS	Georges River	13	2	na	15	39	163	na	na
497	607	COOS	Georges River	13	2	na	15	35	163	na	na
497	612	COOS	Georges River	13	2	na	15	35	163	na	na
497	723	Winmalee	Blue Mountains	12	3	na	15	35	58	A1	DATA
497	742	Winmalee	Blue Mountains	12	3	na	15	35	58	A1	DATA
497	990	Winmalee	Blue Mountains	10	5	na	15	5	58	A1	DATA
524	509	Warriewood	Sydney Harbour	12	2	na	14	53	145		na
524	529	Warriewood	Sydney Harbour	12	2	na	14	30	145		na
524	532	Warriewood	Sydney Harbour	12	2	na	14	30	145		na
524	931	Warriewood	Sydney Harbour	12	2	na	14	30	145		na
524	105	NSOOS	Sydney Harbour	12	2	na	14	30	145		na
524	603	NSOOS	Sydney Harbour	12	2	na	14	152	145		na
524	907	Rouse Hill	Middle Hawkesbury-Nepean	12	2	na	14	152	77	na	na
524	564	Riverstone	Middle Hawkesbury-Nepean	12	2	na	14	152	77	A1, C1	na
524	894	Penrith	Middle Hawkesbury-Nepean	11	3	na	14	152	77	A1, C1	na
524	177	Port Kembla	Illawarra	14	na	na	14	1	40	A1	na
524	289	Port Kembla	Illawarra	14	na	na	14	3	40	A1	na
524	296	Port Kembla	Illawarra	14	na	na	14	9	40	A1	na
524	249	Bellambi	Illawarra	14	na	na	14	9	40	A1	na
524	662	Bellambi	Illawarra	14	na	na	14	9	40	A1	na
524	138	SWSOOS	Georges River	13	1	na	14	18	178	C1	na
524	269	SWSOOS	Georges River	8	2	4	14	62	178	na	na
524	544	SWSOOS	Georges River	13	1	na	14	62	178	na	na
524	631	SWSOOS	Georges River	13	1	na	14	48	178	na	na
524	168	COOS	Georges River	12	2	na	14	48	178	na	na
524	297	COOS	Georges River	12	2	na	14	48	178	na	na
524	356	COOS	Georges River	12	2	na	14	48	178	na	na
524	387	COOS	Georges River	12	2	na	14	48	178	na	na
524	560	COOS	Georges River	12	2	na	14	48	178	na	na
524	578	COOS	Georges River	12	2	na	14	48	178	na	na
524	597	COOS	Georges River	12	2	na	14	48	178	na	na
524	636	COOS	Georges River	12	2	na	14	48	178	na	na
524	676	COOS	Georges River	12	2	na	14	48	178	na	na
524	1028	COOS	Georges River	12	2	na	14	6	178	C1	

Sydney-Wide Rank	SPS	Sewerage System	Geographic Area (GA)	Asset Score	Overflow Score	Environmental Sensitivity Score	SPS Ranking Score	System Rank	GA Rank	Asset Flags	Environment Flags
524	725	Winmalee	Blue Mountains	12	2	na	14	6	61	A1	DATA
553	673	West Camden	Upper Nepean	10	3	na	13	54	5	A1	na
553	431	SWSOOS	Sydney Harbour	11	2	na	13	54	151		na
553	34	NSOOS	Sydney Harbour	11	2	na	13	7	151		na
553	70	NSOOS	Sydney Harbour	11	2	na	13	5	151		na
553	100	NSOOS	Sydney Harbour	11	2	na	13	156	151		na
553	107	NSOOS	Sydney Harbour	11	2	na	13	156	151		na
553	930	NSOOS	Sydney Harbour	11	2	na	13	156	151		na
553	991	Rouse Hill	Middle Hawkesbury-Nepean	11	2	na	13	2	80	A1	na
553	883	Penrith	Middle Hawkesbury-Nepean	8	5	na	13	19	80	na	na
553	485	West Hornsby	Lower Hawkesbury	8	5	na	13	64	24	C1	na
553	431	SWSOOS	Georges River	11	2	na	13	64	192	na	na
553	1006	SWSOOS	Georges River	11	2	na	13	64	192	C1	na
553	170	COOS	Georges River	11	2	na	13	64	192	na	na
553	255	COOS	Georges River	11	2	na	13	64	192	na	na
553	747	Winmalee	Blue Mountains	11	2	na	13	58	62	A1, C1	DATA
553	958	Winmalee	Blue Mountains	10	3	na	13	58	62	A1	DATA
569	510	Warriewood	Sydney Harbour	10	2	na	12	10	157		na
569	522	Warriewood	Sydney Harbour	10	2	na	12	56	157		na
569	524	Warriewood	Sydney Harbour	10	2	na	12	56	157		na
569	525	Warriewood	Sydney Harbour	10	2	na	12	56	157		na
569	537	Warriewood	Sydney Harbour	10	2	na	12	56	157		na
569	941	Warriewood	Sydney Harbour	10	2	na	12	34	157		na
569	1029	SWSOOS	Sydney Harbour	10	2	na	12	34	157		na
569	32	NSOOS	Sydney Harbour	10	2	na	12	34	157		na
569	102	NSOOS	Sydney Harbour	10	2	na	12	34	157		na
569	209	NSOOS	Sydney Harbour	10	2	na	12	34	157		na
569	218	NSOOS	Sydney Harbour	10	2	na	12	34	157		na
569	234	NSOOS	Sydney Harbour	10	2	na	12	159	157		na
569	263	NSOOS	Sydney Harbour	10	2	na	12	159	157		na
569	305	NSOOS	Sydney Harbour	10	2	na	12	159	157		na
569	306	NSOOS	Sydney Harbour	10	2	na	12	7	157		na
569	898	St Marys	Middle Hawkesbury-Nepean	10	2	na	12	69	82	na	na
569	993	Wollongong	Illawarra	12	na	na	12	69	45	A1	na
569	73	SWSOOS	Georges River	10	2	na	12	69	196	na	na
569	1029	SWSOOS	Georges River	10	2	na	12	69	196	na	na
569	750	Winmalee	Blue Mountains	10	2	na	12	69	64	A1	DATA
569	848	Winmalee	Blue Mountains	10	2	na	12	69	64	A1	DATA
569	928	Winmalee	Blue Mountains	9	3	na	12	69	64	na	DATA
569	951	Winmalee	Blue Mountains	10	2	na	12	69	64	A1	DATA
592	511	Warriewood	Sydney Harbour	9	2	na	11	60	172		na
592	979	Warriewood	Sydney Harbour	9	2	na	11	60	172		na
592	129	NSOOS	Sydney Harbour	9	2	na	11	40	172		na
592	314	NSOOS	Sydney Harbour	9	2	na	11	40	172		na
592	359	NSOOS	Sydney Harbour	9	2	na	11	162	172		na
592	1087	BOOS	Sydney Harbour	9	2	na	11	162	172		na

Sydney-Wide Rank	SPS	Sewerage System	Geographic Area (GA)	Asset Score	Overflow Score	Environmental Sensitivity Score	SPS Ranking Score	System Rank	GA Rank	Asset Flags	Environment Flags
592	235	Hornsby Heights	Lower Hawkesbury	9	2	na	11	162	25	na	na
592	78	SWSOOS	Georges River	9	2	na	11	162	198	C1	na
592	191	SWSOOS	Georges River	9	2	na	11	162	198	C1	na
592	192	SWSOOS	Georges River	9	2	na	11	77	198	C1	na
592	217	SWSOOS	Georges River	9	2	na	11	77	198	na	na
592	327	SWSOOS	Georges River	10	1	na	11	77	198	C1	na
592	948	Winmalee	Blue Mountains	9	2	na	11	13	68	na	DATA
592	955	Winmalee	Blue Mountains	9	2	na	11	39	68	na	DATA
606	64	SWSOOS	Sydney Harbour	8	2	na	10	11	178		na
606	210	NSOOS	Sydney Harbour	7	3	na	10	42	178		na
606	247	NSOOS	Sydney Harbour	8	2	na	10	167	178		na
606	339	NSOOS	Sydney Harbour	7	3	na	10	167	178		na
606	645	Warriewood	Lower Hawkesbury	7	3	na	10	167	26	na	na
606	479	Wollongong	Illawarra	10	na	na	10	167	46	A1, C1	na
606	64	SWSOOS	Georges River	8	2	na	10	167	203	na	na
606	93	SWSOOS	Georges River	8	2	na	10	167	203	na	na
606	155	SWSOOS	Georges River	8	2	na	10	167	203	na	na
606	214	SWSOOS	Georges River	8	2	na	10	167	203	na	na
606	318	SWSOOS	Georges River	8	2	na	10	167	203	na	na
606	601	SWSOOS	Georges River	8	2	na	10	80	203	na	na
606	1000	SWSOOS	Georges River	9	1	na	10	80	203	na	na
606	1001	SWSOOS	Georges River	9	1	na	10	80	203	na	na
620	577	Warriewood	Sydney Harbour	7	2	na	9	43	182		na
620	940	Warriewood	Sydney Harbour	7	2	na	9	43	182		na
620	999	Warriewood	Sydney Harbour	7	2	na	9	43	182		na
620	1036	Warriewood	Sydney Harbour	7	2	na	9	43	182		na
620	35	NSOOS	Sydney Harbour	7	2	na	9	176	182		na
620	36	NSOOS	Sydney Harbour	7	2	na	9	176	182		na
620	37	NSOOS	Sydney Harbour	7	2	na	9	8	182		na
620	185	NSOOS	Sydney Harbour	7	2	na	9	8	182		na
620	200	NSOOS	Sydney Harbour	7	2	na	9	8	182		na
620	19	BOOS	Sydney Harbour	7	2	na	9	8	182		na
620	1095	Hornsby Heights	Lower Hawkesbury	7	2	na	9	8	27	na	na
620	303	Shellharbour	Illawarra	9	na	na	9	8	47	A1	na
620	342	Shellharbour	Illawarra	9	na	na	9	8	47	A1	na
620	500	Shellharbour	Illawarra	9	na	na	9	12	47	A1	na
620	501	Shellharbour	Illawarra	9	na	na	9	12	47	A1	na
620	502	Shellharbour	Illawarra	9	na	na	9	83	47	A1	na
620	504	Shellharbour	Illawarra	9	na	na	9	83	47	A1	na
620	506	Shellharbour	Illawarra	9	na	na	9	83	47	A1	na
620	290	Port Kembla	Illawarra	9	na	na	9	83	47	A1	na
620	667	Port Kembla	Illawarra	9	na	na	9	83	47	A1	na
620	642	Kiama	Illawarra	9	na	na	9	11	47	A1	na
620	651	Kiama	Illawarra	9	na	na	9	11	47	A1	na
620	333	SWSOOS	Georges River	8	1	na	9	14	211	na	na
620	534	SWSOOS	Georges River	8	1	na	9	40	211	na	na

Sydney-Wide Rank	SPS	Sewerage System	Geographic Area (GA)	Asset Score	Overflow Score	Environmental Sensitivity Score	SPS Ranking Score	System Rank	GA Rank	Asset Flags	Environment Flags
644	646	Warriewood	Lower Hawkesbury	6	2	na	8	12	28	na	na
644	1007	Wollongong	Illawarra	8	na	na	8	12	58	A1	na
644	1008	Wollongong	Illawarra	8	na	na	8	12	58	A1	na
644	1012	Wollongong	Illawarra	8	na	na	8	47	58	A1	na
644	1101	Shellharbour	Illawarra	8	na	na	8	178	58	A1	na
644	927	Kiama	Illawarra	8	na	na	8	178	58	A1	na
644	1088	SWSOOS	Georges River	7	1	na	8	15	213	na	na
644	1089	SWSOOS	Georges River	7	1	na	8	13	213	na	na
652	1014	Warriewood	Sydney Harbour	4	2	na	6	48	192		na
652	568	Kiama	Illawarra	6	na	na	6	14	63	A1, C1	na
654	140	NSOOS	Sydney Harbour	3	2	na	5	15	193		na
654	144	Wollongong	Illawarra	5	na	na	5	16	64	A1	na
654	344	Shellharbour	Illawarra	5	na	na	5	16	64	A1	na
654	505	Shellharbour	Illawarra	5	na	na	5	88	64	A1	na
na	440	West Camden	Upper Nepean	na	na	na	na	na	na	na	na
na	319	Warragamba	Upper Nepean	na	na	na	na	na	na	na	na
na	204	St Marys	Middle Hawkesbury-Nepean	na	na	na	na	na	na	na	na
na	672	Rouse Hill	Middle Hawkesbury-Nepean	na	na	na	na	na	na	na	na
na	259	Quakers Hill	Middle Hawkesbury-Nepean	na	na	na	na	na	na	na	na

Legend

1. **Asset Flags:** **T1** = no telemetry; **A1** = ATWL alarm activation not fail-safe; **C1** = contingency plan not effective.
2. **Environmental Flags:** **TSCA1** = Species, population, or ecological community (or critical habitat) protected under the Threatened Species Conservation Act 1995 occurs within the boundaries of the potentially impacted area and has the potential to be adversely impacted by an overflow; **TSCA2** = Species, population, or ecological community (or critical habitat) protected under the Threatened Species Conservation Act 1995 occurs within the boundaries of the potentially impacted area but is unlikely to be adversely affected by an overflow; **CWA1** = Overflows from the SPS would discharge directly to a waterway classified S or P under the Clean Waters Act 1970; **CWA2** = Overflows from the SPS would not discharge directly to a waterway classified S or P under the Clean Waters Act 1970 but have the potential to adversely impact such a waterway; **PRP1** = Overflows from the SPS would discharge directly into a private residential property; **PRP2** = SPS does not discharge directly into a pr vate residential property but has the potential to adversely impact a private residential property.

Table G-5: Sydney Wide Priority Ranking of Inflow Catchments in Terms of Chokes and Leakage

Notes: Inflow catchments are sorted firstly in order of final priority and secondly in order of initial priority. Within these groupings, inflow catchments are grouped by sewerage system. Footnotes are given on the final page of the table.

Inflow catchment	System	Geographic Area (GA)	Net Infiltration/ Exfiltration (I/E)1	Percentage Rainfall Ingress2	Leakage Severity3	Choke Frequency4	Initial Priority	Sensitive Area Present5	Final Priority
CT232	Bellambi	Illawarra	None	L	L	H	1	Y	1
FC422	Bellambi	Illawarra	None	LL	LL	H	1	Y	1
FC44	Bellambi	Illawarra	None	LL	LL	H	1	Y	1
MO43	Bellambi	Illawarra	None	LL	LL	H	1	Y	1
NC33	Bellambi	Illawarra	Infiltration (high)	H	H	M	1	N	1
BS-BENB	BOOS	Sydney Harbour	None	H	M	H	1	N	1
BS-CURL	BOOS	Sydney Harbour	None	H	M	H	1	N	1
RB-1B14	BOOS	Sydney Harbour	None	L	L	H	1	Y	1
VAUC-12	BOOS	Sydney Harbour	None	L	LL	H	1	Y	1
PH113	COOS	Georges River	Exfiltration (medium)	M	H	M	1	Y	1
PH16	COOS	Georges River	Exfiltration (medium)	M	H	M	1	Y	1
SU121	COOS	Georges River	Exfiltration (medium)	L	L	H	1	Y	1
SW32A	COOS	Georges River	None	H	M	H	1	Y	1
820172	NSOOS	Sydney Harbour	I/E Unknown	H	H	M	1	Y	1
820210	NSOOS	Lower Hawkesbury	Exfiltration (high)	H	H	M	1	Y	1
820221	NSOOS	Sydney Harbour	Infiltration (low)	H	M	H	1	N	1
820226	NSOOS	Sydney Harbour	Exfiltration (moderate)	M	H	H	1	N	1
820226	NSOOS	Lower Hawkesbury	Exfiltration (moderate)	M	H	H	1	Y	1
820245	NSOOS	Lower Hawkesbury	None	H	M	H	1	Y	1
820255	NSOOS	Sydney Harbour	None	M	L	H	1	N	1
820260	NSOOS	Sydney Harbour	I/E Unknown	H	H	H	1	N	1
820265	NSOOS	Sydney Harbour	Infiltration (high)	H	H	M	1	Y	1
820274	NSOOS	Sydney Harbour	I/E Unknown	H	H	M	1	Y	1
820275	NSOOS	Sydney Harbour	Infiltration (low)	H	M	H	1	Y	1
820301	NSOOS	Sydney Harbour	I/E Unknown	M	H	M	1	Y	1
820308U	NSOOS	Sydney Harbour	I/E Unknown	M	H	H	1	Y	1
820312	NSOOS	Sydney Harbour	Exfiltration (moderate)	M	H	M	1	N	1
820321	NSOOS	Sydney Harbour	Exfiltration (moderate)	M	H	M	1	Y	1
820345	NSOOS	Sydney Harbour	None	LL	LL	H	1	N	1
820409	NSOOS	Sydney Harbour	I/E Unknown	M	H	M	1	Y	1
820581	NSOOS	Sydney Harbour	Exfiltration (moderate)	H	H	M	1	N	1
820618	NSOOS	Sydney Harbour	I/E Unknown	M	H	M	1	Y	1
820695	NSOOS	Sydney Harbour	I/E Unknown	H	H	M	1	Y	1
820700	NSOOS	Sydney Harbour	Infiltration (high)	M	H	H	1	Y	1
9A-3	NSOOS	Sydney Harbour	Infiltration (high)	LL	L	H	1	Y	1
E1	NSOOS	Sydney Harbour	I/E Unknown	H	H	H	1	N	1

Inflow catchment	System	Geographic Area (GA)	Net Infiltration/ Exfiltration (I/E)1	Percentage Rainfall Ingress2	Leakage Severity3	Choke Frequency4	Initial Priority	Sensitive Area Present5	Final Priority
E12	NSOOS	Sydney Harbour	I/E Unknown	H	H	H	1	Y	1
EF	NSOOS	Sydney Harbour	I/E Unknown	H	H	M	1	Y	1
EK	NSOOS	Sydney Harbour	I/E Unknown	M	H	M	1	Y	1
ELO	NSOOS	Sydney Harbour	I/E Unknown	M	H	M	1	Y	1
EM	NSOOS	Sydney Harbour	I/E Unknown	M	H	M	1	Y	1
WM1-12	NSOOS	Sydney Harbour	Infiltration (high)	H	H	H	1	Y	1
LA55	Port Kembla	Illawarra	None	LL	LL	H	1	Y	1
LH14	Port Kembla	Illawarra	Exfiltration (high)	H	H	M	1	Y	1
SP3083	Port Kembla	Illawarra	None	LL	LL	H	1	N	1
SPSX177	Port Kembla	Illawarra	Exfiltration (high)	H	H	L	1	Y	1
SPSX308	Port Kembla	Illawarra	None	LL	LL	H	1	Y	1
SPS500	Shellharbour	Illawarra	Unknown	H	H	M	1	Y	1
MD3-04	St Marys	Middle Hawkesbury-Nepean	Exfiltration (low)	LL	LL	H	1	Y	1
MD3-08	St Marys	Middle Hawkesbury-Nepean	Exfiltration (low)	LL	LL	H	1	N	1
RC1-07	St Marys	Middle Hawkesbury-Nepean	Exfiltration (high)	LL	M	H	1	Y	1
03-GUNG	SWSOOS	Georges River	None	H	M	H	1	N	1
802353	SWSOOS	Georges River	Unknown	M	H	M	1	N	1
802413U	SWSOOS	Georges River	Infiltration (high)	M	H	M	1	N	1
802435	SWSOOS	Georges River	Exfiltration (moderate)	M	H	M	1	N	1
802630	SWSOOS	Georges River	Unknown	H	H	M	1	N	1
802631	SWSOOS	Georges River	Exfiltration (high)	H	H	M	1	Y	1
802632	SWSOOS	Georges River	Infiltration (high)	H	H	M	1	N	1
802640	SWSOOS	Georges River	Unknown	H	H	M	1	N	1
823350	SWSOOS	Georges River	None	M	L	H	1	Y	1
823620	SWSOOS	Georges River	Exfiltration (low)	L	L	H	1	N	1
CC2-15	SWSOOS	Georges River	Unknown	H	H	M	1	N	1
CC2-30A	SWSOOS	Georges River	None	H	M	H	1	N	1
CMH287	SWSOOS	Georges River	Exfiltration (high)	H	H	M	1	N	1
OB1-01	SWSOOS	Georges River	Exfiltration (moderate)	M	H	H	1	N	1
OB2-01	SWSOOS	Georges River	Exfiltration (high)	L	M	H	1	Y	1
PA1-01	SWSOOS	Georges River	None	LL	LL	H	1	N	1
SP2-01	SWSOOS	Georges River	Exfiltration (high)	H	H	M	1	N	1
WC3-16	SWSOOS	Georges River	Exfiltration (high)	H	H	M	1	Y	1
WC3-25	SWSOOS	Georges River	Exfiltration (high)	H	H	M	1	Y	1
CS3-04	West Camden	Upper Nepean	Exfiltration (moderate)	M	H	M	1	N	1
CS3-04A	West Camden	Upper Nepean	Exfiltration (moderate)	M	H	M	1	N	1
EC1-02	West Camden	Upper Nepean	Exfiltration (moderate)	M	H	M	1	Y	1
EC11-06	West Camden	Upper Nepean	Exfiltration (moderate)	M	H	M	1	Y	1
EC11-07	West Camden	Upper Nepean	Exfiltration (moderate)	M	H	M	1	Y	1

Inflow catchment	System	Geographic Area (GA)	Net Infiltration/ Exfiltration (I/E)1	Percentage Rainfall Ingress2	Leakage Severity3	Choke Frequency4	Initial Priority	Sensitive Area Present5	Final Priority
EC11-08	West Camden	Upper Nepean	Exfiltration (moderate)	M	H	M	1	Y	1
WE4-01	West Camden	Upper Nepean	Exfiltration (moderate)	M	H	M	1	Y	1
WE4-03	West Camden	Upper Nepean	Exfiltration (moderate)	M	H	M	1	N	1
NA3-01	West Hornsby	Lower Hawkesbury	I/E Unknown	H	H	M	1	Y	1
TH1M16A	West Hornsby	Lower Hawkesbury	Exfiltration (high)	L	M	H	1	Y	1
TH1ML02	West Hornsby	Lower Hawkesbury	Exfiltration (high)	L	M	H	1	Y	1
CO23	Wollongong	Illawarra	Exfiltration (moderate)	L	L	H	1	Y	1
SP1441	Wollongong	Illawarra	Exfiltration (high)	H	H	M	1	Y	1
NM-1B8	BOOS	Sydney Harbour	Unknown	H	H	L	2	Y	1
820201	NSOOS	Sydney Harbour	Infiltration (low)	H	M	H	2	Y	1
820203	NSOOS	Sydney Harbour	Exfiltration (high)	H	H	L	2	Y	1
820205D	NSOOS	Lower Hawkesbury	None	H	M	M	2	Y	1
820213	NSOOS	Sydney Harbour	Exfiltration (high)	H	M	M	2	Y	1
820297	NSOOS	Sydney Harbour	None	H	M	M	2	Y	1
820307	NSOOS	Sydney Harbour	I/E Unknown	H	H	L	2	Y	1
820407	NSOOS	Sydney Harbour	Infiltration (low)	H	M	M	2	Y	1
820627	NSOOS	Sydney Harbour	Infiltration (moderate)	M	M	M	2	Y	1
820843	NSOOS	Sydney Harbour	None	H	M	M	2	Y	1
WM1-17	NSOOS	Sydney Harbour	Exfiltration (high)	L	M	M	2	Y	1
CE601	Penrith	Middle Hawkesbury-Nepean	Exfiltration (high)	L	M	M	2	Y	1
KB11	Shellharbour	Illawarra	None	H	M	M	2	Y	1
RC1-06	St Marys	Middle Hawkesbury-Nepean	Exfiltration (high)	LL	M	M	2	Y	1
802159	SWSOOS	Georges River	None	H	M	M	2	Y	1
802303	SWSOOS	Georges River	Infiltration (high)	M	H	L	2	Y	1
802417	SWSOOS	Georges River	Exfiltration (high)	L	M	M	2	Y	1
802955	SWSOOS	Georges River	Infiltration (high)	H	H	L	2	Y	1
CC2-34	SWSOOS	Georges River	None	H	M	M	2	Y	1
CMH-41	SWSOOS	Georges River	Exfiltration (moderate)	H	H	L	2	Y	1
CMH-91	SWSOOS	Georges River	Exfiltration (moderate)	M	H	L	2	Y	1
EH2-05	SWSOOS	Georges River	None	H	M	M	2	Y	1
RP2-01	SWSOOS	Georges River	None	H	M	M	2	Y	1
CS3-06	West Camden	Upper Nepean	Exfiltration (moderate)	M	H	L	2	Y	1
TG1ML03	West Hornsby	Lower Hawkesbury	Exfiltration (high)	LL	M	M	2	Y	1
SP2381	Wollongong	Illawarra	None	H	M	M	2	Y	1
AU16	Bellambi	Illawarra	Exfiltration (moderate)	LL	L	M	3	Y	1
AU17	Bellambi	Illawarra	Exfiltration (moderate)	LL	L	M	3	Y	1
BU811	Bellambi	Illawarra	Exfiltration (moderate)	LL	L	M	3	Y	1

Inflow catchment	System	Geographic Area (GA)	Net Infiltration/ Exfiltration (I/E)1	Percentage Rainfall Ingress2	Leakage Severity3	Choke Frequency4	Initial Priority	Sensitive Area Present5	Final Priority
BU82	Bellambi	Illawarra	None	L	L	M	3	Y	1
WC72	Bellambi	Illawarra	Exfiltration (moderate)	LL	L	M	3	Y	1
CC62	COOS	Georges River	Unknown	LL	L	M	3	Y	1
CO52	COOS	Georges River	Exfiltration (medium)	LL	L	M	3	Y	1
SU126	COOS	Georges River	Exfiltration (medium)	L	L	M	3	Y	1
SU128	COOS	Georges River	Exfiltration (medium)	L	L	M	3	Y	1
BE64	Shellharbour	Illawarra	Exfiltration (moderate)	L	L	L	3	Y	1
MW12	Shellharbour	Illawarra	Exfiltration (moderate)	L	L	L	3	Y	1
OP11	Shellharbour	Illawarra	Unknown	LL	L	L	3	Y	1
802204	SWSOOS	Georges River	Unknown	M	L	M	3	Y	1
CMH187	SWSOOS	Georges River	Infiltration (high)	L	L	M	3	Y	1
962010	Winmalee	Blue Mountains	Exfiltration (moderate)	L	L	M	3	Y	1
968010	Winmalee	Blue Mountains	None	M	L	L	3	Y	1
96901	Winmalee	Blue Mountains	None	M	L	M	3	Y	1
BA93	Bellambi	Illawarra	Unknown	LL	LL	M	4	Y	1
802252	SWSOOS	Georges River	Exfiltration (low)	L	L	L	4	Y	1
970010	Blackheath	Blue Mountains	None	L	LL	L	5	Y	1
864020	Winmalee	Blue Mountains	None	L	LL	M	5	Y	1
NM-PYRM	BOOS	Sydney Harbour	None	H	M	M	2	Y	2
ME37	COOS	Georges River	Exfiltration (high)	LL	M	M	2	N	2
11-8	NSOOS	Sydney Harbour	None	H	M	M	2	N	2
820015	NSOOS	Sydney Harbour	None	H	M	M	2	N	2
820205D	NSOOS	Sydney Harbour	None	H	M	M	2	N	2
820220	NSOOS	Sydney Harbour	None	H	M	M	2	N	2
820325	NSOOS	Sydney Harbour	Exfiltration (low)	M	M	M	2	N	2
820420	NSOOS	Sydney Harbour	None	H	M	M	2	N	2
820455	NSOOS	Sydney Harbour	Infiltration (low)	H	M	M	2	N	2
820548	NSOOS	Sydney Harbour	Exfiltration (moderate)	M	H	L	2	N	2
820585	NSOOS	Sydney Harbour	Exfiltration (moderate)	H	H	L	2	N	2
820586	NSOOS	Sydney Harbour	None	H	M	M	2	N	2
820592	NSOOS	Sydney Harbour	Exfiltration (moderate)	M	H	L	2	N	2
820694	NSOOS	Sydney Harbour	Infiltration (moderate)	H	M	M	2	N	2
820765	NSOOS	Sydney Harbour	Infiltration (low)	H	M	M	2	N	2
820822	NSOOS	Sydney Harbour	None	H	M	M	2	N	2
820825	NSOOS	Sydney Harbour	None	H	M	M	2	N	2
W14	NSOOS	Sydney Harbour	Infiltration (moderate)	H	M	M	2	N	2
WC1	NSOOS	Sydney Harbour	Exfiltration (low)	M	M	M	2	N	2
WM1-9	NSOOS	Sydney Harbour	None	H	M	M	2	N	2

Inflow catchment	System	Geographic Area (GA)	Net Infiltration/ Exfiltration (I/E)1	Percentage Rainfall Ingress2	Leakage Severity3	Choke Frequency4	Initial Priority	Sensitive Area Present5	Final Priority
WW15A	NSOOS	Sydney Harbour	Infiltration (moderate)	M	M	M	2	N	2
802406	SWSOOS	Georges River	None	H	M	M	2	N	2
802407	SWSOOS	Georges River	None	H	M	M	2	N	2
802476	SWSOOS	Georges River	Exfiltration (high)	L	M	M	2	N	2
802534	SWSOOS	Georges River	Exfiltration (moderate)	M	H	L	2	N	2
802690	SWSOOS	Georges River	None	H	M	M	2	N	2
802801	SWSOOS	Georges River	Infiltration (high)	M	H	L	2	N	2
802945	SWSOOS	Georges River	None	H	M	M	2	N	2
809205	SWSOOS	Georges River	Exfiltration (low)	M	M	M	2	Y	2
BC115	SWSOOS	Georges River	Unknown	H	H	L	2	N	2
BC133	SWSOOS	Georges River	None	H	M	M	2	N	2
CMH-72	SWSOOS	Georges River	Exfiltration (moderate)	M	H	L	2	N	2
CMH-82	SWSOOS	Georges River	None	H		M	2	N	2
CO1-13	SWSOOS	Georges River	Infiltration (moderate)	M	M	M	2	N	2
EB1-14	SWSOOS	Georges River	Infiltration (moderate)	M	M	M	2	N	2
EB1-19	SWSOOS	Georges River	Infiltration (moderate)	M	M	M	2	N	2
EH2-08	SWSOOS	Georges River	None	H	M	M	2	N	2
ES3-11	SWSOOS	Georges River	Infiltration (high)	M	H	L	2	N	2
GC1-40	SWSOOS	Georges River	Exfiltration (low)	M	M	M	2	N	2
GL1-07	SWSOOS	Georges River	None	H	M	M	2	N	2
M-BAR1	SWSOOS	Georges River	Infiltration (high)	H	H	L	2	N	2
M-PRIN1	SWSOOS	Georges River	Infiltration (high)	H	H	L	2	N	2
M-UNDE1	SWSOOS	Georges River	Unknown	H	H	L	2	N	2
PS3	SWSOOS	Georges River	Infiltration (high)	H	H	L	2	N	2
RM1-05	SWSOOS	Georges River	Exfiltration (low)	M	M	M	2	N	2
RM1-07	SWSOOS	Georges River	Exfiltration (low)	M	M	M	2	N	2
SD115	SWSOOS	Georges River	Exfiltration (moderate)	M	H	L	2	N	2
WC3-40	SWSOOS	Georges River	Infiltration (low)	H	M	M	2	N	2
CS3-07	West Camden	Upper Nepean	Exfiltration (moderate)	M	H	L	2	N	2
NA2-02	West Camden	Upper Nepean	Exfiltration (moderate)	M	H	L	2	N	2
NA2-03A	West Camden	Upper Nepean	Exfiltration (moderate)	M	H	L	2	N	2
RR3-02	West Camden	Upper Nepean	Exfiltration (moderate)	M	H	L	2	N	2
RR3-04	West Camden	Upper Nepean	Exfiltration (moderate)	M	H	L	2	N	2
RR3-06	West Camden	Upper Nepean	Exfiltration (moderate)	M	H	L	2	N	2
RR3-07	West Camden	Upper Nepean	Exfiltration (moderate)	M	H	L	2	N	2
SP484	West Camden	Upper Nepean	Exfiltration (moderate)	M	H	L	2	N	2

Inflow catchment	System	Geographic Area (GA)	Net Infiltration/ Exfiltration (I/E)1	Percentage Rainfall Ingress2	Leakage Severity3	Choke Frequency4	Initial Priority	Sensitive Area Present5	Final Priority
EL4ML03	West Hornsby	Lower Hawkesbury	Exfiltration (high)	LL	M	M	2	N	2
PC5-03	West Hornsby	Lower Hawkesbury	Exfiltration (high)	LL	M	M	2	N	2
SR3-05	West Hornsby	Lower Hawkesbury	Infiltration (low)	H	M	M	2	N	2
SR3-08	West Hornsby	Lower Hawkesbury	Infiltration (low)	H	M	M	2	N	2
SR3-12	West Hornsby	Lower Hawkesbury	Infiltration (low)	H	M	M	2	N	2
TH1ML24	West Hornsby	Lower Hawkesbury	Infiltration (low)	H	M	M	2	N	2
TH1ML37	West Hornsby	Lower Hawkesbury	Infiltration (low)	H	M	M	2	N	2
BU852	Bellambi	Illawarra	None	L	L	M	3	Y	2
BK-LVPL	BOOS	Sydney Harbour	Infiltration (moderate)	M	M	L	3	Y	2
BS-B5	BOOS	Sydney Harbour	Infiltration (high)	L	L	M	3	Y	2
BW-15	BOOS	Sydney Harbour	Infiltration (high)	L	L	M	3	Y	2
DB-1	BOOS	Sydney Harbour	Unknown	L	L	M	3	Y	2
DB-2	BOOS	Sydney Harbour	Unknown	L	L	M	3	Y	2
MS-12B6	BOOS	Sydney Harbour	Infiltration (low)	H	M	L	3	Y	2
NM-PIPE	BOOS	Sydney Harbour	Infiltration (high)	L	L	M	3	Y	2
PS16COL	BOOS	Sydney Harbour	Infiltration (low)	H	M	L	3	Y	2
PS17COL	BOOS	Sydney Harbour	Infiltration (moderate)	M	M	L	3	Y	2
VAUC-11	BOOS	Sydney Harbour	Infiltration (moderate)	L	L	M	3	Y	2
960010	Glenbrook	Middle Hawkesbury-Nepean	Exfiltration (moderate)	L	L	M	3	Y	2
HH1-05	Hornsby Heights	Lower Hawkesbury	Exfiltration (moderate)	LL	L	M	3	Y	2
HH1-06	Hornsby Heights	Lower Hawkesbury	Exfiltration (moderate)	LL	L	M	3	Y	2
HH1-08	Hornsby Heights	Lower Hawkesbury	Exfiltration (moderate)	LL	L	M	3	Y	2
HH1-09	Hornsby Heights	Lower Hawkesbury	Exfiltration (moderate)	LL	L	M	3	Y	2
MR7-04	Hornsby Heights	Lower Hawkesbury	None	M	L	M	3	Y	2
MR7-05	Hornsby Heights	Lower Hawkesbury	None	M	L	M	3	Y	2
933010	North Richmond	Middle Hawkesbury-Nepean	None	H	M	L	3	Y	2
3193	NSOOS	Sydney Harbour	I/E Unknown	L	L	M	3	Y	2
3226	NSOOS	Sydney Harbour	I/E Unknown	L	L	M	3	Y	2
3251	NSOOS	Sydney Harbour	I/E Unknown	L	L	M	3	Y	2
820052U	NSOOS	Sydney Harbour	Exfiltration (moderate)	L	L	M	3	Y	2
820240	NSOOS	Lower Hawkesbury	None	H	M	L	3	Y	2
820322	NSOOS	Sydney Harbour	None	M	L	M	3	Y	2
820547	NSOOS	Sydney Harbour	None	M		M	3	Y	2
820620	NSOOS	Sydney Harbour	Infiltration (low)	M	L	M	3	Y	2
820621	NSOOS	Sydney Harbour	Infiltration (low)	M	L	M	3	Y	2
820623	NSOOS	Sydney Harbour	Exfiltration (moderate)	L	L	M	3	Y	2
820624	NSOOS	Sydney Harbour	None	M	L	M	3	Y	2
820628	NSOOS	Sydney Harbour	None	M	L	M	3	Y	2
820680	NSOOS	Sydney Harbour	None	LL	M	L	3	Y	2

Inflow catchment	System	Geographic Area (GA)	Net Infiltration/ Exfiltration (I/E)1	Percentage Rainfall Ingress2	Leakage Severity3	Choke Frequency4	Initial Priority	Sensitive Area Present5	Final Priority
820685	NSOOS	Sydney Harbour	None	M	L	M	3	Y	2
820696	NSOOS	Sydney Harbour	Exfiltration (moderate)	L	L	M	3	Y	2
820769	NSOOS	Sydney Harbour	Exfiltration (moderate)	LL	L	M	3	Y	2
8A-5	NSOOS	Sydney Harbour	I/E Unknown	LL	L	M	3	Y	2
EP201	Penrith	Middle Hawkesbury-Nepean	Exfiltration (high)	LL	M	L	3	Y	2
MV202	Penrith	Middle Hawkesbury-Nepean	Exfiltration (moderate)	LL	L	M	3	Y	2
BE114	Port Kembla	Illawarra	Infiltration (high)	L	L	M	3	Y	2
HC81	Port Kembla	Illawarra	Exfiltration (low)	L	L	M	3	Y	2
BC7-01	Quakers Hill	Middle Hawkesbury-Nepean	Exfiltration (high)	L	M	L	3	Y	2
BC7-02	Quakers Hill	Middle Hawkesbury-Nepean	Exfiltration (high)	L	M	L	3	Y	2
BC7-03	Quakers Hill	Middle Hawkesbury-Nepean	Exfiltration (high)	L	M	L	3	Y	2
BC7-05	Quakers Hill	Middle Hawkesbury-Nepean	I/E Unknown	L	L	M	3	Y	2
BC7-07	Quakers Hill	Middle Hawkesbury-Nepean	I/E Unknown	L	L	M	3	Y	2
BC7-12	Quakers Hill	Middle Hawkesbury-Nepean	Infiltration (moderate)	L	L	M	3	Y	2
EC2-03	Quakers Hill	Middle Hawkesbury-Nepean	Exfiltration (high)	LL	M	L	3	Y	2
LP1-02	Quakers Hill	Middle Hawkesbury-Nepean	Exfiltration (moderate)	L	L	M	3	Y	2
LP1-07	Quakers Hill	Middle Hawkesbury-Nepean	Exfiltration (moderate)	L	L	M	3	Y	2
LP1-11	Quakers Hill	Middle Hawkesbury-Nepean	Exfiltration (moderate)	L	L	M	3	Y	2
MR6-02	Quakers Hill	Middle Hawkesbury-Nepean	I/E Unknown	L	L	M	3	Y	2
912010	Richmond	Middle Hawkesbury-Nepean	Exfiltration (low)	L	L	M	3	Y	2
84ROU04	Rouse Hill	Middle Hawkesbury-Nepean	None	M	L	M	3	Y	2
8ROU02	Rouse Hill	Middle Hawkesbury-Nepean	I/E Unknown	LL	L	M	3	Y	2
8ROU08	Rouse Hill	Middle Hawkesbury-Nepean	I/E Unknown	LL	L	M	3	Y	2
BA83	Shellharbour	Illawarra	Unknown	LL	L	L	3	Y	2
BE62	Shellharbour	Illawarra	Exfiltration (moderate)	L	L	L	3	Y	2
BE68	Shellharbour	Illawarra	Exfiltration (low)	L	L	L	3	Y	2
MR3-06	St Marys	Middle Hawkesbury-Nepean	Exfiltration (low)	L	L	M	3	Y	2
MR3-08	St Marys	Middle Hawkesbury-Nepean	Exfiltration (low)	L	L	M	3	Y	2
RC1-11	St Marys	Middle Hawkesbury-Nepean	Exfiltration (high)	L	M	L	3	Y	2
ST1-03	St Marys	Middle Hawkesbury-Nepean	I/E Unknown	LL	L	M	3	Y	2
ST1-11	St Marys	Middle Hawkesbury-Nepean	Exfiltration (moderate)	L	L	M	3	Y	2
ST1-12	St Marys	Middle Hawkesbury-Nepean	Exfiltration (moderate)	L	L	M	3	Y	2
ST1-13	St Marys	Middle Hawkesbury-Nepean	Exfiltration (moderate)	L	L	M	3	Y	2
MC2	Warriewood	Sydney Harbour	Unknown	L	L	M	3	Yes	2
TWW4	Warriewood	Sydney Harbour	Exfiltration (High)	LL	M	L	3	Yes	2
KP3-01	West Hornsby	Lower Hawkesbury	Exfiltration (moderate)	L	L	M	3	Y	2

Inflow catchment	System	Geographic Area (GA)	Net Infiltration/ Exfiltration (I/E)1	Percentage Rainfall Ingress2	Leakage Severity3	Choke Frequency4	Initial Priority	Sensitive Area Present5	Final Priority
KP3-01A	West Hornsby	Lower Hawkesbury	Exfiltration (moderate)	L	L	M	3	Y	2
KP3-03	West Hornsby	Lower Hawkesbury	Exfiltration (moderate)	L	L	M	3	Y	2
KP3-07	West Hornsby	Lower Hawkesbury	Exfiltration (moderate)	L	L	M	3	Y	2
NO1-02	West Hornsby	Lower Hawkesbury	Exfiltration (moderate)	L	L	M	3	Y	2
NO1-09	West Hornsby	Lower Hawkesbury	Exfiltration (moderate)	L	L	M	3	Y	2
NO1-11	West Hornsby	Lower Hawkesbury	Exfiltration (moderate)	L	L	M	3	Y	2
NO1-15	West Hornsby	Lower Hawkesbury	Exfiltration (moderate)	L	L	M	3	Y	2
NO1-23	West Hornsby	Lower Hawkesbury	Exfiltration (moderate)	L	L	M	3	Y	2
OM2-02	West Hornsby	Lower Hawkesbury	Exfiltration (high)	LL	M	L	3	Y	2
OM2-10	West Hornsby	Lower Hawkesbury	Exfiltration (high)	LL	M	L	3	Y	2
OM2-14	West Hornsby	Lower Hawkesbury	Exfiltration (high)	LL	M	L	3	Y	2
OM2-15	West Hornsby	Lower Hawkesbury	Exfiltration (high)	LL	M	L	3	Y	2
WP1-02	West Hornsby	Lower Hawkesbury	Exfiltration (moderate)	L	L	M	3	Y	2
WP1-06	West Hornsby	Lower Hawkesbury	Exfiltration (moderate)	L	L	M	3	Y	2
WP1-07	West Hornsby	Lower Hawkesbury	Exfiltration (moderate)	L	L	M	3	Y	2
WP1-09	West Hornsby	Lower Hawkesbury	Exfiltration (moderate)	L	L	M	3	Y	2
SP1501	Wollongong	Illawarra	Infiltration (low)	M	L	M	3	Y	2
BA9112	Bellambi	Illawarra	None	LL	LL	M	4	Y	2
NW22	Bellambi	Illawarra	None	LL	LL	M	4	Y	2
BU610	COOS	Georges River	None	L	L	M	4	Y	2
IL12	COOS	Georges River	Infiltration (low)	LL	LL	M	4	Y	2
PH116	COOS	Georges River	Unknown	LL	L	M	4	Y	2
SU111	COOS	Georges River	None	LL	LL	M	4	Y	2
SU18	COOS	Georges River	None	LL	LL	M	4	Y	2
87010	Mount Victoria	Blue Mountains	Exfiltration (moderate)	Low	Low	Low	4	Y	2
LA511	Port Kembla	Illawarra	None	LL	LL	M	4	Y	2
DSP343	Shellharbour	Illawarra	Unknown	LL	L	L	4	Y	2
MP32	Shellharbour	Illawarra	None	L	LL	LL	4	Y	2
MP33	Shellharbour	Illawarra	None	L	LL	LL	4	Y	2
SPS498	Shellharbour	Illawarra	Unknown	LL	L	L	4	Y	2
802424	SWSOOS	Georges River	None	L	LL	M	4	Y	2
964010	Winmalee	Blue Mountains	None	L	LL	M	4	Y	2
966010	Winmalee	Blue Mountains	Exfiltration (moderate)	L	L	M	4	Y	2

Inflow catchment	System	Geographic Area (GA)	Net Infiltration/ Exfiltration (I/E)1	Percentage Rainfall Ingress2	Leakage Severity3	Choke Frequency4	Initial Priority	Sensitive Area Present5	Final Priority
967010	Winmalee	Blue Mountains	Exfiltration (moderate)	L	L	L	4	Y	2
DA24	Port Kembla	Illawarra	None	LL	LL	L	5	Y	2
CT23	Bellambi	Illawarra	None	L	L	M	3	N	3
CT27	Bellambi	Illawarra	None	L	L	M	3	N	3
RE22	Bellambi	Illawarra	None	L	L	M	3	N	3
TC91	Bellambi	Illawarra	None	L	L	M	3	N	3
BW-13	BOOS	Sydney Harbour	Infiltration (low)	M	L	M	3	N	3
NM-B10	BOOS	Sydney Harbour	Infiltration (high)	L	L	M	3	N	3
NM-EDNA	BOOS	Sydney Harbour	Unknown	L	L	M	3	N	3
SU12A	COOS	Georges River	Unknown	LL	M	M	3	N	3
HH1-03	Hornsby Heights	Lower Hawkesbury	Exfiltration (moderate)	LL	L	M	3	N	3
HH1-04	Hornsby Heights	Lower Hawkesbury	Exfiltration (moderate)	LL	L	M	3	N	3
HH1-07	Hornsby Heights	Lower Hawkesbury	Exfiltration (moderate)	LL	L	M	3	N	3
MR7-06	Hornsby Heights	Lower Hawkesbury	None	M	L	M	3	N	3
MR7-08	Hornsby Heights	Lower Hawkesbury	Exfiltration (moderate)	L	L	M	3	N	3
11-1	NSOOS	Sydney Harbour	I/E Unknown	LL	L	M	3	N	3
3021	NSOOS	Sydney Harbour	I/E Unknown	L	L	M	3	N	3
820008	NSOOS	Sydney Harbour	I/E Unknown	L	L	M	3	N	3
820011	NSOOS	Sydney Harbour	I/E Unknown	L	L	M	3	N	3
820021	NSOOS	Sydney Harbour	I/E Unknown	L	L	M	3	N	3
820054	NSOOS	Sydney Harbour	Infiltration (high)	LL	L	M	3	N	3
820055	NSOOS	Sydney Harbour	I/E Unknown	LL	L	M	3	N	3
820057	NSOOS	Sydney Harbour	I/E Unknown	L	L	M	3	N	3
820101	NSOOS	Sydney Harbour	None	M	L	M	3	N	3
820114	NSOOS	Sydney Harbour	None	M	L	M	3	N	3
820155	NSOOS	Sydney Harbour	Infiltration (moderate)	M	M	L	3	N	3
820175	NSOOS	Sydney Harbour	Exfiltration (moderate)	LL	L	M	3	N	3
820240	NSOOS	Sydney Harbour	None	H	M	L	3	N	3
820295	NSOOS	Sydney Harbour	None	H	M	L	3	N	3
820311	NSOOS	Sydney Harbour	None	M	L	M	3	N	3
820335	NSOOS	Sydney Harbour	None	M	L	M	3	N	3
820413	NSOOS	Sydney Harbour	None	H	M	L	3	N	3
820571U	NSOOS	Sydney Harbour	None	M	L	M	3	N	3
820594	NSOOS	Sydney Harbour	None	H	M	L	3	N	3
820693	NSOOS	Sydney Harbour	None	H	M	L	3	N	3
820811	NSOOS	Sydney Harbour	None	M	L	M	3	N	3
9A-1	NSOOS	Sydney Harbour	I/E Unknown	LL	L	M	3	N	3
9B-1	NSOOS	Sydney Harbour	I/E Unknown	LL	L	M	3	N	3
FS4-02	NSOOS	Sydney Harbour	None	M	L	M	3	N	3
FS4-03	NSOOS	Sydney Harbour	None	M	L	M	3	N	3

Inflow catchment	System	Geographic Area (GA)	Net Infiltration/ Exfiltration (I/E)1	Percentage Rainfall Ingress2	Leakage Severity3	Choke Frequency4	Initial Priority	Sensitive Area Present5	Final Priority
NB114	NSOOS	Sydney Harbour	Exfiltration (moderate)	L	L	M	3	N	3
NB66	NSOOS	Sydney Harbour	None	M	L	M	3	N	3
MX101	Penrith	Middle Hawkesbury-Nepean	Exfiltration (moderate)	L	L	M	3	N	3
SH301	Penrith	Middle Hawkesbury-Nepean	Exfiltration (moderate)	L	L	M	3	N	3
SP407	Penrith	Middle Hawkesbury-Nepean	I/E Unknown	L	L	M	3	N	3
HC84	Port Kembla	Illawarra	Exfiltration (low)	L	L	M	3	Y	3
S176101	Port Kembla	Illawarra	Exfiltration (high)	L	M	L	3	N	3
SPSX176	Port Kembla	Illawarra	Exfiltration (high)	L	M	L	3	Y	3
WC1-03	Quakers Hill	Middle Hawkesbury-Nepean	Infiltration (moderate)	L	L	M	3	N	3
WC1-10	Quakers Hill	Middle Hawkesbury-Nepean	Infiltration (moderate)	L	L	M	3	N	3
8ROU06	Rouse Hill	Middle Hawkesbury-Nepean	Exfiltration (high)	LL	M	L	3	N	3
UNGRH01	Rouse Hill	Middle Hawkesbury-Nepean	I/E Unknown	LL	L	M	3	N	3
BE66	Shellharbour	Illawarra	Exfiltration (low)	L	L	L	3	Y	3
SH51	Shellharbour	Illawarra	Infiltration (high)	LL	M	L	3	Y	3
MR3-03	St Marys	Middle Hawkesbury-Nepean	Exfiltration (high)	L	M	L	3	N	3
ST1-14	St Marys	Middle Hawkesbury-Nepean	Exfiltration (moderate)	L	L	M	3	N	3
03-BOGG	SWSOOS	Georges River	Unknown	L	L	M	3	N	3
08-BIR	SWSOOS	Georges River	Unknown	L	L	M	3	N	3
10-P309	SWSOOS	Georges River	Exfiltration (high)	L	M	L	3	N	3
802352	SWSOOS	Georges River	Unknown	LL	L	M	3	N	3
802415	SWSOOS	Georges River	Unknown	LL	L	M	3	N	3
802460	SWSOOS	Georges River	None	M	L	M	3	N	3
802530	SWSOOS	Georges River	Infiltration (moderate)	H	M	L	3	N	3
802533	SWSOOS	Georges River	None	H	-	L	3	N	3
802537	SWSOOS	Georges River	Infiltration (moderate)	H	M	L	3	N	3
802720	SWSOOS	Georges River	None	M	L	M	3	N	3
802803	SWSOOS	Georges River	Infiltration (low)	H	M	L	3	N	3
802850	SWSOOS	Georges River	Infiltration (low)	H	M	L	3	N	3
802900	SWSOOS	Georges River	None	H	M	M	3	N	3
809230	SWSOOS	Georges River	Unknown	L	L	M	3	Y	3
820811	SWSOOS	Georges River	None	M	L	M	3	N	3
823402	SWSOOS	Georges River	Exfiltration (low)	L	L	M	3	N	3
823660	SWSOOS	Georges River	Exfiltration (moderate)	L	L	M	3	N	3
BO2-01	SWSOOS	Georges River	Exfiltration (moderate)	LL	L	M	3	N	3
CA1-12	SWSOOS	Georges River	Exfiltration (moderate)	L	L	M	3	N	3
CA1-19	SWSOOS	Georges River	Exfiltration (moderate)	L	L	M	3	N	3
CA1-23	SWSOOS	Georges River	Exfiltration (moderate)	L	L	M	3	N	3
CC2-21	SWSOOS	Georges River	None	H	M	L	3	N	3

Inflow catchment	System	Geographic Area (GA)	Net Infiltration/ Exfiltration (I/E)1	Percentage Rainfall Ingress2	Leakage Severity3	Choke Frequency4	Initial Priority	Sensitive Area Present5	Final Priority
CC2-28	SWSOOS	Georges River	None	H	M	L	3	N	3
CE3-03	SWSOOS	Georges River	None	H	M	M	3	N	3
CE3-08	SWSOOS	Georges River	None	H	M	L	3	N	3
CE3-10	SWSOOS	Georges River	Infiltration (low)	H	M	L	3	N	3
CMH-22	SWSOOS	Georges River	Infiltration (moderate)	H	M	L	3	N	3
CMH-26	SWSOOS	Georges River	Infiltration (low)	H	M	L	3	N	3
CMH-84	SWSOOS	Georges River	Infiltration (low)	H	M	L	3	N	3
CMH86	SWSOOS	Georges River	None	H	M	L	3	N	3
CS8-08	SWSOOS	Georges River	None	H	M	L	3	N	3
DA203	SWSOOS	Georges River	None	H	M	L	3	N	3
DA204	SWSOOS	Georges River	None	H	M	L	3	N	3
DF1-10	SWSOOS	Georges River	Infiltration (low)	H	M	L	3	N	3
DF1-14	SWSOOS	Georges River	Infiltration (low)	H	M	L	3	N	3
FW1-11	SWSOOS	Georges River	Infiltration (high)	L	L	M	3	N	3
FW1-19	SWSOOS	Georges River	Unknown	L	L	M	3	N	3
GC1-04	SWSOOS	Georges River	Unknown	LL	L	M	3	N	3
GC1-06	SWSOOS	Georges River	Unknown	LL	L	M	3	N	3
LC404	SWSOOS	Georges River	None	H	M	L	3	N	3
LK1-01	SWSOOS	Georges River	None	M	L	M	3	N	3
LP1-11	SWSOOS	Georges River	Exfiltration (moderate)	L	L	M	3	N	3
LU1-01	SWSOOS	Georges River	Exfiltration (moderate)	L	L	M	3	N	3
NB103	SWSOOS	Georges River	Infiltration (low)	H	M	L	3	N	3
NB105	SWSOOS	Georges River	Infiltration (low)	H	M	L	3	N	3
NB109	SWSOOS	Georges River	Infiltration (low)	H	M	L	3	N	3
SD112	SWSOOS	Georges River	Infiltration (moderate)	M	M	L	3	N	3
SS10-01	SWSOOS	Georges River	None	H	M	L	3	N	3
VI3-05	SWSOOS	Georges River	None	M	L	M	3	N	3
VI3-09	SWSOOS	Georges River	None	M	L	M	3	N	3
913020	Warragamba	Upper Nepean	Infiltration (low)	M	L	M	3	N	3
PC5-02	West Hornsby	Lower Hawkesbury	Exfiltration (high)	LL	M	L	3	N	3
PC5-04	West Hornsby	Lower Hawkesbury	Exfiltration (high)	LL	M	L	3	N	3
PC5-08	West Hornsby	Lower Hawkesbury	Exfiltration (high)	LL	M	L	3	N	3
PC5-09	West Hornsby	Lower Hawkesbury	Exfiltration (high)	LL	M	L	3	N	3
TH1ML38	West Hornsby	Lower Hawkesbury	Infiltration (low)	H	M	L	3	N	3
BA91	Bellambi	Illawarra	Unknown	LL	LL	M	4	Y	3
BA9101	Bellambi	Illawarra	Unknown	L	LL	M	4	Y	3
BA96	Bellambi	Illawarra	Unknown	L	LL	M	4	Y	3
CC91	Bellambi	Illawarra	None	LL	LL	M	4	Y	3
WC81	Bellambi	Illawarra	Infiltration (moderate)	L	L	L	4	Y	3
BS-DILN	BOOS	Sydney Harbour	Unknown	L	L	L	4	Y	3
KS-107	BOOS	Sydney Harbour	Infiltration (low)	M	L	L	4	Y	3
PS1COL	BOOS	Sydney Harbour	Unknown	LL	L	L	4	Y	3
PS27COL	BOOS	Sydney Harbour	Unknown	L	L	L	4	Y	3
CC413	Castle Hill	Middle Hawkesbury-Nepean	Exfiltration	L	L	L	4	Y	3

Inflow catchment	System	Geographic Area (GA)	Net Infiltration/ Exfiltration (I/E)1	Percentage Rainfall Ingress2	Leakage Severity3	Choke Frequency4	Initial Priority	Sensitive Area Present5	Final Priority
			(moderate)						
CH22	Castle Hill	Middle Hawkesbury-Nepean	Exfiltration (moderate)	L	L	L	4	Y	3
GL22	Castle Hill	Middle Hawkesbury-Nepean	I/E Unknown	LL	L	L	4	Y	3
MR51	Castle Hill	Middle Hawkesbury-Nepean	None	LL	LL	M	4	Y	3
PA73	Castle Hill	Middle Hawkesbury-Nepean	Exfiltration (moderate)	L	L	L	4	Y	3
SR14	Castle Hill	Middle Hawkesbury-Nepean	Exfiltration (moderate)	L	L	L	4	Y	3
SU120	COOS	Georges River	None	LL	LL	M	4	Y	3
CC1-01	Hornsby Heights	Lower Hawkesbury	None	LL	LL	M	4	Y	3
CC1-02	Hornsby Heights	Lower Hawkesbury	None	LL	LL	M	4	Y	3
CC1-03	Hornsby Heights	Lower Hawkesbury	None	LL	LL	M	4	Y	3
CC1-04	Hornsby Heights	Lower Hawkesbury	None	LL	LL	M	4	Y	3
CC1-05	Hornsby Heights	Lower Hawkesbury	None	LL	LL	M	4	Y	3
HH1-01	Hornsby Heights	Lower Hawkesbury	None	LL	LL	M	4	Y	3
2897	NSOOS	Sydney Harbour	I/E Unknown	L	L	L	4	Y	3
2973	NSOOS	Sydney Harbour	I/E Unknown	L	L	L	4	Y	3
3119	NSOOS	Sydney Harbour	None	L	LL	M	4	Y	3
3284	NSOOS	Sydney Harbour	I/E Unknown	L	L	L	4	Y	3
820003	NSOOS	Sydney Harbour	I/E Unknown	L	L	L	4	Y	3
820005	NSOOS	Sydney Harbour	None	L	LL	M	4	Y	3
820019U	NSOOS	Sydney Harbour	I/E Unknown	L	L	L	4	Y	3
820113	NSOOS	Sydney Harbour	Exfiltration (moderate)	L	L	L	4	Y	3
820140	NSOOS	Sydney Harbour	Infiltration (low)	L	LL	M	4	Y	3
820225	NSOOS	Lower Hawkesbury	None	M	L	L	4	Y	3
820235	NSOOS	Lower Hawkesbury	None	L	LL	M	4	Y	3
820250	NSOOS	Lower Hawkesbury	Exfiltration (moderate)	L	L	L	4	Y	3
820273	NSOOS	Sydney Harbour	None	L	LL	M	4	Y	3
820303U	NSOOS	Sydney Harbour	None	L	LL	M	4	Y	3
820600	NSOOS	Sydney Harbour	I/E Unknown	L	L	L	4	Y	3
820625	NSOOS	Sydney Harbour	None	L	LL	M	4	Y	3
820626	NSOOS	Sydney Harbour	None	L	LL	M	4	Y	3
820631	NSOOS	Sydney Harbour	None	L	LL	M	4	Y	3
820662U	NSOOS	Sydney Harbour	None	M	L	L	4	Y	3
820682	NSOOS	Sydney Harbour	None	L	LL	M	4	Y	3
LAG2	NSOOS	Sydney Harbour	I/E Unknown	L	L	L	4	Y	3
MS28	NSOOS	Sydney Harbour	None	M	L	L	4	Y	3
SPS-103	NSOOS	Sydney Harbour	Exfiltration (moderate)	LL	L	M	4	Y	3
SPS-67	NSOOS	Sydney Harbour	I/E Unknown	L	L	L	4	Y	3
WD2	NSOOS	Sydney Harbour	None	L	LL	M	4	Y	3
WR512	NSOOS	Sydney Harbour	None	L	LL	M	4	Y	3
PC302	Penrith	Middle Hawkesbury-Nepean	None	L	LL	M	4	Y	3

Inflow catchment	System	Geographic Area (GA)	Net Infiltration/ Exfiltration (I/E)1	Percentage Rainfall Ingress2	Leakage Severity3	Choke Frequency4	Initial Priority	Sensitive Area Present5	Final Priority
BO71	Port Kembla	Illawarra	None	LL	LL	M	4	Y	3
OU13	Port Kembla	Illawarra	Infiltration (high)	L	L	L	4	Y	3
SPSX296	Port Kembla	Illawarra	None	L	LL	M	4	Y	3
BC3-01	Quakers Hill	Middle Hawkesbury-Nepean	Exfiltration (moderate)	L	L	L	4	Y	3
BC3-03	Quakers Hill	Middle Hawkesbury-Nepean	Exfiltration (moderate)	L	L	L	4	Y	3
BC3-04	Quakers Hill	Middle Hawkesbury-Nepean	Exfiltration (moderate)	L	L	L	4	Y	3
BC3-06	Quakers Hill	Middle Hawkesbury-Nepean	Exfiltration (moderate)	L	L	L	4	Y	3
BC3-07	Quakers Hill	Middle Hawkesbury-Nepean	Exfiltration (moderate)	L	L	L	4	Y	3
BC3-08	Quakers Hill	Middle Hawkesbury-Nepean	Exfiltration (moderate)	L	L	L	4	Y	3
QH1-01	Quakers Hill	Middle Hawkesbury-Nepean	None	M	L	L	4	Y	3
934020	Round Corner	Middle Hawkesbury-Nepean	Exfiltration (low)	L	L	L	4	Y	3
8ROU09	Rouse Hill	Middle Hawkesbury-Nepean	None	LL	LL	M	4	Y	3
AP412	Shellharbour	Illawarra	Infiltration (moderate)	L	L	L	4	Y	3
BO5-01	St Marys	Middle Hawkesbury-Nepean	None	LL	LL	M	4	Y	3
KW1-01	St Marys	Middle Hawkesbury-Nepean	None	L	LL	M	4	Y	3
LC1-01	St Marys	Middle Hawkesbury-Nepean	None	L	LL	M	4	Y	3
MD3-01	St Marys	Middle Hawkesbury-Nepean	None	LL	LL	M	4	Y	3
OS1-02	St Marys	Middle Hawkesbury-Nepean	None	L	LL	M	4	Y	3
RC1-04	St Marys	Middle Hawkesbury-Nepean	None	LL	LL	M	4	Y	3
ST1-01	St Marys	Middle Hawkesbury-Nepean	I/E Unknown	LL	L	L	4	Y	3
WD1-05	St Marys	Middle Hawkesbury-Nepean	Exfiltration (moderate)	LL	L	L	4	Y	3
TWW10	Warriewood	Sydney Harbour	Infiltration (Low)	LL	LL	M	4	Yes	3
TWW14	Warriewood	Sydney Harbour	Infiltration (Low)	LL	LL	M	4	Yes	3
TWW19	Warriewood	Sydney Harbour	Unknown	L	L	L	4	Yes	3
TWW20	Warriewood	Sydney Harbour	Unknown	L	L	L	4	Yes	3
TWW3	Warriewood	Sydney Harbour	None	L	LL	M	4	Y	3
CA2-05	West Camden	Upper Nepean	None	L	LL	M	4	Y	3
NO1-01	West Hornsby	Lower Hawkesbury	Infiltration (high)	L	L	L	4	Y	3
NO1-07	West Hornsby	Lower Hawkesbury	Exfiltration (moderate)	L	L	L	4	Y	3
NO1-16	West Hornsby	Lower Hawkesbury	Exfiltration (moderate)	L	L	L	4	Y	3
NO1-20	West Hornsby	Lower Hawkesbury	Exfiltration (moderate)	L	L	L	4	Y	3
TG1ML01	West Hornsby	Lower Hawkesbury	Infiltration (low)	LL	LL	M	4	Y	3
TG1ML02	West Hornsby	Lower Hawkesbury	Infiltration (low)	LL	LL	M	4	Y	3
TH1ML40	West Hornsby	Lower Hawkesbury	Exfiltration (moderate)	L	L	L	4	Y	3
WP1-01	West Hornsby	Lower Hawkesbury	Exfiltration (moderate)	L	L	L	4	Y	3

Inflow catchment	System	Geographic Area (GA)	Net Infiltration/ Exfiltration (I/E)1	Percentage Rainfall Ingress2	Leakage Severity3	Choke Frequency4	Initial Priority	Sensitive Area Present5	Final Priority
WP1-01A	West Hornsby	Lower Hawkesbury	Exfiltration (moderate)	L	L	L	4	Y	3
WP1-03	West Hornsby	Lower Hawkesbury	Exfiltration (moderate)	L	L	L	4	Y	3
WO42A	COOS	Georges River	None	LL	LL	M	5	Y	3
TWW2	Warriewood	Sydney Harbour	None	L	LL	L	5	Y	3
TWW8	Warriewood	Sydney Harbour	None	LL	LL	L	5	Y	3
BA94	Bellambi	Illawarra	Unknown	LL	LL	M	4	N	4
CO31	Bellambi	Illawarra	None	LL	LL	M	4	Y	4
MK12	Bellambi	Illawarra	None	LL	LL	M	4	N	4
CC417	Castle Hill	Middle Hawkesbury-Nepean	Exfiltration (moderate)	L	L	L	4	N	4
CH213	Castle Hill	Middle Hawkesbury-Nepean	Exfiltration (moderate)	L	L	L	4	N	4
CH25	Castle Hill	Middle Hawkesbury-Nepean	Exfiltration (moderate)	L	L	L	4	N	4
CR811	Castle Hill	Middle Hawkesbury-Nepean	None	LL	LL	M	4	N	4
CR812	Castle Hill	Middle Hawkesbury-Nepean	None	LL	LL	M	4	N	4
ER32	Castle Hill	Middle Hawkesbury-Nepean	None	LL	LL	M	4	N	4
ER33	Castle Hill	Middle Hawkesbury-Nepean	None	LL	LL	M	4	N	4
GL21	Castle Hill	Middle Hawkesbury-Nepean	I/E Unknown	LL	L	L	4	N	4
GL213	Castle Hill	Middle Hawkesbury-Nepean	None	LL	LL	M	4	N	4
GL28	Castle Hill	Middle Hawkesbury-Nepean	None	LL	LL	M	4	N	4
SPACE	Castle Hill	Middle Hawkesbury-Nepean	None	LL	LL	M	4	N	4
CM22	COOS	Georges River	Infiltration (high)	LL	L	L	4	N	4
LC22	COOS	Georges River	Unknown	LL	L	M	4	N	4
LC23	COOS	Georges River	Infiltration (medium)	L	L	M	4	N	4
ME31	COOS	Georges River	Exfiltration(high)	LL	LL	M	4	N	4
PH12	COOS	Georges River	Infiltration (medium)	LL		M	4	Y	4
SU115	COOS	Georges River	None	LL	LL	M	4	N	4
SU16	COOS	Georges River	Infiltration (medium)	LL	LL	M	4	N	4
BH4-01	Hornsby Heights	Lower Hawkesbury	Exfiltration (moderate)	L	L	L	4	N	4
BH4-03	Hornsby Heights	Lower Hawkesbury	Exfiltration (moderate)	L	L	L	4	N	4
BH4-04	Hornsby Heights	Lower Hawkesbury	Exfiltration (moderate)	L	L	L	4	N	4
BH4-05	Hornsby Heights	Lower Hawkesbury	Exfiltration (moderate)	L	L	L	4	N	4
BH4-06	Hornsby Heights	Lower Hawkesbury	Exfiltration (moderate)	L	L	L	4	N	4
BH4-09	Hornsby Heights	Lower Hawkesbury	Exfiltration (moderate)	L	L	L	4	N	4
MR7-07	Hornsby Heights	Lower Hawkesbury	None	L	LL	M	4	N	4
Bombo	Kiama	Illawarra	Unknown	L	L	Unknown	4	Y	4
SPSX568	Kiama	Illawarra	None	L	LL	L	4	Y	4
11-3	NSOOS	Sydney Harbour	None	L	LL	M	4	N	4

Inflow catchment	System	Geographic Area (GA)	Net Infiltration/ Exfiltration (I/E)1	Percentage Rainfall Ingress2	Leakage Severity3	Choke Frequency4	Initial Priority	Sensitive Area Present5	Final Priority
3270	NSOOS	Sydney Harbour	I/E Unknown	L	LL	L	4	N	4
3380	NSOOS	Sydney Harbour	I/E Unknown	L	L	L	4	N	4
7-3	NSOOS	Sydney Harbour	I/E Unknown	LL	L	L	4	N	4
820016	NSOOS	Sydney Harbour	None	L	LL	M	4	N	4
820019U	NSOOS	Sydney Harbour	I/E Unknown	L	L	L	4	N	4
820173	NSOOS	Sydney Harbour	None	LL	LL	M	4	N	4
820225	NSOOS	Sydney Harbour	None	M	L	L	4	N	4
820235	NSOOS	Sydney Harbour	None	L	LL	M	4	N	4
820250	NSOOS	Sydney Harbour	Exfiltration (moderate)	L	L	L	4	N	4
820350	NSOOS	Sydney Harbour	None	L	LL	M	4	N	4
820549	NSOOS	Sydney Harbour	None	L	LL	M	4	N	4
820579	NSOOS	Sydney Harbour	None	M	L	L	4	N	4
820580	NSOOS	Sydney Harbour	None	M	L	L	4	N	4
820598	NSOOS	Sydney Harbour	None	M	L	L	4	N	4
820634	NSOOS	Sydney Harbour	None	L	LL	M	4	N	4
820751	NSOOS	Sydney Harbour	None	M	L	M	4	N	4
820755	NSOOS	Sydney Harbour	None	L	LL	M	4	N	4
820821	NSOOS	Sydney Harbour	None	L	LL	M	4	N	4
820951	NSOOS	Sydney Harbour	None	L	LL	M	4	N	4
BB2	NSOOS	Sydney Harbour	None	M	L	L	4	N	4
DR3-10	NSOOS	Sydney Harbour	None	M	L	L	4	N	4
EJ1	NSOOS	Sydney Harbour	None	M	L	L	4	N	4
HC2	NSOOS	Sydney Harbour	None	M	L	L	4	N	4
WC10	NSOOS	Sydney Harbour	Exfiltration (low)	L	LL	M	4	N	4
OB305	Penrith	Middle Hawkesbury-Nepean	Exfiltration (moderate)	LL	L	L	4	N	4
SP400	Penrith	Middle Hawkesbury-Nepean	Infiltration (moderate)	LL	LL	M	4	N	4
BE17	Port Kembla	Illawarra	None	L	LL	M	4	N	4
DA26	Port Kembla	Illawarra	None	L	LL	M	4	Y	4
DA29	Port Kembla	Illawarra	None	L	LL	M	4	Y	4
OU110	Port Kembla	Illawarra	Infiltration (high)	L	L	L	4	N	4
MR6-05	Quakers Hill	Middle Hawkesbury-Nepean	None	L	LL	M	4	N	4
942010	Riverstone	Middle Hawkesbury-Nepean	Exfiltration (low)	L	L	L	4	N	4
MD3-10	St Marys	Middle Hawkesbury-Nepean	Exfiltration (low)	LL	LL	M	4	N	4
PR1-07	St Marys	Middle Hawkesbury-Nepean	None	LL	LL	M	4	N	4
ST1-15	St Marys	Middle Hawkesbury-Nepean	Exfiltration (moderate)	L	L	L	4	N	4
02-SAND	SWSOOS	Georges River	Exfiltration (high)	L	L	M	4	N	4
06-MACK	SWSOOS	Georges River	Unknown	L	L	M	4	N	4
802203	SWSOOS	Georges River	None	L	LL	M	4	N	4
802423U	SWSOOS	Georges River	Exfiltration (low)	L		L	4	N	4
802433	SWSOOS	Georges River	Exfiltration (low)	L	L	L	4	N	4
802465	SWSOOS	Georges River	None	M	L	L	4	N	4
802524	SWSOOS	Georges River	Unknown	L	L	L	4	N	4
802535	SWSOOS	Georges River	None	M	L	L	4	N	4

Inflow catchment	System	Geographic Area (GA)	Net Infiltration/ Exfiltration (I/E)1	Percentage Rainfall Ingress2	Leakage Severity3	Choke Frequency4	Initial Priority	Sensitive Area Present5	Final Priority
802681	SWSOOS	Georges River	None	L	LL	M	4	N	4
802940	SWSOOS	Georges River	Infiltration (moderate)	LL	LL	M	4	N	4
809180D	SWSOOS	Georges River	None	L	LL	M	4	N	4
809184	SWSOOS	Georges River	None	L	LL	M	4	N	4
809206	SWSOOS	Georges River	Exfiltration (low)	LL	LL	M	4	N	4
823510	SWSOOS	Georges River	None	LL	LL	M	4	N	4
BL4-01	SWSOOS	Georges River	None	L	LL	M	4	N	4
BR2-06	SWSOOS	Georges River	None	LL	LL	M	4	N	4
CA1-15	SWSOOS	Georges River	Exfiltration (moderate)	L	L	L	4	N	4
CA1-25	SWSOOS	Georges River	Exfiltration (moderate)	L	L	L	4	N	4
CMH406	SWSOOS	Georges River	Unknown	L	L	L	4	Y	4
CR6-10	SWSOOS	Georges River	None	M	L	L	4	N	4
EB303	SWSOOS	Georges River	None	M	L	L	4	N	4
EB309	SWSOOS	Georges River	None	M	L	L	4	N	4
EB312	SWSOOS	Georges River	None	M	L	L	4	N	4
GC1-02	SWSOOS	Georges River	Exfiltration (low)	LL	LL	M	4	N	4
GC1-11	SWSOOS	Georges River	Infiltration (low)	LL	LL	M	4	N	4
GC1-15	SWSOOS	Georges River	Infiltration (low)	LL	LL	M	4	N	4
GC1-19	SWSOOS	Georges River	Infiltration (low)	LL	LL	M	4	N	4
GC1-23	SWSOOS	Georges River	Infiltration (low)	LL	LL	M	4	N	4
GC1-28	SWSOOS	Georges River	None	LL	LL	M	4	N	4
GC1-29	SWSOOS	Georges River	None	LL	LL	M	4	N	4
GC1-31	SWSOOS	Georges River	None	LL	LL	M	4	N	4
GC1-36	SWSOOS	Georges River	None	LL	LL	M	4	N	4
GS2-01	SWSOOS	Georges River	None	L	LL	M	4	N	4
KC2-01	SWSOOS	Georges River	None	L	LL	M	4	N	4
KR3-01	SWSOOS	Georges River	None	M	L	L	4	N	4
LI1-11	SWSOOS	Georges River	None	L	LL	M	4	N	4
LI1-19	SWSOOS	Georges River	None	L	LL	M	4	N	4
RR6-01	SWSOOS	Georges River	None	LL	LL	M	4	N	4
SM1-12	SWSOOS	Georges River	Unknown	L	L	L	4	N	4
SM1-16	SWSOOS	Georges River	Exfiltration (low)	L	L	L	4	N	4
SM1-19	SWSOOS	Georges River	Exfiltration (low)	L	L	L	4	N	4
SM1-22	SWSOOS	Georges River	Exfiltration (low)	L	L	L	4	N	4
T1-FRAN	SWSOOS	Georges River	Unknown	L	L	L	4	N	4
T2-BAKE	SWSOOS	Georges River	Unknown	L	L	L	4	N	4
T2-EXEL	SWSOOS	Georges River	Unknown	L	L	L	4	N	4
T2-RAND	SWSOOS	Georges River	Exfiltration (moderate)	L	L	L	4	N	4
T3-DDB	SWSOOS	Georges River	Infiltration (high)	L	L	L	4	N	4
T3-UDIV	SWSOOS	Georges River	Infiltration (high)	LL	L	M	4	N	4
T3>TENT	SWSOOS	Georges River	Unknown	L	L	L	4	N	4
VI1-01	SWSOOS	Georges River	None	L	LL	M	4	N	4
WE1-06	SWSOOS	Georges River	Unknown	L	L	L	4	N	4

Inflow catchment	System	Geographic Area (GA)	Net Infiltration/ Exfiltration (I/E)1	Percentage Rainfall Ingress2	Leakage Severity3	Choke Frequency4	Initial Priority	Sensitive Area Present5	Final Priority
WE2-09	SWSOOS	Georges River	Unknown	L	L	L	4	N	4
WE2-10A	SWSOOS	Georges River	Infiltration (high)	L	L	L	4	N	4
WE2-11A	SWSOOS	Georges River	Infiltration (high)	L	L	L	4	N	4
WE5-03	SWSOOS	Georges River	None	L	L	M	4	N	4
AC22	Wollongong	Illawarra	None	L	LL	M	4	Y	4
CO28[6]	Wollongong	Illawarra	None	LL	LL	M	4	Y	4
PS19COL	BOOS	Sydney Harbour	None	L	L	L	5	Y	4
WB-203A	BOOS	Sydney Harbour	Infiltration (low)	L	LL	L	5	Y	4
WW-2B4	BOOS	Sydney Harbour	Infiltration (low)	L	L	L	5	Y	4
CC42	Castle Hill	Middle Hawkesbury-Nepean	None	L	LL	L	5	Y	4
CC43	Castle Hill	Middle Hawkesbury-Nepean	None	L	LL	L	5	Y	4
RA511	Castle Hill	Middle Hawkesbury-Nepean	None	L	LL	L	5	Y	4
RA57	Castle Hill	Middle Hawkesbury-Nepean	None	L	LL	L	5	Y	4
RA59	Castle Hill	Middle Hawkesbury-Nepean	None	L	LL	L	5	Y	4
CC1-06	Hornsby Heights	Lower Hawkesbury	None	LL	LL	L	5	Y	4
3120	NSOOS	Sydney Harbour	None	L	LL	L	5	Y	4
820004	NSOOS	Sydney Harbour	I/E Unknown	L	LL	L	5	Y	4
820053	NSOOS	Sydney Harbour	I/E Unknown	LL	LL	M	5	Y	4
820121	NSOOS	Sydney Harbour	Exfiltration (high)	LL	LL	L	5	Y	4
820285	NSOOS	Sydney Harbour	Infiltration (low)	L	LL	L	5	Y	4
820290	NSOOS	Sydney Harbour	None	L	LL	L	5	Y	4
820405	NSOOS	Sydney Harbour	None	L	LL	M	5	Y	4
820597	NSOOS	Sydney Harbour	None	L	LL	L	5	Y	4
820697	NSOOS	Sydney Harbour	None	LL	LL	L	5	Y	4
LAG 6	NSOOS	Sydney Harbour	None	L	LL	L	5	Y	4
SPS-477	NSOOS	Sydney Harbour	None	L	LL	L	5	Y	4
SWC4A	NSOOS	Sydney Harbour	None	L	LL	L	5	Y	4
EP205	Penrith	Middle Hawkesbury-Nepean	None	LL	LL	L	5	Y	4
MP202	Penrith	Middle Hawkesbury-Nepean	None	L	LL	M	5	Y	4
SP404	Penrith	Middle Hawkesbury-Nepean	Infiltration (moderate)	LL	LL	L	5	Y	4
SPSX289	Port Kembla	Illawarra	None	L	LL	L	5	Y	4
SPSX290	Port Kembla	Illawarra	None	L	LL	L	5	Y	4
W134	Port Kembla	Illawarra	None	L	LL	L-	5	Y	4
DO1-01	Quakers Hill	Middle Hawkesbury-Nepean	None	L	LL	L	5	Y	4
EC2-08	Quakers Hill	Middle Hawkesbury-Nepean	Exfiltration (low)	LL	LL	L	5	Y	4
RH1-01	Quakers Hill	Middle Hawkesbury-Nepean	Exfiltration (low)	LL	LL	L	5	Y	4
RH1-02	Quakers Hill	Middle Hawkesbury-Nepean	Exfiltration (low)	LL	LL	L	5	Y	4
RR4-07	Quakers Hill	Middle Hawkesbury-Nepean	Exfiltration (low)	LL	LL	L	5	Y	4
OS1-03	St Marys	Middle Hawkesbury-Nepean	None	L	LL	L	5	Y	4
RC1-14	St Marys	Middle Hawkesbury-Nepean	None	L	LL	L	5	Y	4
RC1-16	St Marys	Middle Hawkesbury-Nepean	None	L	LL	L	5	Y	4
826020	Warriewood	Sydney Harbour	None	LL	LL	L	5	Yes	4
TWW1	Warriewood	Sydney Harbour	None	L	LL	L	5	Yes	4
TWW11	Warriewood	Sydney Harbour	Infiltration (Low)	LL	LL	L	5	Yes	4
TWW13	Warriewood	Sydney Harbour	Infiltration (Low)	LL	LL	L	5	Yes	4
TWW5	Warriewood	Sydney Harbour	None	LL	LL	L	5	Yes	4

Inflow catchment	System	Geographic Area (GA)	Net Infiltration/ Exfiltration (I/E)1	Percentage Rainfall Ingress2	Leakage Severity3	Choke Frequency4	Initial Priority	Sensitive Area Present5	Final Priority
TWW6	Warriewood	Sydney Harbour	None	LL	LL	L	5	Yes	4
TWW7	Warriewood	Lower Hawkesbury	I/E Unknown	L	LL	L	5	Y	4
EN1-01	West Camden	Upper Nepean	None	LL	LL	L	5	Y	4
EN1-02	West Camden	Upper Nepean	None	LL	LL	L	5	Y	4
EN1-06	West Camden	Upper Nepean	None	L	LL	L	5	Y	4
SL11	Bellambi	Illawarra	Infiltration (moderate)	LL	LL	L	5	Y	5
CA4-10	BOOS	Sydney Harbour	Infiltration (low)	L	LL	L	5	N	5
HE11	COOS	Georges River	Exfiltration (medium)	LL	LL	L	5	N	5
EH1-09	Hornsby Heights	Lower Hawkesbury	None	LL	LL	M	5	N	5
SPSX569	Kiama	Illawarra	None	L	LL	M	5	Y	5
820130	NSOOS	Sydney Harbour	None	L	LL	L	5	N	5
820330	NSOOS	Sydney Harbour	None	L	LL	L	5	N	5
820505	NSOOS	Sydney Harbour	None	LL	LL	L	5	N	5
820760	NSOOS	Sydney Harbour	None	L	LL	L	5	N	5
DR3-02	NSOOS	Sydney Harbour	None	L	LL	L	5	N	5
DR5-01	NSOOS	Sydney Harbour	None	L	LL	L	5	N	5
DV121	NSOOS	Sydney Harbour	None	L	LL	M	5	N	5
SWC3	NSOOS	Sydney Harbour	None	L	LL	L	5	N	5
MR6-04	Quakers Hill	Middle Hawkesbury-Nepean	None	L	LL	L	5	N	5
01-TER	SWSOOS	Georges River	None	L	LL	L	5	N	5
802412	SWSOOS	Georges River	None	L	LL	L	5	N	5
802434	SWSOOS	Georges River	None	LL	LL	L	5	N	5
802470	SWSOOS	Georges River	None	L	LL	L	5	N	5
802507	SWSOOS	Georges River	None	L	LL	L	5	N	5
802509	SWSOOS	Georges River	Infiltration (low)	L	LL	L	5	N	5
AA105	SWSOOS	Georges River	Infiltration (low)	L	LL	L	5	N	5
FP1-08	SWSOOS	Georges River	None	LL	LL	L	5	N	5
GC1-14	SWSOOS	Georges River	Infiltration (low)	LL	LL	L	5	N	5
GC1-43	SWSOOS	Georges River	None	LL	LL	M	5	N	5
GC1-46	SWSOOS	Georges River	None	LL	LL	H	5	N	5
HOLS	SWSOOS	Georges River	None	LL	LL	L	5	N	5
LPTW	SWSOOS	Georges River	None	LL	LL	L	5	N	5
PH6-01	SWSOOS	Georges River	Infiltration (low)	L	LL	L	5	N	5
SM1-29	SWSOOS	Georges River	Infiltration (low)	L	LL	L	5	N	5
SM1-32	SWSOOS	Georges River	Infiltration (low)	L	LL	M	5	N	5
WE2-01	SWSOOS	Georges River	None	L	LL	L	5	N	5
WE2-03	SWSOOS	Georges River	None	L	LL	L	5	N	5
WE2-05	SWSOOS	Georges River	None	L	LL	L	5	N	5
TWW12	Warriewood	Sydney Harbour	Infiltration (Low)	LL	LL	L	5	No	5
TWW17	Warriewood	Sydney Harbour	Infiltration (Low)	LL	LL	L	5	Yes	5
TWW7	Warriewood	Sydney Harbour	Unknown	L	LL	L	5	No	5
CR2-06	West Camden	Upper Nepean	None	L	LL	L	5	N	5
CR2-08	West Camden	Upper Nepean	None	L	LL	L	5	N	5
EN1-09	West Camden	Upper Nepean	None	L	LL	L	5	N	5
HD-01	West Camden	Upper Nepean	None	L	LL	L	5	N	5
HD-02	West Camden	Upper Nepean	None	L	LL	L	5	N	5

Inflow catchment	System	Geographic Area (GA)	Net Infiltration/ Exfiltration (I/E)1	Percentage Rainfall Ingress2	Leakage Severity3	Choke Frequency4	Initial Priority	Sensitive Area Present5	Final Priority
HD-03	West Camden	Upper Nepean	None	L	LL	L	5	N	5
HD-04	West Camden	Upper Nepean	None	L	LL	L	5	N	5
HR-03	West Camden	Upper Nepean	None	L	LL	L	5	N	5
BU61	COOS	Georges River	None	L	LL	L	None	Y	None
CM21	COOS	Georges River	None	LL	LL	L	None	N	None
CM23G	COOS	Georges River	None	LL	LL	L	None	Y	None
FC23	COOS	Georges River	None	LL	LL	L	None	Y	None
SPS676	COOS	Georges River	None	LL	LL	L	None	Y	None
SP14434	Wollongong	Illawarra	None	H	M	H	1	N	-
CO27	Wollongong	Illawarra	Exfiltration (moderate)	L	L	M	3	N	-
CI12	Wollongong	Illawarra	Exfiltration (moderate)	L	L	L	4	N	-
BU3-05	SWSOOS	Georges River	None	LL	LL	L	5	N	None

1. Net I/E has been determined using the ratio of Average Dry Weather Flow (ADWF) to Indoor Water Consumption (WC). A ratio > 1 indicates infiltration: ration > 2.0 = Infiltration (high); ratio 1.5 - 2.0 = infiltration (moderate); ratio 1.0-1.5 = infiltration (low). A ratio < 0.8 indicates exfiltration: ratio 0.8-0.7 = Exfiltration (low); ratio 0.7-0.5 = Exfiltration (moderate); ratio < 0.5 = Exfiltration (high). A ratio between 0.8 and 1.0 indicates no I/E (None).
2. Percentage (%) rainfall ingress classification: a) H = high (> 15%); b) M = medium (10-15%); c) L= low (5-10%); d) LL = very low (< 5 %).
3. Leakage severity classification (overlay of net I/E and % rainfall ingress) - a) H = high, b) M = medium, c) L = low, d) LL = very low (see Methods document).
4. Choke frequency classification: Choke density is measured on a suburb basis rather than an inflow catchment basis. The worst performing suburb in each inflow catchment has been used to determine inflow catchment classifications: a) H = high (> 80 chokes per 100 km of sewer); b) M = medium (60-180 chokes per 100 km of sewer); c) L = low (< 60 chokes per 100 km of sewer).
5. Where potential impacts on sensitive areas were considered to be very low, no modifications were made to the initial priority ranking.

Sewerage Overflows Licensing Project
Environmental Impact Statement

Volume 1: Sydney Wide Overview

Appendix H

Criteria review committee report for system and water quality modelling

FINAL REPORT

SEWERAGE OVERFLOWS LICENCING PROJECT (SOLP) - CRITERIA REVIEW COMMITTEE (CRC) FOR MOUSE MODELLING AND WATER QUALITY MONITORING

Prepared for
Sydney Water Corporation

16 December 1997

Woodward-Clyde

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A3300535/0001

Woodward-Clyde

Engineering & sciences applied to the natural and built environment

17 December 1997
Project No. A3300535/0001

Sydney Water
Sewerage Overflows Licencing Project
PO Box A53
SYDNEY SOUTH NSW 2001

Attention: Mr Richard Schuil
Project Manager

Dear Richard,

Subject: Sewerage Overflows Licencing Project (SOLP) - Criteria Review Committee (CRC) for MOUSE Modelling and Water Quality Monitoring - Final Report

The CRCs final report on the above is attached in accordance with your request. One bound copy, one unbound copy and a floppy disc (Microsoft Word 3.1) are provided with this letter. An electronic copy has been forwarded to you and all members of the CRC.

On behalf of all members of the CRC, I wish to thank Sydney Water Corporation for the open and cooperative approach of all of your team. The presentations were of a high standard which enabled the CRC to obtain a good understanding of the SOLP within the short time available.

It is the job of the CRC to be critical. It also is easy to critique in a few days the work undertaken over many months by large teams of people. It is not so easy to provide solutions to the critique. The CRC recognises that our snapshot review has raised several comments and questions. We trust that these comments and questions will be taken as constructive and will result in a better product for the SOLP.

Thank you for the opportunity to be of service for this key project for protection and enhancement of Sydney's waterways.

Yours sincerely,

Allen Gale
CRC Chairperson

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1.1 BACKGROUND

The background to this assignment, as set out in Sydney Water Corporation's letter of invitation to CRC members dated 7 September, 1997, is:

In September 1994, the Sydney Water Corporation applied to the EPA for licences for sewerage overflows. The application process included the preparation and display of EISs. The EISs will include predicted performances of the sewerage systems and impacts on the receiving waters to supplement operational performance information and water quality monitoring information.

The model were developed by the Sydney Water Corporation over a number of years have been previously reviewed by external experts. The most recent CRC review was completed on 5 July 1995.

Since this last review, the models have been significantly advanced and modified. The most noticeable changes have been:

- The development of time series models based on real 10 year time series of rainfall for both sewer MOUSE models and the Water Quality models;
- The development of a Sewage Treatment Plan (STP) model (MOST) designed to optimise the wet weather treatment and storage facilities within the STPs, both for cost and performancc;
- The extension of the water quality models to provide conservative markers for Ecological and Human Health Risk Assessment;
- Improved calibration of water quality models to reflect additional sampling and monitoring data; and
- Development of simplified MOUSE models for the minor sewer systems.

As a part of the quality assurance for the preparation of the sewer overflow EISs, the Overflows Licencing Programme (SOLP) management decided to hold a CRC meeting to allow expert review of the modelling carried out for the project.

1.2 COMPOSITION OF CRC PANEL

The members of the CRC panel were:

- Mr Allen Gale (Chairperson), Operations Manger for Western Australia, Woodward-Clyde, WA;
- Dr Graham Harris, Chief of Division, CSIRO Land and Water, ACT;
- Mr Daniel Large, Numerical Modeller, EPA, NSW;
- Dr Jeppe Nielsen, Director, Nielsen Environmental P/L, NSW;
- Dr Geoffrey O'Loughlin, Director, Anstad P/L, NSW; and
- Dr John Parslow, Research Scientist CSIRO Marine Research, Hobart, Tasmania.

1.3 OBJECTIVE OF ASSIGNMENT

The primary objective of the CRCs assignment, as defined in the letter requesting services from CRC members, was to.... *"ensure that the most recent modelling, which will form a major component of the EISs for sewer overflows has been rigorously developed and will pass scrutiny by the community and the scientific and other professional community who will scrutinise the EISs and the modelling work".*

The CRC sought clarification of this objective in light of notes supplied as part of presentations to the panel. It was confirmed that the objective was to undertake a "strategic planning" level review. This was defined by the CRC as:

> ***"Strategic Planning*** - The initial stages of an evaluation to enable identification of the most appropriate system(s) to meet defined project objectives and for more detailed analysis. Strategic planning does not define the individual components of the system. However, it does identify the general components of the system."
>
> With respect to Sydney Water Corporation's SOLP this was interpreted as meaning:
>
> - Identification of the relative significance of different receiving environment zones;
> - Identification of the broad relationship of costs and sewer system performance (as ARI); and
> - Identification of the broad relative performance of sewer overflows vs catchment inputs and dry weather flows.

It was agreed that it was not a requirement that detailed technical reviews of the models be undertaken.

1.4 REVIEW FRAMEWORK

The review was conducted within the framework of the three principal objectives of Sydney Water, as outlined in the Water Board (Corporation) Act, 1994:

- to be a successful business;
- to protect the environment by conducting operations in accordance with the principles of ecologically sustainable development;
- to protect public health by supplying safe drinking water.

1.5 SCOPE OF WORK

The Scope of Work, as defined in Sydney Water's letter to CRC members dated 7 September, 1997 is set out below. 28 issues requiring evaluation were defined. These 28 issues were rearranged to fit under four categories as follows:

- Appropriateness.
- Technical Adequacy.
- Fit of Results.
- Suitability for Use in the Overflow Licencing Project.

This enabled consolidated responses to be made on the general findings, as many of the issues were related. The issues were:

Appropriateness

i) The appropriateness of using the models for time series modelling.

ii) The appropriateness of the input assumptions for water quality, sewage effluent quality and overflow quality used for the water quality models.

iii) The appropriateness of the rainfall gauge aggregation used for the sewer models and the water quality models.

iv) The appropriateness of assuming that stormwater quality will not improve or reduce by the year 2021.

v) The appropriateness of using the models to predict future conditions in the sewerage systems using predicted population growth and predicted improvements to the system.

vi) The appropriateness of using the models to predict future conditions in the receiving waters.

vii) Where monitoring data for specific sites is unavailable for calibration, the appropriateness of quoting modelling data for existing and future conditions.

viii) The appropriateness of constructing single node models for the minor sewerage systems based on flows gauged at the STP.

ix) The appropriateness of predicting overflows in the above single node models specially when the STP gauge cuts out below peak flow rate.

x) The appropriateness of using MOUSE model options as a strategic planning tool. The options are given randomly variable overflow incidence across the catchment within the required ARI frequency.

xi) The appropriateness of defining system overflow frequency for the large systems on a waterway basis rather than a system wide basis as opposed to a system wide basis for the small systems.

xii) The appropriateness of the definition of the Basecase.

xiii) The appropriateness of the assumptions regarding wet weather treatment and storage at the STP's.

xiv) The appropriateness of the assumptions regarding impacts of settled and disinfected wet weather STP bypass flows on receiving water.

xv) The appropriateness of using conservative tracers which are not able to be calibrated with sampled water quality as a basis for calculating risk using the ERA methodology (it will not be necessary to review ERA methodology itself as this has been separately reviewed).

xvi) The appropriateness of the ecological and human health criteria used as assessors of receiving water quality.

xvii) The appropriateness of the linkages between all the models.

Technical Adequacy

i) The technical accuracy of the output from the MOST model.

ii) The technical accuracy of modifications made to SEEKER to more accurately predict flows at the STP.

iii) The limitations and accuracy of using a conservative tracer to predict concentrations of Schedule 10 chemicals in receiving waters.

iv) The quality of the MOUSE verification reports as a tool for providing goodness of fit of the models.

v) The impact of errors in overflow prediction in the single node models on the water quality models in the Hawkesbury-Nepean River system.

Fit of Results

i) The degree of fit of the models with existing monitored conditions.

Suitability for Use in the Overflow Licensing Project

i) The degree to which comments in the previous Criteria Review Committee Meeting Report have been addressed.

ii) The extent to which the system and STP abatement options address ESD principles.

1.6 MODELS CONSIDERED

The models considered are as set out in Table 1-1.

As indicated in the report from the 1995 CRC, most of the modelling effort is the responsibility of the Utilities Planning Services, part of the Utilities Subsidiary Business of Sydney Water Corporation. Some aspects of the modelling are the responsibility of Water Resources Planning, part of the Transwater Subsidiary Business and Water Quality Studies, part of the Australian Water Technologies (AWT) Subsidiary Business.

Table 1-1

MODELS USED FOR INPUT INTO SEWER OVERFLOWS

Aspect	Component	Model	Responsible Area
Sewerage systems - Single Event and Time Series Analysis	Hydraulic	MOUSE	Utilities Planning Services
		MOUSE-SS (steady state)	Utilities Planning Services
		MOUSEPIPE (dynamic)	Utilities Planning Services
	Dry weather inflow	HYDRO-GEN	Utilities Planning Services
	Wet weather inflow	HYDRO-GEN	Utilities Planning Services
	Hydrology (dry & wet weather)	MOUSENAM	Utilities Planning Services
Stormwater	Hydrologic	HSPF	Water Resources Planning
		AQUALM	Water Quality Studies
Receiving Water Quality	Hydrodynamic and bacterial fate	SALMON-Q	Water Resources Planning
		MIKE-11	Water Quality Studies
		MIKE-12	Water Quality Studies
		MIKE-21	Water Quality Studies
	Hydrodynamic and eutrophication	SALMON-Q	Water Resources Planning
		MIKE-11	Water Quality Studies
Options Analysis	Minimum Cost	SEEKER	Utilities Planning Services
STP Storage/Treatment Optimisation	Minimum Cost	MOST	Utilities Planning Services

Note: Water Quality Studies (AWT, Ensight) are service providers. The models are owned by Sydney Water Corporation. At the conclusion of the current round of modelling the models will be handed back to UPS and Product Planning who will maintain them until a further round of modelling is required. The main areas of technical expertise reside with a number of consultants of whom AWT Ensight is only one.

1.7 MEETING PROCEDURE

The meeting was conducted in accordance with Sydney Water Corporation's "Criteria Review Committee Manual". The meeting was held at Sydney Water Corporation's Head Office, Corner Pitt and Bathurst Streets, Sydney on 15, 16 and 17 October 1997. A copy of the agenda and presenters is presented in Table 1-2.

Table 1-2

AGENDA FOR CRC MEETING ON WATER QUALITY, SEWERAGE AND STP MODELLING

Date:Time	Agenda Topic	Presenter
	Wednesday	
15/10/97:08.30	Purpose of the CRC and expected outcomes of the Overflow Licensing Programme	Colin Heath
15/10/97:09.00	Review of CRC procedures	Andrew Kasmarik
15/10/97:09.10	Overview of all modelling projects and their inter-relationships including questions from the panel.	Andrew Kasmarik
15/10/97:10.10	Overview of QA processes	Steve O'Donoghue
15/10/97:10.30	Question and Answer	Panel
15/10/97:10.40	**Morning Tea**	
15/10/97:11.00	Presentation of MOUSE modelling for the larger sewerage systems including questions from panel	Peter West
15/10/97:13.00	**Lunch**	
15/10/97:14.00	Presentation of MOUSE modelling for minor sewerage systems	Glen McDermott
15/10/97:15.10	Presentation of MOST STP modelling including questions from the panel	Gerald Mullen
15/10/97:16.10	**Afternoon Tea**	
15/10/97:16.20	Completion of MOST modelling and questions from panel	Gerald Mullen
15/10/97:16.35	In camera session by review panel to review the days proceedings	Panel
15/10/97:17.00	End of Day	
	Thursday	
16/10/97:08.30	Introduction to water quality modelling.	Andrew Kasmarik
16/10/97:09.00	Presentation of MIKE and AQUALM water quality modelling including questions from the panel	Rod Kerr
16/10/97:11.00	Morning Tea	
16/10/97:11.30	Presentation of HSPF and SALMON-Q water quality modelling including questions from the panel	Ian Fisher
16/10/97:13.30	**Lunch**	
16/10/97:14.15	Presentation on how WQ modelling has been used for ecological and human health risk assessment	Gary Bickford
16/10/97:15.00	Panel retires for deliberations; questions to modellers are researched and replied to	
	Friday	
17/10/97:08.30	Panel review in camera continues	
17/10/97:14.30	Panel delivers findings of the CRC	Chairman, Allen Gale plus other panel members
17/10/97:16.30	Criteria Review Committee meeting ends	

2.1 FORMAT OF SUMMARY OF FINDINGS

The format is as follows:

- Actions on previous CRCs recommendations;
- General Findings; and
- Responses to Specific Items in Brief.

Several of the specific items have commonality and others require relatively simple responses. The CRC thus took the view that a consolidated response addressing the broader issues was an essential component to provide strategic directions.

The CRC also considered that the starting point of the evaluations should be actions taken on the previous CRCs recommendations.

2.2 ACTIONS ON PREVIOUS CRCs RECOMMENDATIONS

The CRCs comments on the status of each of the recommendations contained in the previous CRCs report is included as Table 2-1. The table is based on a table provided by Sydney Water Corporation. Comments by Sydney Water Corporation have been reproduced in Table 2-1.

The CRC considers that the table supplied by Sydney Water Corporation contained insufficient detail for a meaningful assessment of progress, except for those instances where it was clear that no action has been taken.

While Sydney Water Corporation has addressed integration of the activities at a management level, it is not clear that this has been translated into integration at a technical level. This is indicated by inconsistencies in modelling approaches, and continuing gaps in data for model calibration. There is also a lack of integration between the modelling development and the broader EIS process. The CRC gained the impression that the model results will be delivered to contractors who will carry out the EIS, so that model indicators and model performance standards are established with regard to community consultation and broader environmental objectives.

Table 2-1

CRC No. 1 FINDINGS AND RECOMMENDATIONS

Recommendation	Sydney Water Review Status	CRC Comments
3.1.1.2		
1. *That the objectives and intended output of each model component should be explicitly detailed.*	Each of the current sewer modelling, WQ modelling and MOST reports explicitly states objectives and intended outcomes.	Although objectives and intended outputs are described, the information is not explicit. In particular these should include performance criteria for the models.
3.1.2.2		
2. *That the requirements of Sewer System Overflow EISs should be resolved immediately. In turn, this will enable better definition of the scope of all contributing activities, including modelling.*	SOLP Licensing Update document April 1997 describes overflow project objectives. These project objectives and MOUSE and water quality objectives are consistent.	The CRC did not sight data to support that EIS requirements have been identified in detail, although apparently the relevant documents were available in the CRC meeting room. Model level of accuracy requirements have not been specified.
3. *That coordinated strategic approach be adopted for all studies, including modelling input, to the EIS studies.*	SOLP is integrated into Water Plan 21 (corporate). SOLP modelling is coordinated by Neil Mayo, with technical support by Andrew Kasmarik and Steve O'Donoghue.	While there is evidence of coordination in terms of oversight and management it was not evident that the EIS studies have been coordinated sufficiently at a technical level.
4. *That the position of a Modelling Coordinator (possessing an overall knowledge of the models and their capabilities, ecological risk assessment, and the EIS requirements, especially the need for community understanding), should be established between the modelling teams and Utilities Licensing Programme Manager to facilitate the effective implementation of both modelling activities and Ecological Risk Assessment. The Modelling coordinator would be responsible for ensuring that the EIS process incorporates an appropriate 'risk management' strategy to manage the gap between customer, shareholder and regulator requirements and available information.*	Role of Modelling Coordinator filled by Neil Mayo with Technical Support by A Kasmarik and S O'Donoghue. Ecological Risk Assessment not undertaken for this specific requirement.	A coordinated approach at a technical level was not evident. The coordination appears to be at a project management level. The CRC believes the recommendation for a risk management strategy by the previous CRC referred to an explicit project strategy, rather than a formal Ecological Risk Assessment. This strategy is still required.

Table 2-1 (Continued)

CRC No. 1 FINDINGS AND RECOMMENDATIONS

Recommendation	Sydney Water Review Status	CRC Comments
5. *That the ongoing planning and modelling task should not be used as a reason to defer essential operation and maintenance activities. Projects associated with normal routine core business activities to maintain existing customer service standards should be separated from capital investments in asset improvements resulting in improved levels of service.*	Interim I/E programme, treat/discharge investigation and Northside storage tunnel are examples of on-going essential works. Day to day operation/maintenance responsibility still remains with Regional System Managers. Capital works projects are still proceeding on justified needs basis.	Appears to have commenced, although extent of interim I/E programme remediation activities is now known.
6. *That modelling outputs should focus on activities which are common to a number of increasingly stringent overflow recurrence performance standards. SEEKER, with input from the MOUSE models, provides the ability to do this.*	Detailed time series modelling for sewers and WQ was undertaken only for scenarios considered most likely to be adopted i.e. Basecase, 4 OF events/year, 2 overflow events/year.	In coastal estuaries, future scenarios with 2 and 4 overflow events per year were modelled. In the Hawkesbury-Nepean, future scenarios involving a basecase (current overflow) and zero overflows were modelled. It was argued (reasonably) that, because removal of overflows had no significant environmental effect, there was no point in modelling 2 year and 4 year scenarios in the Hawkesbury-Nepean.
7. *That an effective integration of community involvement in model development and application should be made **now**. An open two-way information dialogue is considered by the CRC to be the best way to ensure an effective EIS process. It is **not** appropriate to **assume** what the community's response will be. The community's feelings must be ascertained through a community involvement programme and the community's views must be integrated into scenario planning and assessment.*	SOLP have a 2 level community involvement process. Stakeholder workshops and Community Reference Group which involves members of the community in review of inputs to the overflows EISs.	There was no evidence that community consultation is at a level appropriate to provide adequate community input (eg the community does not appear to have "signed off" on the set of environmental and performance indicators being used for modelling.

Table 2-1 (Continued)

CRC No. 1 FINDINGS AND RECOMMENDATIONS

Recommendation	Sydney Water Review Status	CRC Comments
8. *That effort must be focussed to obtain an indication of the community's willingness to pay for environmental and public health improvements resulting from overflow abatement strategies. This information is considered by the CRC to be vital to both Sydney Water's decision making process and the NSW Government Pricing Tribunal's deliberation.*	Willingness to pay survey has been undertaken by ACIL/AGB McNair for June EISs and is currently being reviewed using benefit transfer techniques for TimeSeries Modelling output.	Evidence of account being taken of the findings from the survey in the modelling process was not sighted.
3.2.2		
9. *That once the requirements of the Sewer System Overflow EISs are known, project briefs should be developed for all modelling activities, with specifically defined model objectives and outputs.*	Project briefs were developed and are available for each project. System operations personnel have given detailed comments on all reports via the PPK report (B Horton).	The project brief sighted did not have objectives defined in terms of model performance. This is considered a deficiency. The CRC understands that model objectives and output requirements are to be stated in future briefs.
3.3.1.2		
10. *That the current models continue to be used and be modified as appropriate to provide input to the Sewer System Overflow EISs.*	SOLP have continued use of models since July 95 CRC.	Review status comment accepted

Table 2-1 (Continued)

CRC No. 1 FINDINGS AND RECOMMENDATIONS

Recommendation	Sydney Water Review Status	CRC Comments
3.3.2.1		
The CRC believes that there are deficiencies in the existing coverage of the models, when compared to the coverage that is likely to be required for the Sewer System Overflows EISs. Specific deficiencies noted include: *a) no receiving water quality model for the ocean. (The CRC understands this may be provided by other models not reviewed by the Committee).* *b) no receiving water quality models for the following receiving waters:* • *Lake Burragorang* • *Grose River* • *Cattai Creek* • *Pittwater* • *Cowan Creek* • *tributaries of the coastal receiving waters* *c) no catchment or surface runoff models of the catchments draining directly to the ocean or to the waterways listed in (b) above.* *d) limited consideration of moving storm effects*	Model coverage was extended to more waterways. However: • no receiving water quality model for the ocean undertaken; • Lake Burragorang not modelled. Time series considers the effects of real storms.	Eutrophication models have only been developed for Hawkesbury-Nepean, Port Jackson and Georges River. Models also been developed for Grose River, Cattai Creek, Pittwater and Cowan Creek. Coastal waters have not been modelled.
3.3.2.2		
11. That a review be made by the Sewer System Overflow EIS management team to identify the most appropriate means of assessing the magnitude, frequency and constituents of overflows from those systems for which MOUSE models have not been developed.	Minor system single node Time series models have been developed and used in preparation of current overflow EISs.	Review status comment accepted

Table 2-1 (Continued)

CRC No. 1 FINDINGS AND RECOMMENDATIONS

Recommendation	Sydney Water Review Status	CRC Comments
12 *That a review be made by the Sewer System Overflow EIS management team to identify the most appropriate means of assessing the impact of sewage overflows on the waterways listed in Section 3.3.2.1 (a) and (b). If no other appropriate means are identified, the model's coverage needs to be extended to close the identified gaps. The identification of appropriate means of assessment must be based on the nature and extent of available data.*	(a) ocean models not utilised due to likely minor impacts. (b) other waterways except Lake Burragorang were modelled. Overflows from systems draining to Lake Burragorang are considered to be minor. Therefore rather the extent of available data, decision made on basis of extent of impact.	Limited eutrophication and stormwater modelling in some catchments is an issue.
13. *That a review by made by the Sewer System Overflow EIS management team to identify the most appropriate means of assessing the relative contributions of sewage overflows and other major sources of pollution such as Sewerage Treatment Plant discharges and stormwater for the waterways listed in 3.3.2.1 (c). If no other appropriate means are identified, the models' coverage needs to be extended to close the identified gaps. The identification of appropriate means of assessment must be based on the nature and extent of available data.*	Discharge impacts for Hawkesbury Nepean STPs are modelled (both wet and dry weather flows). Stormwater has been included as an input to the AQUALM and HSPF models. Coastal STP discharges not modelled (see 12(a) above).	Review status comment accepted
14. *That the Sewer System Overflow EIS management team review the identified areas of model coverage deficiencies and the nature and extent of available data; and if appropriate commission a suitable monitoring programme to collect field data that can be used for impact assessment at later stages of the overflow licensing programme.*	There is an ongoing SWC monitoring programme (Environmental Indicators). The models are considered appropriate for the current strategic planning purpose.	There appear to be deficiencies in the data supporting the estuarine catchment and water quality modelling which are not being addressed by Sydney Water Corporations monitoring programme. The CRC did not sight any sewer overflow monitoring data and there appears to be inconsistencies in assumed data between catchments. No consideration appears to have been given for variation in overflow quality across and between catchments.

Table 2-1 (Continued)

CRC No. 1 FINDINGS AND RECOMMENDATIONS

Recommendation	Sydney Water Review Status	CRC Comments
3.3.4.2		
15. That increased emphasis be given to modelling quality aspects of sewage overflows. In general, the models being used have water quality capabilities which are not being effectively used to date.	Water quality models now incorporate overflow data from MOUSE modelling.	Sydney Water Corporations response does not address the issue. There was no evidence that the MOUSE models now simulate quality as well as quantity. The CRC considers this to be a serious deficiency.
3.3.4.2		
16. That a re-assessment be made urgently of the need for sewage overflow quality modelling as an extension of the existing MOUSE models, and a more comprehensive collection of sewage overflow quality data be undertaken in order to calibrate the models.	Generic sewage overflow quality data is being used. Present use of event mean concentrations appears to be appropriate.	The CRC considers that actual monitoring data should be obtained and used, particularly to recognise the variable quality of sewage from catchments with differing land uses. This is considered particularly important for future licencing applications.
17. That AQUALM be calibrated for a wider range of gauged catchments to adequately justify its use. In particular, the calibration should aim to cover a range of catchment soil types and land uses.	Generic catchments data is still being used. It gives reasonable results in most locations. In Port Jackson, some development of AQUALM calibration has occurred.	The lack of adequate calibration of AQUALM is still a major source of uncertainty and potential error. More calibration work, along with sensitivity analysis, is warranted.
18. That Water Resources Planning Sub-branch submit to the Utilities Licensing Programme Manager full details of HSPF and SALMON-Q model calibration procedures an outline of results to date. The calibration must address both dry and wet weather conditions. This information, which was not provided to the CRC should be provided to the EIS Project manager before the tendering process commences.	Calibration data for HSPF and SALMON-Q was completed. See Hawkesbury Nepean WQ reports and calibration reports.	The Hawkesbury - Nepean calibration report was obtained at the commencement of the meeting and thus there was insufficient time to review this in detail. This report does not include HSPF calibration/validation. This CRC repeats the request of the initial CRC

Table 2-1 (Continued)

CRC No. 1 FINDINGS AND RECOMMENDATIONS

Recommendation	Sydney Water Review Status	CRC Comments
19. *That the Utilities Licensing Programme Manager obtain full details of the quality assurance and technical and community review activities incorporated in the Ecological Risk assessment programme, which, according to presentations made to the CRC, is a vitally important input component of the EISs. This information should be provided prior to the commencement of the tendering process.*	ERA product of list of chemicals, events/10 years and hours exceedance for 37 ERA sites to be provided. Information on QA, technical and community review activities in the ERA programme was not undertaken.	The CRC does not have sufficient information to address this issue.
3.3.6.2		
20. *That a full outline of the methodology and assumptions involved in converting a recurrence interval based rainfall into a recurrence interval based sewer flow be fully presented in a single, stand alone document.*	Time series of actual rainfall substituted for average recurrence interval events.	Review status comment accepted
3.3.7.2		
21. *That an appropriate core pool of experienced modellers be retained by Sydney Water to ensure the short and long term development and effective utilisation of modelling activities.*	SWC and AWT plan to maintain a group of MOUSE modellers capable of developing the models further during the detailed planning phase as long as the models can demonstrate the use for planning and operations.	Sydney Water Corporations response does not refer to water quality modelling expertise.

Table 2-1 (Continued)

CRC No. 1 FINDINGS AND RECOMMENDATIONS

Recommendation	Sydney Water Review Status	CRC Comments
3.3.8.1 Findings		
*The CRC finds that, in an overall sense, the outputs of the current suite of models are currently **not able** to meet all the Director of Planning's requirements for the Sewer System Overflow EISs. However, the models appear capable of extending their coverage, subject to the availability of the necessary calibration data, to cover most of the requirements.* *The CRCs assessment of the ability of the current output from the suite of models selected to meet the Director's requirements which are reproduced in Annexure B.*	The models have been extended to cover all major waterways.	With the exception of the Georges River and Port Jackson the water quality models currently used for coastal estuaries do not adequately represent nutrient cycling. This particularly applies to exchange of pollutants with sediments and macrophytes.
22. That the coverage and use of the models be extended where appropriate, subject to the availability of calibration data, to cover the EIS requirements.	The models have been extended to cover all major waterways.	The key issue is model uncertainty rather than geographic cover. There appears to be problems with models in some areas such as Pittwater.

2.3 GENERAL FINDINGS

2.3.1 Project Focus and Coordination

The CRC recognises that the extent of work undertaken for the SOLP project in characterising the waterways around Sydney far exceeds that undertaken elsewhere in Australia. The CRC believes that this work potentially provides a strong foundation for cost effective management of sewage overflows into waterways around Sydney providing certain gaps and deficiencies in this effort are addressed. The CRC also recognises that for historical and organisational reasons, the modelling efforts have been divided between different teams for the Hawkesbury-Nepean River and coastal study areas.

The CRC recognises that, because of the urgent demand for the EISs to be completed by early 1998, there was insufficient time to prepare a fully coordinated approach across all catchments. This meant that a decision was made to continue with the data and model already available.

Although the work undertaken has been considerable, the CRC does not consider that it has been adequately focussed and the variations in presentations and approaches across catchments are indicative of insufficient technical coordination of the various groups undertaking the work. There are continuing inconsistencies among sewer, catchment and receiving water models in spatial and temporal resolution, quality of data for calibration and validation and representation of in-water processes.

The CRC considers that the work has been driven more by the available model capabilities than by an analysis of the EIS needs and their translation into model performance specifications. At this stage in the project, the managers should review the EIS requirements and future project directions, and establish clearly defined outputs and performance targets. The modelling reports should be required to demonstrate that these targets are met.

It may well be appropriate to set difference performance targets, requiring different levels of investment in data and modelling, in different catchments. This should be based on an explicit assessment of environmental significance and risk.

2.3.2 Strategic Issues

Two issues which have a major impact on the approach taken with modelling are the basis on which the environmental requirements are defined and the environmental indicators used. With respect to the basis used, it is the CRCs opinion that the modelling and required outcomes should be driven by meeting receiving water quality requirements. The use of indicators such as the number of swimming days per year and number of boating days per year is not considered to be an environmentally sensitive approach unless they are related to bacteriological and other indicator requirements for use of waterways.

It appears that the approach has been driven by engineering solutions working from the catchment down rather than from the receiving water back into the catchments. As a performance measure, especially for eutrophication and ecosystem impacts, days exceedance may be either overly sensitive or insensitive to management actions, depending on the thresholds set and the frequency distribution of predicted indicator levels. Thus, the CRC considers that it would be more appropriate to use more environmentally rigorous measures of environmental improvement and to use these receiving water quality parameters to establish

the type and extent of management systems required in the catchment to achieve receiving water objectives.

A focus on environmental quality objectives in receiving waters, and the integrated catchment management required to achieve them, might lead to quite different conclusions for the SOLP project and Sydney Water Corporation. For example, it is probable that sewer overflows at some locations within catchments have much larger environmental impacts than at other locations, yet the SEEKER optimisation and the whole SOLP strategy is based on catchment-wide event frequencies. In many catchments, conclusions about impacts of changing overflow frequencies are critically dependent on assumed stormwater quality. Where stormwater quality is poor, overflows have only marginal impact. A focus on setting and achieving environmental objectives in receiving waters could lead to catchment management for improved stormwater quality and, consequently, to different conclusions about the need to reduce overflows.

Specific issues with environmental indicators are:

- a common core of environmental indicators has not been established;
- the new ANZECC guidelines (to be published in the near future) have not been addressed. These need to be addressed;
- for Port Hacking, the impacts of anoxia in deep sections of the port have not been taken into account;
- the appropriate spatial scales for measurement and prediction of impacts in receiving water have not been specifically identified. It is implicitly assumed that the spatial resolution of the receiving water quality models is adequate. This may not be true, especially for recreational use and human health; and
- justification for the selection and relevance of indicators must be provided.

There was some difficulty in clarifying the definitions and differences between "events" versus "incidences". The definitions provided by Sydney Water Corporation presenters were:

- *"Events:*
  - *if one overflow operates in the whole system and does not stop for more than 24 hours, this is an event (for all except NSOOS SWSOOS).*
  - *When one overflow operates in a receiving water catchment (RWC) for NSOOS and SWSOOS. Each RWC is treated as a whole sewerage system.*
- *Incidences: Where one overflow location operates in the system".*

Although events may be satisfactory for strategic planning purposes, the use of incidences for more detailed evaluations in the future may be more relevant. This is because communities are as concerned with the occurrence of localised incidences as with larger events across the catchment.

2.3.3 Quality of Overflow Data

The predicted receiving water quality depends on both predicted overflow quantity and quality, and the predicted stormwater quantity and quality. These obviously depend on rainfall and, to allow for variability in rainfall, a standard decade 1985-94 was used as a benchmark for the overflow impact modelling. The CRC agrees with this approach.

Another key assumption has been that the quality of future overflows will be the same as those for the decade 1985-1994. This has been based on the assumption that impacts of increased population densities will be offset by improved water quality management procedures in catchments. The CRC supports this general approach. However, it is recommended that, for sites/catchments of significance, the sensitivity of water quality impacts to changing stormwater quantity and quality, both higher and lower, be evaluated.

The issue of sensitivity to changing input data and the need to assess the impacts applies to all aspects of the modelling.

It is also recommended that a means to assess the possible implications of temporal and spatial variability of quality and quantity of overflow data across the various systems be developed. The CRC recognises that the work required for this task could be considerable and therefore the approach may be to select particular sites/catchments of significance.

An example of differences in data used by different groups undertaking the work in different catchments is the concentration of phosphorus in overflows of 4.0 mg/L for the Hawkesbury-Nepean versus 2.2 mg/L for Port Jackson. The CRC considers this difference is extremely important because:

- it highlights the apparent lack of coordination between modelling groups; and
- phosphorus levels are a key parameter for ecological management and the differences may have a significant impact on the findings from the modelling.

The water quality modelling apparently has been based on generic sewer overflow data. The CRC considers that it is important that the validity of these data be tested against measured discharge and characteristics. Therefore, it is recommended that a pilot overflow discharge/characterisation monitoring programme be undertaken for a few selected sites.

2.3.4 Quality of Models

The previous CRC indicated that the current models should continue to be used and be modified as appropriate to provide input into the sewer system overflow EISs. That CRC then outlined a number of issues that needed to be addressed regarding model coverage, water quality aspects, model data and assumptions, degree of fit of the model results and ability to meet EIS requirements. This CRC has not attempted to review the details of the models. Rather, the appropriateness for future applications was addressed. Comments for each of the various types of models are set out in Table 2 -2.

Conclusions from the review of the models are:

1. there is insufficient assessment of the performance of the models in that:
   - there is no rigorous methodology for acceptance or rejection of calibration results;
   - there is a need to assess the sensitivity of environmental indicators and management conclusions to model assumptions and prediction errors.
2. For strategic planning purposes the models enable decisions to be made once:
   - performance standards for models necessary to meet strategic planning purposes have been defined; and
   - validation of performance needs has been undertaken.

3. The models need further development of quantitative information to judge their adequacy for EIS purposes. The performance measures of the number of swimming/boating days should be supported by more sensitive parameters, related to ANZECC guidelines.
4. The models may still not be sufficiently reliable for licensing purposes, even after addressing the above. Model performance criteria for licensing purposes need to be defined and agreed with regulatory agencies.
5. There is no statistical basis established for assessing model performance. Given the use of exceedence thresholds, the CRC recommends the statistical comparison of predicted and observed cumulative frequency distributions for the environmental indicators.

Table 2-2

APPROPRIATENESS OF MODELS FOR FUTURE APPLICATIONS

Model Type	Comments
Catchment Models, particularly AQUALM	1. Assurances in the various reports of good calibration of models are not supported by real data (e.g. plots observed versus predicted show a wide [in the order of 3 times] variation). 2. There are no event volume/event load comparisons. Claims that large discrepancies in predicted and observed concentrations are due to small timing errors should be tested by comparing predicted and observed event volumes and loads. 3. There has been no attempt to validate predicted total loads (stormwater plus overflows) from subcatchments against observations. 4. Data for catchment calibration verification is inadequate. 5. The validity of daily time series linear interpolation is not established.
Receiving Water Quality Models	1. The CRC does not consider the current modelling of DIN and DIP as conservative traces in coastal systems to be appropriate. 2. The model for the Pittwater system has not been dynamically calibrated. 3. There is no allowance for dry weather pollution for the Middle Harbour system. 4. The spatial resolution for all models for assessing environmental quality has not been identified. Inadequate model spatial resolution could lead to underestimation of impacts. 5. SALMON-Q does not include the impacts of macrophytes on water quality, although this is not a significant issue at the strategic planning stage.
Options Analysis Models - SEEKER	SEEKER has undergone updates and improvements since the initial CRC. The improvements relate mainly to a correction factor to allow for routing through catchments. The CRC believes that this correction factor, although not rigorous, provides improvements to the performance of SEEKER. The CRC also believes that the model is suitable for use as a strategic planning tool when used in conjunction with MOUSE. However, it should not be used for detailed design of system engineering.
Options Analysis Models - MOST	MOST is a simple spreadsheet model used for optimisation of storage and disinfection requirements for sewage treatment plants. The model appears to be a useful and adequate tool in selecting the best storage and disinfection options.
Sewerage System Models - MOUSE, MOUSENAM	The MOUSE suite of models is considered to be suitable for future applications.

2.3.5 Model Calibration

The CRC found that the calibration of models was very unevenly addressed, and no formal, consistent statistical treatments or performance criteria were used.

In the case of the sewer overflow models, it seems likely that the model performance is quite good, and there were suggestions that predicted and observed overflow volumes may agree to within 10 to 20%. This level of performance was achieved in comparison of predicted and observed event volumes arriving at STPs. However, the predicted flows at intermediate system gauges in large systems have not been retained, and there has been no statistical assessment of prediction errors in event volumes at these gauging points. A comparison of this type would add considerably to confidence in overflow predictions.

There is clearly inadequate data to fully calibrate coastal catchment models, and it seems likely that model errors, at least in comparisons of predicted and observed instantaneous loads are very large (factor of 3 or more), and likely to include both 'noise' and consistent bias in particular catchments. The noise component might be reduced in comparison of predicted and observed event volumes and loads, but this needs to be demonstrated. The CRC was assured that the HSPF catchment models used in the Hawkesbury-Nepean are better calibrated, but no calibration/validation results were provided.

The receiving water quality models have been calibrated and validated qualitatively, using visual comparisons of predicted and observed time series. Levels of agreement varied widely. Poor agreement in some cases was attributed to timing errors which may not affect management conclusions, but this has not been demonstrated. Given the threshold exceedance approach used for environmental assessment, the key performance test for these models is their ability to reproduce the observed cumulative frequency distribution of indicators. These comparisons should be carried out for all receiving water quality models and data. Provided the time series of observations sample sufficient events, these comparisons should not be too sensitive to small time lag errors.

2.4 RESPONSES TO SPECIFIC QUESTIONS

The following summarises the CRCs findings and recommendations on the 28 specific issues in the scope of work. The issues have been reordered under the headings of:

- Appropriateness;
- Technical Adequacy;
- Fit of Results; and
- Suitability for Use in the Overflow Licensing Project.

2.4.1 Appropriateness

I. The appropriateness of using the models for time series.

The models are considered appropriate for time series. This was established in the initial CRC. However, calibration of HSPF using 10 years of data may be difficult.

II. The appropriateness of input assumptions for water quality, sewage effluent quality and overflow quality used for the water quality models.

This item is addressed in three parts:

- stormwater - there are limited data across catchments, with most being based on a single point in the catchment, or even outside the catchment. However, uncertainties are inherent in all stormwater modelling and the approaches used for this project appear to be as good as anywhere in Australia.
- sewage effluent quality - apart from the Hawkesbury-Nepean catchment, the data are not based on field measurements and there are inconsistencies across catchments (e.g. the differences in total P between the Hawkesbury-Nepean and the coastal catchments).
- overflow quality - there is insufficient data as the overflow quality has not been widely measured in the field. Some overflows have been monitored by Sydney Water Corporation, although these data were not sighted by the CRC.

The above comments on data should not hold up the strategic planning process being undertaken by Sydney Water Corporation, but the CRC considers that there is a need to urgently assess the impacts of these uncertainties on water quality predictions.

III. The appropriateness of the rainfall gauge aggregation used for the sewer models and the water quality models.

The CRC considers that this approach is appropriate.

IV. The appropriateness of assuming that stormwater quality will not improve or reduce by the Year 2021.

The CRC understands the approach taken by Sydney Water Corporation that the effects of increased population density will be offset by improved catchment management. Many of the conclusions from the modelling are critically dependant on these data and a sensitivity analysis of both higher and lower stormwater quality needs to be undertaken.

V. The appropriateness of using the models to predict future conditions in the sewerage systems using predicted population growth and predicted improvements to the system.

The CRC considers that this approach is appropriate.

VI. The appropriateness of using the models to predict future conditions in the receiving waters.

The approach is considered appropriate for strategic planning purposes. However, the use of water quality models for other purposes, such as license monitoring or reporting is considered to be appropriate only if the points raised in Sections 2.3.4 and 2.3.5 are addressed satisfactorily. The basis for the initial decision (time constraints and background history) is recognised but Sydney Water Corporation needs to critically review the applicability of the models for present and future uses (both short and long term). The outcomes from this review must be carried forward to the EIS process.

VII. Where monitoring data for specific sites is unavailable for calibration the appropriateness of quoting modelling data for existing and future conditions.

The CRC understands that this item relates specifically to Port Kembla. It is considered that the approach is satisfactory for strategic planning purposes, but better model validation is required for future purposes.

VIII. ***The appropriateness of constructing single node models for the minor sewerage systems based on flows gauged at the STP.***

The approach is considered acceptable for the purpose of strategic planning for the minor systems. However, for more detailed analysis in the future, there is a need to assess whether additional nodes are warranted.

The CRC considers that the methodology and rigour of statistical analysis undertaken for minor sewerage systems is better than for major systems. This is probably due to a need to limit the degree of uncertainty with minor sewerage systems.

IX. ***The appropriateness of predicting overflows in the above single node models, especially when the STP gauge cuts out below peak flow rate.***

There appears to be no other choice. The approach should be satisfactory in the light of analysis experience in other systems.

X. ***The appropriateness of using MOUSE model options as a strategic planning tool. The options are given randomly variably overflow incidence across the catchment within the required ARI frequency.***

MOUSE is considered an appropriate model for strategic planning purposes. The use of randomly variable overflow incidence within ARI is considered acceptable for strategic level of assessment. However, it is not considered acceptable for more detailed assessments. For more detailed analysis, consideration should be given to using time and location-based incidents rather than overall catchment events.

XI. ***The appropriateness of defining system overflow frequency for the large systems on a waterway basis rather than a system-wide basis as opposed to a system-wide basis for the small systems.***

Definition of system overflow frequency on a waterway basis is considered appropriate for the large systems as the environmental impacts on the waterway drive the requirements for overflow management. There may be more than one waterway in the larger systems and the quality of the waterway may vary. For smaller systems, this is not likely to be the case and, therefore, the system-wide basis is considered appropriate for the smaller systems.

XII. ***The appropriateness of the definition of the Basecase.***

The concept appears reasonable.

XIII ***The appropriateness of the assumptions regarding wet weather treatment and storage at the STPs.***

The assumptions appear to be appropriate and are considered to be an advance on current industry standards.

XIV ***The appropriateness of the assumptions regarding impacts of settled and disinfected wet weather STP bypass flows on receiving waters.***

The CRC understands that the intent of this item is to confirm that faecal coliform concentrations is the only issue of significance. The assumptions are considered appropriate in view of the considerable dilution under wet weather conditions.

XV ***The appropriateness of using conservative tracers which are not able to be calibrated with sampled water quality as a basis for calculating risk using the ERA methodology (it will not be necessary to review ERA methodology itself as this has been separately reviewed).***

The use of conservative tracers is considered appropriate providing they are to be used for screening of toxicants. However:

- the approach does not address accumulations in sediments; and
- one-dimensional transport models may over-estimate dilution in the vicinity of inputs by assuming instantaneous cross-stream mixing.

XVI ***The appropriateness of the ecological and human health criteria used as assessors of receiving water quality.***

The human health criteria are considered to be appropriate. The ecological health indicators (e.g. number of swimming/boating days/year) are not considered to be appropriate, as discussed in Section 2.3.2 above.

It should be noted that the CRC did not sight a list of the schedule 10 toxicants assessed.

XVII ***The appropriateness of linkages between all the models.***

The linkages are not considered to be appropriate. This relates primarily to the lack of matching time steps and the appropriate time steps for the various models. This applies particularly to time step mismatches between catchment models and water quality models. Other issues are:

- there is no assessment of the propagation of assumptions and errors through the models; and
- cumulative conservatism in approach for the various steps in the modelling process and its impacts on the findings.

2.4.2 Technical Adequacy

I. ***The quality of the MOUSE options report in describing the 2021 scenarios.***

The quality is considered adequate. The CRC believes that the MOUSE models are likely to yield accurate estimates of overflow volume (although this has not been confirmed directly).

II. ***The water quality modelling supports the above assumptions [regarding wet weather storage at STPs and wet weather bypasses on receiving water].***

It is the CRCs understanding that this item refers only to the Hawkesbury-Nepean system as this is the only system in which wet weather bypasses occur from STPs.

On the assumption that the water quality models prove to be adequate, then the water quality modelling is seen as supporting the above assumptions. However, a firm conclusion cannot be made until the adequacy of the model is established.

III. ***The technical accuracy of the outputs obtained from the models.***

The response to this item is prefaced on the assumption that technical accuracy of the models has not been fully quantified. It is the CRCs opinion that the MOUSE modelling is adequate. However, the CRC has reservations about the adequacy of the water quality models, as discussed previously.

IV. The technical accuracy of the output from the MOST model.

The MOST model is considered to be technically accurate.

V. The technical accuracy of modifications made to SEEKER to more accurately predict flows at the STP.

The CRC considers that it was not given sufficient information to fully address this item. Although the principles upon which the model has been based appear to be satisfactory, the CRC did not see evidence to verify its technical accuracy.

VI. The limitations and accuracy of using a conservative tracer to predict concentrations of schedule ten chemicals in receiving waters.

This issue has been addressed under XV in Section 2.4.1.

VII. The quality of the MOUSE verification reports as a tool for providing goodness of fit of the models.

As discussed previously, overflow volumes are not measured directly and the verification reports do not directly compare predicted and observed event flows at intermediate gauges near overflows. This should be done.

VIII. The impact of errors in overflow prediction in the single node models on the water quality models in the Hawkesbury-Nepean river system.

The CRC does not consider it was given sufficient information to enable a decision to be made on this item.

2.4.3 Fit of Results

I. The degree of fit of the models with existing monitored conditions.

The response to this item is made on a model by model basis as follows:

- MOUSE/MOUSENAM - Good;
- MOST - Not an issue;
- AQUALM - Questionable (refer to Table 2-2). Note that calibration plots were not provided to the CRC, having been reviewed by the previous CRC;
- HSPF - The CRC was not shown verification results for HSPF; and
- Water Quality - Questionable (refer to Table 2-2). MIKE models and ERA hydrodynamics are acceptable but the input to the models appear to be of poor quality. Data on degree of fit for SALMON-Q was provided during the CRC meeting, but it was not reviewed sufficiently to enable comments to be made.

2.4.4 Suitability for Use in the Overflow Licensing Project

I. The degree to which comments in the previous criteria review committee meeting report have been addressed.

The specific details are presented in Table 2-1 above. The general conclusion is that many of the recommendations have received superficial attention.

II. The extent to which the system and STP abatement options address ESD principles.

The definitions of ESD vary widely. However, the important aspects are to ensure that economics and environment are accounted for. This appears to have been done adequately. The following are more specific comments:

- social equity - similar standards have been applied across all catchments which is equitable, but the extent of improvements is not equitable. This raises the issue of which of these two factors should be used in arriving at the preferred solutions;
- intergenerational equity - this requires continuous improvement in data accumulation and modelling. This should be achieved by passing on to future generations the continuous improvement by EPA etc;
- precautionary principle - the apparent conservatism in the modelling supports this principle. There is a need to continually review models and to update data to support this precautionary principle in the longer term;
- resource use and minimisation - cost analyses appear to account for these factors;
- population increase - planning should offset impacts of increasing population;
- impacts on natural environment - the models need to describe the impacts comprehensively.

Table H-1: List of actions resulting from CRC report

ACTION	RESPONSIBLE PERSON	DATE
Action 1:.Accuracy of models will be determined by the statistical review of model accuracy to be undertaken for Sydney Water Corporation by an independent consultant	A. Kasmarik	30/6/98
Action 2:.Short term: carry out sensitivity analysis assuming different stormwater quality in a trial catchment eg Port Jackson	A. Kasmarik	30 May 1998
Action 3:.Long term: Sydney Water Corporation to review the catchment models in the light of accuracy assessment. Assess the future approach for quantification of stormwater loads and shifts in stormwater quality leading up to 2021	R. Keesen	30 June 1998
Action 4:. Data on measured quality of sewage will be presented in a sewage overflow report.	R. Keesen	30 June 1998
Action 5:.The impact of uncertainty of sewage quality on water predictions will be analysed after the review of accuracy and the production of the sewage quality report, if the Sydney Water Corporation considers it necessary. The need for review will be based on variations in sewage quality and the results of the accuracy analysis.	C. Heath	1 July 1998
Action 6: .Carry out an analysis using existing stormwater data to establish correlation between stormwater quality and suspected exfiltrating catchments. Look for evidence of a connection between exfiltration and reduced stormwater quality. If non exfiltrating catchments have better water quality than exfiltrating catchments we can obtain an indication of potential benefits in dry weather of I/E rehabilitation A sensitivity analysis of stormwater quality in the receiving environment will use the results of this action. See action 2.	S. O'Donoghue	30 June 1998
Action 7: Consider the need to begin sampling and analysis in Port Kembla Harbour on the basis of system licences if models need to be calibrated.	C. Heath	Negotiation with EPA
Action 8: Sydney Water Corporation will construct multi node models for the minor systems as required for system licences.	C. Heath	Dec 98
Action 9:.Robust linkages between the water quality and sewerage system models will need to be developed. The importance of these linkages will be determined by the review of accuracy in Action 1. These issues plus others and their effect on accuracy will be incorporated in subsequent modifications to models to achieve improved performance standards.	A. Kasmarik	Dec 1999
Action 10 During the next stage of planning, Sydney Water Corporation will need to ensure engineering judgement is applied to SEEKER solutions to ensure solutions achieve all operational requirements as well as being lowest cost solutions	C. Heath	After Dec 98
Action 11: An expert modelling coordinator will be provided on a project basis to oversee level of consistency at a technical level. This process will address consistency issues for each new project	Clients and project managers of future modelling	project basis
Action 12:. Continue the existing I/E programmes	C. Heath	Ongoing

ACTION	RESPONSIBLE PERSON	DATE
Action 13 A screening exercise will be carried out, using monitoring data to assess which unmodelled waterways are significantly impacted by eutrophication and hence require further investigation. The need for further modelling will then be based upon system management need, demands of the regulator and community comments on the SOLP EISs.	C. Heath	Dec 1998
Action 14:The full extent of sewage quality data available will be collated and presented in a report. Variation in overflow quality will be collated and presented in a report as part of Action 5	R. Keesen	June 98
Action 15: Sydney Water Corporation will assess the need to model quality of sewage based on the analysis of monitoring data and the sensitivity of receiving waters to variations on quality of sewage overflows.	C. Heath	Dec 98
Action 16: Sydney Water Corporation will negotiate with the EPA on an adequate level of monitoring	C. Heath	Negotiation with EPA
Action 17: Calibration reports will be provided to SOLP for HSPF and SALMONQ as a part of the final modelling report.	A. Kasmarik	30 March 1998
Action 18: Product Planning will supply QA program to SOLP for the ERA projects.	R. Keesen	30 April 1998
Action 19: Modelling needs will be reviewed as a part of the licensing process. The need for integration with long term measuring and reporting will be assessed	C. Heath	December 1998

Table H-2: Issues from CRC held September 1997

Issue	CRC Recommendation	Sydney Water Corporation proposed responses/actions	Responsible person	Date
Appropriateness				
I. The appropriateness of using the models for time series.	The models are considered appropriate for time series. This was established in the initial CRC. However, calibration of HSPF using 10 years of data may be difficult.	Action 1:.Accuracy of models will be addressed by the statistical review of model accuracy to be undertaken for Sydney Water Corporation by an independent consultant	A. Kasmarik	30/6/98
II. The appropriateness of input assumptions for water quality, sewage effluent quality and overflow quality used for the water quality models.	This item is addressed in three parts: stormwater - there are limited data across catchments, with most being based on a single point in the catchment, or even outside the catchment. However, uncertainties are inherent in all stormwater modelling and the approaches used for this project appear to be as good as anywhere in Australia.	Action 2:.Short term: carry out sensitivity analysis assuming different stormwater quality in a trial catchment eg Port Jackson	A. Kasmarik	30 May 1998
		Action 3:.Long term: Sydney Water Corporation to review the catchment models in the light of accuracy assessment. Assess the future approach for quantification of stormwater loads and shifts in stormwater quality leading up to 2021	R. Keesen	30 June 1998
	sewage effluent quality - apart from the Hawkesbury-Nepean catchment, the data are not based on field measurements and there are inconsistencies across catchments (eg. the differences in total P between the Hawkesbury-Nepean and the coastal catchments).	Response: The term effluent appears to deal with overflow quality. The CRCs comment on consistency will be addressed in future projects. See action 12	R. Keesen	30 June 1998
	overflow quality - there is insufficient data as the overflow quality has not been widely measured in the field. Some overflows have been monitored by Sydney Water Corporation, although these data were not sighted by the CRC.	Action 4:. Data on measured quality of sewage will be presented in a sewage overflow report.	C. Heath	1 July 1998

Issue	CRC Recommendation	Sydney Water Corporation proposed responses/actions	Responsible person	Date
	The above comments on data should not hold up the strategic planning process being undertaken by Sydney Water Corporation, but the CRC considers that there is a need to urgently assess the impacts of these uncertainties on water quality predictions.	Action 5:.The impact of uncertainty of sewage quality on water predictions will be analysed after the review of accuracy and the production of the sewage quality report, if the Sydney Water Corporation considers it necessary. The need for review will be based on variations in sewage quality and the results of the accuracy analysis.		
III. The appropriateness of the rainfall gauge aggregation used for the sewer models and the water quality models.	The CRC considers that this approach is appropriate.	Response: Sydney Water Corporation considers the current approach is adequate for strategic planning.		
IV. The appropriateness of assuming that stormwater quality will not improve or reduce by the Year 2021.	The CRC understands the approach taken by Sydney Water Corporation that the effects of increased population density will be offset by improved catchment management. Many of the conclusions from the modelling are critically dependant on these data and a sensitivity analysis of both higher and lower stormwater quality needs to be undertaken.	Refer to Issue II (stormwater) Action 6: .Carry out an analysis using existing stormwater data to establish correlation between stormwater quality and suspected exfiltrating catchments. Look for evidence of a connection between exfiltration and reduced stormwater quality. If non exfiltrating catchments have better water quality than exfiltrating catchments we can obtain an indication of potential benefits in dry weather of I/E rehabilitation A sensitivity analysis of stormwater quality in the receiving environment will use the results of this action. See action 2.	S O'Donoghue	30 June 1998
V. The appropriateness of using the models to predict future conditions in the sewerage systems using predicted population growth and predicted improvements to the system.	The CRC considers that this approach is appropriate.	Response: Present action is considered adequate.		

Issue	CRC Recommendation	Sydney Water Corporation proposed responses/actions	Responsible person	Date
VI. The appropriateness of using the models to predict future conditions in the receiving waters.	The approach is considered appropriate for strategic planning purposes. However, the use of water quality models for other purposes, such as license monitoring or reporting is considered to be appropriate only if the points raised in Sections 2.3.4 and 2.3.5 are addressed satisfactorily. The basis for the initial decision (time constraints and background history) is recognised but Sydney Water Corporation needs to critically review the applicability of the models for present and future uses (both short and long term). The outcomes from this review must be carried forward to the EIS process.	Response: The CRC comments are accepted and actions are being taken to address Section 2.3.4 and 2.3.5. The review of accuracy will determine the acceptability of the current models and their applicability to measurement and reporting for system licences.		
VII. Where monitoring data for specific sites is unavailable for calibration the appropriateness of quoting modelling data for existing and future conditions.	The CRC understands that this item relates specifically to Port Kembla. It is considered that the approach is satisfactory for strategic planning purposes, but better model validation is required for future purposes.	Response: Present method of constructing the model is considered adequate for strategic purposes. Action 7 Consider the need to begin sampling and analysis in Port Kembla Harbour on the basis of system licences if models need to be calibrated.	C. Heath	Negotiation with EPA
VIII. The appropriateness of constructing single node models for the minor sewerage systems based on flows gauged at the STP.	The approach is considered acceptable for the purpose of strategic planning for the minor systems. However, for more detailed analysis in the future, there is a need to assess whether additional nodes are warranted. The CRC considers that the methodology and rigour of statistical analysis undertaken for minor sewerage systems is better than for major systems. This is probably due to a need to limit the degree of uncertainty with minor sewerage systems.	Response: Present method of constructing the model is considered adequate for strategic purposes. Action 8: Sydney Water Corporation will construct multi node models for the minor systems as required for system licences.	C. Heath	Dec 98
IX. The appropriateness of predicting overflows in the above single node models, especially when the STP gauge cuts out below peak flow rate.	There appears to be no other choice. The approach should be satisfactory in the light of analysis experience in other systems.	Response: Present method of constructing the model is considered adequate for strategic purposes.		
X. The appropriateness of using MOUSE model options as a strategic planning tool. The	MOUSE is considered an appropriate model for strategic planning purposes. The use of randomly variable overflow incidence within ARI is considered acceptable for strategic level of assessment.	Response: In the next stage of planning, Sydney Water Corporation will consider event frequency and volume at individual overflow locations. The current method is considered adequate for		

Issue	CRC Recommendation	Sydney Water Corporation proposed responses/actions	Responsible person	Date
options are given randomly variably overflow incidence across the catchment within the required ARI frequency.	However, it is not considered acceptable for more detailed assessments. For more detailed analysis, consideration should be given to using time and location-based incidents rather than overall catchment events.	strategic planning purposes.		
XI. The appropriateness of defining system overflow frequency for the large systems on a waterway basis rather than a system-wide basis as opposed to a system-wide basis for the small systems.	Definition of system overflow frequency on a waterway basis is considered appropriate for the large systems as the environmental impacts on the waterway drive the requirements for overflow management. There may be more than one waterway in the larger systems and the quality of the waterway may vary. For smaller systems, this is not likely to be the case and, therefore, the system-wide basis is considered appropriate for the smaller systems.	Response: The current method is considered adequate.		
XII. The appropriateness of the definition of the Basecase.	The concept appears reasonable.	Response: The current method is considered adequate.		
XII The appropriateness of the assumptions regarding wet weather treatment and storage at the STPs.	The assumptions appear to be appropriate and are considered to be an advance on current industry standards.	Response: The current method is considered adequate.		
XIV The appropriateness of the assumptions regarding impacts of settled and disinfected wet weather STP bypass flows on receiving waters.	The CRC understands that the intent of this item is to confirm that faecal coliform concentrations is the only issue of significance. The assumptions are considered appropriate in view of the considerable dilution under wet weather conditions.	Response: The current method is considered adequate.		
XV The appropriateness of	The use of conservative tracers is considered appropriate providing	Response: The models were not used to assess sediment toxicity.		

Issue	CRC Recommendation	Sydney Water Corporation proposed responses/actions	Responsible person	Date
using conservative tracers which are not able to be calibrated with sampled water quality as a basis for calculating risk using the ERA methodology (it will not be necessary to review ERA methodology itself as this has been separately reviewed).	they are to be used for screening of toxicants. However: the approach does not address accumulations in sediments; and one-dimensional transport models may over-estimate dilution in the vicinity of inputs by assuming instantaneous cross-stream mixing.	Toxicity of sediments was addressed by direct measurement of sediment samples. Far field models were used to assess average concentrations of contaminants. It is acknowledged that these models do not take into account localised impacts at the point of discharge. Localised impacts are assessed qualitatively in the EISs. Further quantitative localised assessment is not considered necessary for the current strategic studies.		
XVI The appropriateness of the ecological and human health criteria used as assessors of receiving water quality.	The human health criteria are considered to be appropriate. The ecological health indicators (eg. number of swimming/boating days/year) are not considered to be appropriate, as discussed in Section 2.3.2 above. It should be noted that the CRC did not sight a list of the schedule 10 toxicants assessed.	Response: The question was intended to refer to swimmability and eutrophication, not ERA. Response: 150 cfu/100mL is a recognised world wide standard Sydney Water Corporation interpretation is more sensitive than reporting on the 50%ile or the 80%ile which are likely to show no change for any option Some improvement might be demonstrated above the 95%ile or 99%ile but these are not recognised standards. *There is some evidence to suggest that exposure to faecals above 1000 cfu/100mL, increases the risk of becoming ill so a risk based methodology could be used however, at this time, Sydney Water Corporation will continue to use the "days exceeding criteria" analysis.*		
XVII The appropriateness of linkages between all the models.	The linkages are not considered to be appropriate. This relates primarily to the lack of matching time steps and the appropriate time steps for the various models. This applies particularly to time step mismatches between catchment models and water quality models. Other issues are: there is no assessment of the propagation of assumptions and errors through the models; and	Action 9:.Robust linkages between the water quality and sewerage system models will need to be developed. The importance of these linkages will be determined by the review of accuracy in Action 1. (Investigation of linkages will include reference to the Water Research Centre UK. Their local contact is Robert Carr of Lawson and Treloar.) These issues plus others and their effect on accuracy will be incorporated in subsequent modifications to models to achieve	A. Kasmarik	Dec 1999

Issue	CRC Recommendation	Sydney Water Corporation proposed responses/actions	Responsible person	Date
	cumulative conservatism in approach for the various steps in the modelling process and its impacts on the findings.	improved performance standards.		
Technical Adequacy				
I. The quality of the MOUSE options report in describing the 2021 scenarios.	The quality is considered adequate. The CRC believes that the MOUSE models are likely to yield accurate estimates of overflow volume (although this has not been confirmed directly).	Response: The review of statistical accuracy of the models in Action 1 will result in calculation of model accuracy. This will aid management in assessing accuracy requirements for future modelling		
II. The water quality modelling supports the above assumptions [regarding wet weather storage at STPs and wet weather bypasses on receiving water].	It is the CRCs understanding that this item refers only to the Hawkesbury-Nepean system as this is the only system in which wet weather bypasses occur from STPs. On the assumption that the water quality models prove to be adequate, then the water quality modelling is seen as supporting the above assumptions. However, a firm conclusion cannot be made until the adequacy of the model is established.	Response: The CRC found no reason to dispute the findings based on models, provided the statistical review of model accuracy is completed.		
III. The technical accuracy of the outputs obtained from the models.	The response to this item is prefaced on the assumption that technical accuracy of the models has not been fully quantified. It is the CRCs opinion that the MOUSE modelling is adequate. However, the CRC has reservations about the adequacy of the water quality models, as discussed previously.	Response: The CRC comments are accepted and full quantification of model accuracy will be provided as part of Action 1.		
IV. The technical accuracy of the output from the MOST model.	The MOST model is considered to be technically accurate.	Response: The present model is considered adequate	C. Heath	Dec 1998
V. The technical accuracy of modifications made to SEEKER to more accurately predict flows at the STP.	The CRC considers that it was not given sufficient information to fully address this item. Although the principles upon which the model has been based appear to be satisfactory, the CRC did not see evidence to verify its technical accuracy.	Response: The present model is considered adequate Action 10 During the next stage of planning, Sydney Water		

Issue	CRC Recommendation	Sydney Water Corporation proposed responses/actions	Responsible person	Date
		Corporation will need to ensure engineering judgement is applied to SEEKER solutions to ensure solutions achieve all operational requirements as well as being lowest cost solutions	C. Heath	After Dec 98
VI. The limitations and accuracy of using a conservative tracer to predict concentrations of schedule ten chemicals in receiving waters.	This issue has been addressed under XV in Section 2.4.1.	Response: Refer to response in same item		
VII. The quality of the MOUSE verification reports as a tool for providing goodness of fit of the models.	As discussed previously, overflow volumes are not measured directly and the verification reports do not directly compare predicted and observed event flows at intermediate gauges near overflows. This should be done.	Response: Accuracy of models will be addressed under Action 1 above Where gauges are not available at overflows, verification checks will be made at gauges nearby as a surrogate for the overflow. Verification of accuracy will also occur at other gauge locations not necessarily near overflows.		
VIII. The impact of errors in overflow prediction in the single node models on the water quality models in the Hawkesbury-Nepean river system.	The CRC does not consider it was given sufficient information to enable a decision to be made on this item.	Response: Accuracy of models will be addressed under Action 1 above If the water quality models are found to be statistically accurate, then the assumptions re single node models will have been found to be adequate.		
Fit of Results				
I. The degree of fit of the models with existing monitored conditions.	The response to this item is made on a model by model basis as follows: MOUSE/MOUSENAM - Good; MOST - Not an issue; AQUALM - Questionable (refer to Table 2-2). Note that calibration plots were not provided to the CRC, having been reviewed by the	Response: The CRC is indicating that they have insufficient information to make a definitive statement. Proposed Actions 1, 2 and 3 will provide sufficient information to decide adequacy of the models. Inputs to the models are a part of the review. To address the specific concerns on inputs, the statistical review will also cover accuracy of inputs.		

Issue	CRC Recommendation	Sydney Water Corporation proposed responses/actions	Responsible person	Date
	previous CRC; HSPF - The CRC was not shown verification results for HSPF; and Water Quality - Questionable (refer to Table 2-2). MIKE models and ERA hydrodynamics are acceptable but the input to the models appear to be of poor quality. Data on degree of fit for SALMON-Q was provided during the CRC meeting, but it was not reviewed sufficiently to enable comments to be made.			
Suitability for Use in the Overflow Licensing Project				
I. The degree to which comments in the previous criteria review committee meeting report have been addressed.	The specific details are presented in Table 2-1 above. The general conclusion is that many of the recommendations have received superficial attention.	Response: Comments which previously appeared to have received superficial attention will be addressed as part of the proposed actions.		
II. The extent to which the system and STP abatement options address ESD principles.	The definitions of ESD vary widely. However, the important aspects are to ensure that economics and environment are accounted for. This appears to have been done adequately. The following are more specific comments: social equity - similar standards have been applied across all catchments which is equitable, but the extent of improvements is not equitable. This raises the issue of which of these two factors should be used in arriving at the preferred solutions; intergenerational equity - this requires continuous improvement in data accumulation and modelling. This should be achieved by passing on to future generations the continuous improvement by EPA etc; precautionary principle - the apparent conservatism in the modelling supports this principle. There is a need to continually review models and to update data to support this precautionary principle in the	Response: Sydney Water Corporation will continue to develop and improve the models on a project basis so that impacts can be more comprehensively described. Impacts on the environment are also monitored by direct measurement and reported annually in the Annual Environment Report.		

Issue	CRC Recommendation	Sydney Water Corporation proposed responses/actions	Responsible person	Date
	longer term; resource use and minimisation - cost analyses appear to account for these factors; population increase - planning should offset impacts of increasing population; impacts on natural environment - the models need to describe the impacts comprehensively.			

Table H-3: Issues from previous CRC dated October 1995

Issue	Sept 97 CRC Recommendation	Sydney Water Corporation proposed response/actions.	Responsible. Person	Date
CRC NO 1 FINDINGS AND RECOMMENDATIONS Table 2.1				
3.1.1.2				
1. That the objectives and intended output of each model component should be explicitly detailed.	Although objectives and intended outputs are described, the information is not explicit. In particular these should include performance criteria for the models.	Response: Agreed. Future projects will require explicit objectives and definition of intended outputs . Action: See action 12 for future projects		
3.1.2.2				
2. That the requirements of Sewer System Overflow EISs should be resolved immediately. In turn, this will enable better definition of the scope of all contributing activities, including modelling.	The CRC did not sight data to support that EIS requirements have been identified in detail, although apparently the relevant documents were available in the CRC meeting room. Model level of accuracy requirements have not been specified.	Response: No formal project requirements were set by SOLP. However individual project briefs were prepared for each modelling project and signed off by the Programme Manager SOLP. Comments on model accuracy are noted and requirements for future projects will be specified. Action see action 1 and Action 12.		
3. That coordinated strategic approach be adopted for all studies, including modelling input, to the EIS studies.	While there is evidence of coordination in terms of oversight and management it was not evident that the EIS studies have been coordinated sufficiently at a technical level.	Response: At the commencement of the modelling in Sydney Water Corporation, the Clean Waterways Consultancy provided technical overview of modelling. This overview allowed the modelling of the Hawkesbury Nepean to differ in approach tot he coastal catchment modelling. Action 11: An expert modelling coordinator will be provided on a project basis to oversee level of consistency at a technical level. This process will address consistency issues for each new project	Clients and project managers of future modelling	On a project basis

Issue	Sept 97 CRC Recommendation	Sydney Water Corporation proposed response/actions.	Responsible. Person	Date
4. That the position of a Modelling Coordinator (possessing an overall knowledge of the models and their capabilities, ecological risk assessment, and the EIS requirements, especially the need for community understanding), should be established between the modelling teams and Utilities Licensing Programme Manager to facilitate the effective implementation of both modelling activities and Ecological Risk Assessment. The Modelling coordinator would be responsible for ensuring that the EIS process incorporates an appropriate 'risk management' strategy to manage the gap between customer, shareholder and regulator requirements and available information.	A coordinated approach at a technical level was not evident. The coordination appears to be at a project management level. The CRC believes the recommendation for a risk management strategy by the previous CRC referred to an explicit project strategy, rather than a formal Ecological Risk Assessment. This strategy is still required.	Action 11: An expert modelling coordinator will be provided on a project basis to oversee level of consistency at a technical level. This process will address consistency issues for each new project Response: An analysis of risk is required in response to the accuracy and sensitivity studies. Action: See action 12		
5. That the ongoing planning and modelling task should not be used as a reason to defer essential operation and maintenance activities. Projects associated with normal routine core business activities to maintain existing customer service standards should be separated from capital investments in asset improvements resulting in improved levels of service.	Appears to have commenced, although extent of interim I/E programme remediation activities is now known.	Response: Several activities are under way. The I/E program was not included in the scope of this CRC. Action 12: Continue the existing I/E programmes		Ongoing
6. That modelling outputs should focus on activities which are common to a number of increasingly stringent overflow recurrence performance standards. SEEKER, with input from the MOUSE models, provides the ability to do this.	In coastal estuaries, future scenarios with 2 and 4 overflow events per year were modelled. In the Hawkesbury-Nepean, future scenarios involving a basecase (current overflow) and zero overflows were modelled. It was argued (reasonably) that, because removal of overflows had no significant environmental effect, there was no point in modelling 2 year and 4 year scenarios in the Hawkesbury-Nepean.	Response: Sydney Water Corporation considers the CRC comments adequately addressed		
7. That an effective integration of community involvement in model development and application should be made now. An open two-way	There was no evidence that community consultation is at a level appropriate to provide adequate community input (eg the community does not appear to have "signed off" on the set of	Response: Community consultation has occurred with community reference groups. The issue of endorsement of performance indicators has not been specifically addressed		

Issue	Sept 97 CRC Recommendation	Sydney Water Corporation proposed response/actions.	Responsible. Person	Date
information dialogue is considered by the CRC to be the best way to ensure an effective EIS process. It is not appropriate to assume what the community's response will be. The community's feelings must be ascertained through a community involvement programme and the community's views must be integrated into scenario planning and assessment.	environmental and performance indicators being used for modelling.	but the indicators in use have been accepted by the community groups for over two years.		
Recommendation	**CRC Comments**			
8. That effort must be focussed to obtain an indication of the community's willingness to pay for environmental and public health improvements resulting from overflow abatement strategies. This information is considered by the CRC to be vital to both Sydney Water's decision making process and the NSW Government Pricing Tribunal's deliberation.	Evidence of account being taken of the findings from the survey in the modelling process was not sighted.	Response: Sydney Water Corporation has completed a willingness to pay for overflow abatement options. The study results will be included in the EIS documents as part of the economic evaluation of options.		
3.2.2				
9. That once the requirements of the Sewer System Overflow EISs are known, project briefs should be developed for all modelling activities, with specifically defined model objectives and outputs.	The project brief sighted did not have objectives defined in terms of model performance. This is considered a deficiency. The CRC understands that model objectives and output requirements are to be stated in future briefs.	Response: The comment is agreed with. Future projects will include model objectives and output requirements		
3.3.1.2				
10. That the current models continue to be used and be modified as appropriate to provide input to the Sewer System Overflow EISs.	Review status comment accepted	Response: Time constraints limited the capability to modify the models for the EISs. They were adequate for the current strategic purposes. Action: See action 3,20		
3.3.2.1				

Issue	Sept 97 CRC Recommendation	Sydney Water Corporation proposed response/actions.	Responsible. Person	Date
The CRC believes that there are deficiencies in the existing coverage of the models, when compared to the coverage that is likely to be required for the Sewer System Overflows EISs. Specific deficiencies noted include: a) no receiving water quality model for the ocean. (The CRC understands this may be provided by other models not reviewed by the Committee). b) no receiving water quality models for the following receiving waters: Lake Burragorang Grose River Cattai Creek Pittwater Cowan Creek tributaries of the coastal receiving waters c) no catchment or surface runoff models of the catchments draining directly to the ocean or to the waterways listed in (b) above. d) limited consideration of moving storm effects	Eutrophication models have only been developed for Hawkesbury-Nepean, Port Jackson and Georges River. Models also been developed for Grose River, Cattai Creek, Pittwater and Cowan Creek. Coastal waters have not been modelled.	Response: There is a need to consider whether existing coverage of the models is adequate. Future modelling will be used to demonstrate licence compliance and improvements in performance. Action 13 :. A screening exercise will be carried out, using monitoring data to assess which unmodelled waterways are significantly impacted by eutrophication and hence require further investigation. The need for further modelling will then be based upon system management need, demands of the regulator and community comments on the SOLP EISs.	C. Heath	Dec 1998
3.3.2.2				
11. That a review be made by the Sewer System Overflow EIS management team to identify the most appropriate means of assessing the magnitude, frequency and constituents of overflows from those systems for which MOUSE models have	Review status comment accepted	Response: Future requirements for modelling will be determined by licences. The current method of assessing overflow performance using single node models, is adequate.		

Issue	Sept 97 CRC Recommendation	Sydney Water Corporation proposed response/actions.	Responsible. Person	Date
not been developed.				
12 That a review be made by the Sewer System Overflow EIS management team to identify the most appropriate means of assessing the impact of sewage overflows on the waterways listed in Section 3.3.2.1 (a) and (b). If no other appropriate means are identified, the model's coverage needs to be extended to close the identified gaps. The identification of appropriate means of assessment must be based on the nature and extent of available data.	Limited eutrophication and stormwater modelling in some catchments is an issue.	Response: Comment endorsed Action: See action 14 For stormwater, see action 2		
13. That a review by made by the Sewer System Overflow EIS management team to identify the most appropriate means of assessing the relative contributions of sewage overflows and other major sources of pollution such as Sewerage Treatment Plant discharges and stormwater for the waterways listed in 3.3.2.1 (c). If no other appropriate means are identified, the models' coverage needs to be extended to close the identified gaps. The identification of appropriate means of assessment must be based on the nature and extent of available data.	Review status comment accepted	Response: Comment endorsed Action: See action 11 For stormwater, see action 2		
14. That the Sewer System Overflow EIS management team review the identified areas of model coverage deficiencies and the nature and extent of available data; and if appropriate commission a suitable monitoring programme to collect field data that can be used for impact assessment at later stages of the overflow licensing programme.	There appear to be deficiencies in the data supporting the estuarine catchment and water quality modelling which are not being addressed by Sydney Water Corporations monitoring programme. The CRC did not sight any sewer overflow monitoring data and there appears to be inconsistencies in assumed data between catchments. No consideration appears to have been given for variation in overflow quality across and between catchments.	Response: Sydney Water Corporation considers that the CRC was not given the opportunity to review all the water quality data available. Sydney Water Corporation considers the data to be extensive and suitable for modelling applications. Action 14:The full extent of sewage quality data available will be collated and presented in a report. Variation in overflow quality will be collated and presented in a report as part of Action 5		

Issue	Sept 97 CRC Recommendation	Sydney Water Corporation proposed response/actions.	Responsible. Person	Date
			R. Keesen	June 98
3.3.4.2				
15. That increased emphasis be given to modelling quality aspects of sewage overflows. In general, the models being used have water quality capabilities which are not being effectively used to date.	Sydney Water Corporations response does not address the issue. There was no evidence that the MOUSE models now simulate quality as well as quantity. The CRC considers this to be a serious deficiency.	Response: Sydney Water Corporation models do not address sewage quality in the sewerage pipes. Action 15: Sydney Water Corporation will assess the need to model quality of sewage based on the analysis of monitoring data and the sensitivity of receiving waters to variations on quality of sewage overflows.	C. Heath	Dec 98
3.3.4.2				
16. That a re-assessment be made urgently of the need for sewage overflow quality modelling as an extension of the existing MOUSE models, and a more comprehensive collection of sewage overflow quality data be undertaken in order to calibrate the models.	The CRC considers that actual monitoring data should be obtained and used, particularly to recognise the variable quality of sewage from catchments with differing land uses. This is considered particularly important for future licensing applications.	Action: see action 6. Action 16: Sydney Water Corporation will negotiate with the EPA on an adequate level of monitoring	C. Heath	After EISs
17. That AQUALM be calibrated for a wider range of gauged catchments to adequately justify its use. In particular, the calibration should aim to cover a range of catchment soil types and land uses.	The lack of adequate calibration of AQUALM is still a major source of uncertainty and potential error. More calibration work, along with sensitivity analysis, is warranted.	Response: CRC comments are agreed with. Future projects will be addressed as a part of action 1 and action 2.		
18. That Water Resources Planning Sub-branch submit to the Utilities Licensing Programme Manager full details of HSPF and SALMON-Q model calibration procedures an outline of results to date. The calibration must address both dry and wet weather conditions. This information, which was not provided to the CRC should be provided to the EIS Project manager before the tendering process commences.	The Hawkesbury - Nepean calibration report was obtained at the commencement of the meeting and thus there was insufficient time to review this in detail. This report does not include HSPF calibration/validation. This CRC repeats the request of the initial CRC	Action 17: Calibration reports will be provided to SOLP for HSPF and SALMONQ as a part of the final modelling report.	A. Kasmarik	Negotiation with EPA
Recommendation	**CRC Comments**			

Issue	Sept 97 CRC Recommendation	Sydney Water Corporation proposed response/actions.	Responsible. Person	Date
19. That the Utilities Licensing Programme Manager obtain full details of the quality assurance and technical and community review activities incorporated in the Ecological Risk assessment programme, which, according to presentations made to the CRC, is a vitally important input component of the EISs. This information should be provided prior to the commencement of the tendering process.	The CRC does not have sufficient information to address this issue.	Action 18: Product Planning will supply QA program to SOLP for the ERA projects.	R. Keesen	30 April 1998
3.3.6.2				
20. That a full outline of the methodology and assumptions involved in converting a recurrence interval based rainfall into a recurrence interval based sewer flow be fully presented in a single, stand alone document.	Review status comment accepted	Response: The time series verification reports are considered adequate.		
3.3.7.2				
21. That an appropriate core pool of experienced modellers be retained by Sydney Water to ensure the short and long term development and effective utilisation of modelling activities.	Sydney Water Corporations response does not refer to water quality modelling expertise.	Response: Modelling teams are created and disbanded depending upon project needs. Presently, MOUSE sewerage system models are being maintained by System Services Utilities. Expertise for Water Quality modelling resides in AWT Ensight. Action 19: Modelling needs will be reviewed as a part of the licensing process. The need for integration with long term measuring and reporting will be assessed	C. Heath	December 1998
3.3.8.1 Findings				
The CRC finds that, in an overall sense, the outputs of the current suite of models are currently not able to meet all the Director of Planning's requirements	With the exception of the Georges River and Port Jackson the water quality models currently used for coastal estuaries do not adequately represent nutrient cycling. This particularly	Response: Sydney Water Corporation agrees with the CRC comments and future projects will be addressed as a part of actions 1, 2, 11		

Issue	Sept 97 CRC Recommendation	Sydney Water Corporation proposed response/actions.	Responsible. Person	Date
for the Sewer System Overflow EISs. However, the models appear capable of extending their coverage, subject to the availability of the necessary calibration data, to cover most of the requirements. The CRCs assessment of the ability of the current output from the suite of models selected to meet the Director's requirements which are reproduced in Annexure B.	applies to exchange of pollutants with sediments and macrophytes.			
22. That the coverage and use of the models be extended where appropriate, subject to the availability of calibration data, to cover the EIS requirements.	The key issue is model uncertainty rather than geographic cover. There appears to be problems with models in some areas such as Pittwater.	Response: The uncertainty issue will be addressed in Action 1		

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Appendix I

Economic and financial data

Summary of cost estimates

The preferred options for the abatement of sewerage overflow impacts are developed by incorporating a combination of strategies both technical and operational. Currently, the EIS's have solutions for containment of dry weather and wet weather overflows. The following table gives an estimate figure of the unit costs for inclusion in the SOLP EISs.

Strategy	Estimate Cost
Wet Weather Overflow Containment Levels	Provided by SEEKER model
Exfiltration per subcatchment	"High" to "Low" = $3.25M "Medium" to "Low" = $2.25M
SPS Failures	$600,000
Chokes per suburb	"High" to "Low" = $2.2M "Medium" to "Low" = $1.5M
STP Upgrades	Provided by MOST Model
Odours	No cost associated

Explanations for these cost estimates follow.

The following strategies for the preferred option are those items which will be included as part of the Sewerage Overflow Licensing Project that are over and above the normal operations expenditure of sewerage systems.

Wet Weather overflows

Wet weather overflow costings have been predicted by SEEKER in the Time Series Modelling. Contractors should use this information as the basis for the costs of their proposed wet weather option. The SEEKER information is included in the Strategic Options For Overflow Abatement - Using Ten Years Time Series Modelling.

Exfiltration

The interim I/E Program is currently budgeted at $112M. There is an approximate cost of $4million per sub-catchment for projects already on the I/E programme.

However, each contractor has been issued with the Sewerage Leakage Analysis Reports, which contain the information on which sub-catchments have High, Medium or Low leakage likelihood's.

As exfiltration rehabilitation would involve basically relining and/or grouting, and, assuming that only 50% of the sub catchment would need rehabilitating, the following estimates can be used:

medium exfiltration subcatchments would need only grouting, at an approximate cost of $90/m.

high exfiltration subcatchments would require relining at a cost of $130/m.

the average length of sewers of a sub-catchment has been calculated at 50km.

Therefore, to reduce "high" exfiltration sub-catchments to "low", the cost would be approximately $3.25M per sub-catchment. To reduce "medium" exfiltration sub-catchments to "low" would cost

approximately $2.25M per sub-catchment. These costs would include preliminary assessment (including water quality monitoring) of the sub-catchment to determine the actual severity of exfiltration.

SPS failures.

Some SPS costings have been calculated into the wet weather SEEKER costs. However, these costs should not be included as SPS upgrade costs because the costs are for increased pump rates which are part of the wet weather costs. They do not include increasing storage at the SPS.

The upgrade of SPSs will range between each SPS in work required and the costs. For the purpose of these EISs, an average cost has been estimated at $600,000 per SPS.

Therefore, for each SPS upgrade, regardless of size and work required, the cost will be $600,000 until further investigation has been completed on the individual SPSs in the second generation EIA.

Chokes

As choke rehabilitation would involve the same work as exfiltration rehabilitation, it has been estimated that:

medium choke suburbs would need only grouting, at an approximate cost of $90/m and we should assume that only 50% of the suburb would require rehabilitation.

high choke suburbs would require relining at a cost of $130/m and we should assume that only 50% of the suburb would require rehabilitation.

the average length of sewers (meters) in a Sydney Suburb has been calculated at 34km.

Therefore, to reduce "high" choke suburbs to "low", the cost would be approximately $2.2M per suburb. To reduce "medium" choke suburbs to "low" would cost approximately $1.5M per suburb.

STP Upgrades

Wet Weather treatment at STPs have been calculated by the MOST model. Contractors have been issued the MOST STP Reports and figures quoted in these reports, for the selected containment level, and option (either storage, disinfection or storage and disinfection) should be used.

Odours

Odours have not been costed as a separate item as the above solutions will lead to reduced odours and costs are embedded in normal system maintenance.

Improved operational and management practices within normal operating expenditure may include:

improved operations and management practices

improved reporting systems

additional water quality monitoring

additional wastewater modelling

Table I-1: Summary of economic evaluation for preferred wet weather abatement strategy

Geographic Area	REZ (1) and wet weather abatement strategy	Present Value Total Costs ($M)	Present Value of Total Benefits ($M)	Net Present Value ($M) (2)	Willingness to Pay (WTP) per household per year($)	Benefit Cost Ratio	Internal Rate of Return
Blue Mountains	Blue Mountains/ Lake Burragorang (10 events/10yrs)	$56.5	$108.2	51.7	$4.12	1.91	15.7%
Upper Nepean	Upper Nepean River/ Warragamba Nepean (basecase)	$17.7	$29.5	$11.8	$1.12	1.67	13.5%
Middle Hawkesbury	Lower Nepean River/ Hawkesbury River (20 events/10yrs)	$33.1	$28.1	($5.0)	$1.07	0.85	5.3%
	HN Tributaries - South Creek/ Cattai Creek (20 events/10yrs)	$77.0	$69.8	($7.2)	$2.66	0.91	6%
Lower Hawkesbury	Lower Hawkesbury - Berowra Creek/ Cowan Creek (basecase)	$22.6	$30.4	$7.7	$1.16	1.34	10.5%
Sydney Harbour and	Parramatta River - fresh & estuarine (40 events/10yrs)	$108.8	$117.7	$8.9	$4.48	1.08	7.9%
Northern Beaches	Lane Cove River - fresh & estuarine (40 events/10yrs)	$101.4	$137.2	$35.8	$5.22	1.35	10.6%
	Sydney Harbour (20 events/10yrs)	$369.1	$174.6	($194.6)	$6.65	0.47	0.2%
	Northside storage tunnel	$241.9	$273.4	$31.5			
	Northern Beaches & Lagoons (20 events/10yrs)	$32.1	$74.8	$42.7	$2.85	2.33	19.2%
Georges River and	Upper Georges River (40 events/10yrs)	$14.8	$54.5	$39.7	$2.07	3.68	30.1%
Southern Beaches	Central Georges River (40 events/10yrs)	$112.6	$110.5	($2.1)	$4.21	0.98	6.8%
	Lower Georges River (40 events/10yrs)	$13.9	$72.2	$58.2	$2.75	5.18	41.9%
	Cooks River (40 events/10yrs)	$201.8	$111.9	($89.8)	$4.26	0.55	1.5%
	Port Hacking (40 events/10yrs)	$2.0	$10.3	$8.3	$0.39	5.23	42.3%
	Southern Sydney Beaches (basecase)	n/a	n/a	n/a	n/a	n/a	n/a
Illawarra	Illawarra inland - Lake Illawarra/ Port Kembla and Minamurra River (40 events/10yrs)	$55.8	$59.5	$3.6	$2.26	1.07	7.7%
	Illawarra Beaches (40 events/10yrs)	$34.8	$37.6	$2.8	$1.43	1.08	7.9%

Notes: (1) REZs aggregated for the economic evaluation; (2) NPV using 7% discount rate

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Appendix J

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