

Surface Water and Groundwater Environmental Management Plan for Sydney's Desalination Plant



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Section 0 Introduction

0.1 Purpose

The purpose of this Surface Water and Groundwater Environmental Management Plan (SWGWMP) is to describe how Veolia Water Australia (Veolia) proposes to manage surface water and groundwater at Sydney's Desalination Plant during its operation and maintenance phase to minimise impacts on ecology and water quality in accordance with MCoA 4.6c.

The SWGWMP has been developed to fulfil the requirements of relevant legislative, specific Project Approvals, the Operate and Maintain (O&M) Contract and relevant Ministers Conditions of Approval (MCoA) and Statement of Commitments (SoC) as detailed in Table 1 Compliance Obligations

0.2 Scope

This SWGWMP is applicable to all Veolia activities at the Sydney Desalination Plant.

In particular, the SWGWMP has been prepared to address the compliance obligations set out in the MCoA and SoC for the Sydney Desalination Plant along with applicable legislation as detailed in Section 4.

This document includes details on:

- potential impacts to surface water and groundwater
- the management and mitigation measures relating to surface water and groundwater impacts
- erosion and sediment controls in the event of temporary construction works on site

It should be noted that the SWGWMP does not address the impacts and management of the discharge of seawater concentrate from the Sydney Desalination Plant. This issue is addressed in the Marine Water Quality and Ecosystem Management Plan MAN-9674.

0.3 Definitions/Abbreviations

DECCW/DPIE	NSW Department of Environment, Climate Change and Water (formerly DECC) now incorporated in DPIE
DEWHA	Department of Environment, Water, Heritage and the Arts (Formerly DEH)
DPIE	NSW Department of Planning Industry and Environment (formerly Department of Infrastructure, Planning and Natural Resources)
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan (Section 14 of IBMS)
EMS	Environmental Management System (See IBMS)
EPA	Environment Protection Authority (DECCW)
EPL	Environment Protection Licence
EMSR	Environmental Management System Representative
IBMS	VEOLIA's Integrated Business Management System
I&I	Industry and Investment NSW (formerly DPI)
ISO	International Organisation for Standardisation
JSEA	Job Safety Environmental Analysis
MCoA	Ministers Conditions of Approval
NPWS	National Parks and Wildlife Service
O&M	Operate and Maintain
NSW	The State of New South Wales
RO	Reverse Osmosis
Schedule 5	Planning Approval Responsibilities Operate and Maintain Contract
SEPP	State Environmental Planning Policy
SoC	Statement of Commitments
SSC	Sutherland Shire Council
SWC	Sydney Water Corporation, previous owners of the plant. It is currently owned by Sydney Desalination Plant (SDP)
SWGMP	Surface Water and Groundwater Management Plan
TS-09	Technical Schedule-09 Environmental Requirements – Operate and Maintain Contract
VEOLIA	Veolia Water Operations

Section 1 Operational Environmental Management Documentation

The Environmental Management System (EMS) for the operation and maintenance phase of the Sydney Desalination Plant is described in the Integrated Business Management System (IBMS) Manual MAN - 9490 (Tier 1). The Environmental Management Plan (EMP) MAN-9490 Section 14 (Tier 2) describes the centralised mechanism and environmental requirements that apply during operation and maintenance of the Sydney Desalination Plant. This Surface Water and Groundwater Management Plan (SWGMP) MAN-9491 (Tier 3) is part of the VEOLIA environmental management suite of documents required for the Sydney Desalination Plant as illustrated below.

This SWGWMP describes higher-level protocols, procedures and management measures that are adopted to mitigate and minimise potential impacts on the community and environment during operation and maintenance activities.

Specific environmental management measures are incorporated into the relevant procedures and work instructions developed to guide activities on site.

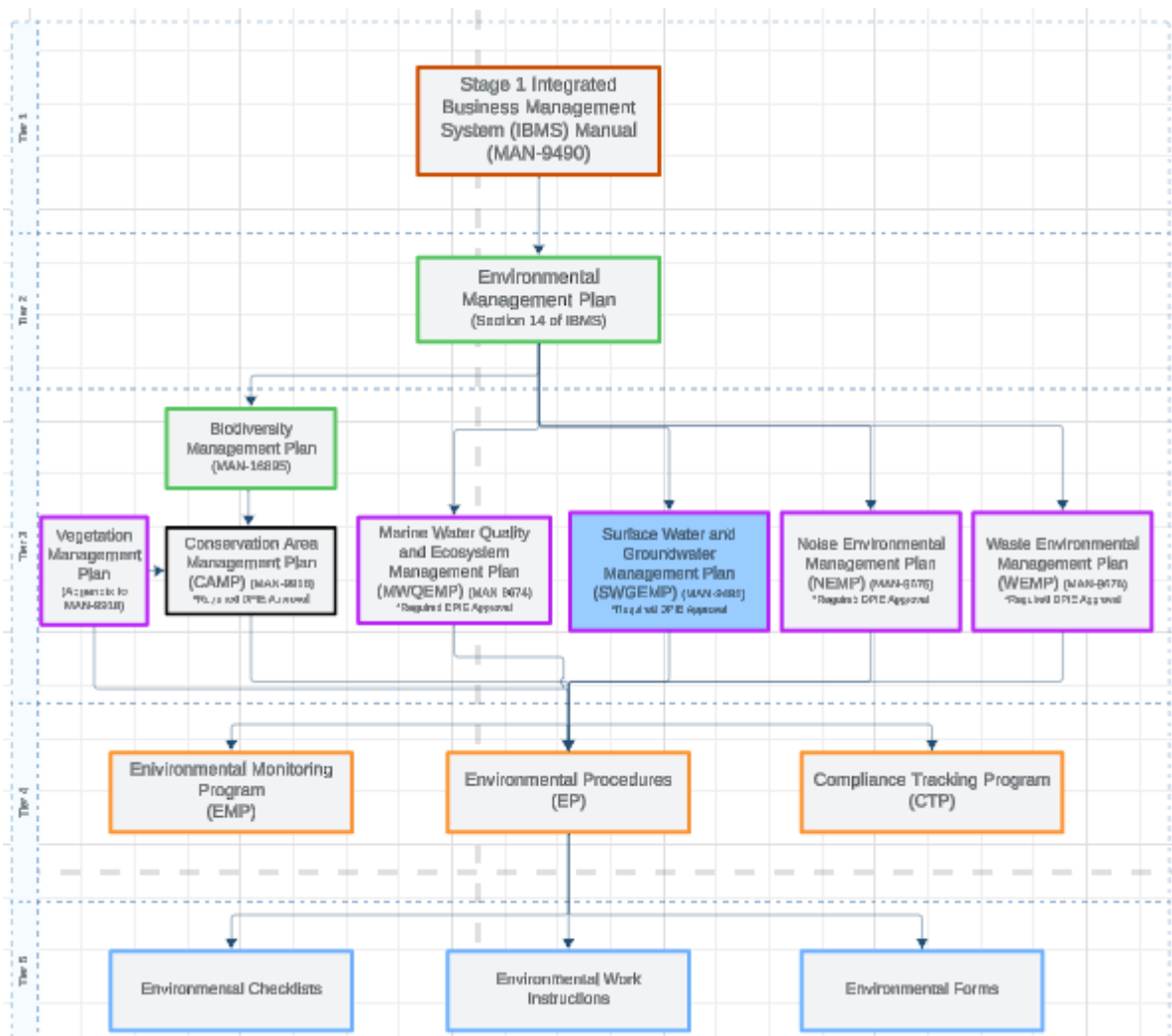


Figure 1 Environmental Documentation Flow Chart

1.1 Document Control

Control of all environmental management documents is managed in accordance with the IBMS Manual.

Section 2 Background

The Environmental Assessment (EA) (SWC, November 2005) for the proposed Sydney Desalination Plant identified that the potential exists for adverse environmental impacts, if left unmitigated, from operation of the plant that are associated with surface water runoff and changes to the groundwater hydrological regime. Further to the EA a Preferred Project Report (PPR) (SWC August, 2006) was prepared with subsequent amendments to the Statement of Commitments (SoC).

Other reports include:

- Annual Groundwater Monitoring Report (Coffey, October 2009)
- Annual Groundwater Monitoring Report (Coffey, October 2008)
- Groundwater and Surface Water Quality 2006-2007 (SWC, October 2007)
- Groundwater Modelling Study (Coffey, February 2007) Groundwater Investigation Report (Coffey, October 2006)
- Report for Desalination Plant, Flooding and Surface Water Management (Draft) (SWC, December 2006)
- Targeted Site Investigation - Sydney Desalination Plant Expansion Footprint - March 2024
- PFAS Source Investigation - Sydney Desalination Plant AECOM 23 May 2024

To address the requirement for baseline monitoring of groundwater (MCoA 4.6c and SoC 8c); monitoring was undertaken at 12 borehole locations across the site by Coffey for approximately four (4) weeks in July and August 2006. Between 21st December 2006 and 25 July 2007 SWC further monitored seven (7) of the 12 wells around the perimeter to give a representative sample of groundwater parameters on site. Level monitoring at these seven (7) locations was carried out by automatic piezometers (borehole data loggers). The monitoring provides a baseline record for Operations of existing groundwater levels, pre-development at the Project site. The results of this monitoring have been summarised in the Groundwater Monitoring Procedure PRO-9731 for interpretation of ongoing monitoring results.

As a result of the 2024 investigations (above) which found low concentrations, but below the relevant guidelines, testing of groundwater for PFAS will be carried out over the coming months to determine the extent and variability of the contamination of the groundwater.

2.1 Plan Approval Process and Stakeholder Consultation

This SWGWMP was submitted to SWC for approval prior to submission to the Department of Planning (DoP) for approval. SWC endorsed the SWGWMP on 22nd December 2009 and in accordance with MCoA (Plant) 4.7 the Plan was first approved by the Department of Planning on 1st April 2010, prior to commencement of operation.

This Plan was prepared in consultation with NSW Department of Environment, Climate Change and Water (DECCW) and Industry and Investment NSW (I&I) in accordance with relevant Project Approvals.

Section 3 Legislative and other requirements

3.1 Relevant Legislation

VEOLIA has developed this SWGWMP in accordance with the requirements of the following relevant NSW and federal legislation, with regard to changes made to the legislation on the 28th of April 2008.

3.1.1 Acts

Protection of the Environment Operations Act 1997 (amended 2014): The POEO Act enables the Government to set out explicit protection of the environment policies (PEPs) and adopt more innovative approaches to reducing pollution. PEPs are instruments for setting environmental standards, goals, protocols and guidelines. They provide both the framework for Government decisions that affect the environment, and are the means of adopting Australia-wide environment protection measures set by the National Environment Protection Council. Before a PEP can be made, the POEO Act requires public consultation on the draft PEP, and an analysis of the economic and social impact of the PEP. The 2014 amendment requires pollution monitoring data to be uploaded to the company website to allow public access.

Operation and maintenance activities at Sydney's Desalination Plant are required to be effectively managed to ensure Veolia complies with the water quality goals and criteria outlined in Section 120 of the POEO Act 1997.

Water Act 1912 (amended 2007): The Water Act 1912 came into force at the turn of the last century and represented a different era in water management in NSW. This Act is being progressively phased out and replaced by the Water Management Act 2000, but some provisions are still in force. The 2007 amendment gave administration of the Act to the Health Department.

The right to control, manage and use groundwater in NSW is vested in the Minister responsible for water resources under the Water Act 1912. The Minister's management role is largely exercised by the Department of Natural Resources (DNR). On 27 April 2007, the new NSW Department of Water and Energy (DWE) took on responsibilities of the former DNR.

In July 2009 the NSW government issued Administrative Orders abolishing the DWE and establishing two new agencies to manage the functions of the former Department. The water responsibilities formerly in DWE are now managed by the NSW Office of Water, in DECCW. That department, in turn, controls a process to allow private entities and other government agencies access to groundwater resources through a licensing system.

Any significant groundwater dewatering activities must comply with the statutory provisions of the Water Act 1912.

Water Management Act 2000: The objects of this Act are to provide for the sustainable and integrated management of the water sources of the State for the benefit of both present and future generations and, in particular:

- (a) to apply the principles of ecologically sustainable development, and
- (b) to protect, enhance and restore water sources, their associated ecosystems, ecological processes and biological diversity and their water quality, and

- (c) to recognise and foster the significant social and economic benefits to the State that result from the sustainable and efficient use of water, including:
 - i. benefits to the environment, and
 - ii. benefits to urban communities, agriculture, fisheries, industry and recreation, and
 - iii. benefits to culture and heritage, and
 - iv. benefits to the Aboriginal people in relation to their spiritual, social, customary and economic use of land and water,
- (d) to recognise the role of the community, as a partner with government, in resolving issues relating to the management of water sources,
- (e) to provide for the orderly, efficient and equitable sharing of water from water sources,
- (f) to integrate the management of water sources with the management of other aspects of the environment, including the land, its soil, its native vegetation and its native fauna,
- (g) to encourage the sharing of responsibility for the sustainable and efficient use of water between the Government and water users,
- (h) to encourage best practice in the management and use of water.

3.1.2 Guidelines

National Water Quality Management Strategy (NWQMS)

The National Water Quality Management Strategy (NWQMS) has been jointly developed since 1992 by the Australian Government in cooperation with state and territory governments, currently under the Natural Resource Management Ministerial Council. The NWQMS is part of the Council of Australian Governments' (COAG) Water Reform Framework and is acknowledged in the National Water Initiative. The NWQMS aims to achieve the sustainable use of Australia and New Zealand's water resources by protecting and enhancing their quality while maintaining economic and social development. The NWQMS is a strategy developed jointly by two ministerial councils: the Australian and New Zealand Environment and Conservation Council (ANZECC), and the Agriculture and Resources Management Council of Australia and New Zealand (ARMCANZ).

ANZECC (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality:

The Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC/ARMCANZ 2000) have been prepared as part of the NWQMS and provide government and the community – especially regulators, industry, consultants, community groups and catchment and water managers – with a framework for conserving ambient water quality in our rivers, lakes, estuaries and marine waters.

Managing Urban Stormwater: Soils and Construction, (Landcom 2004); also known as the “Blue Book”, provides guidelines to minimise land degradation and water pollution at development sites in NSW. The guidelines focus on minimising erosion and preventing sediment moving off site during the construction phase of development. These measures are, however, also applicable to operation and maintenance activities.

Guidelines for the Protection of Groundwater in Australia - National Water Quality Management Strategy - September 2013

These guidelines provide currently known principles and key methods for maximising groundwater quality protection.

Commonwealth Environmental Management Guidance on PFOS and PFOA (Draft 2016)

This document provides concentration values which:

- provide a guide as to when more detailed investigation might be appropriate
- in the case of water quality guidelines, provide guidance to policy formulation in the states and territories taking into account local conditions and associated costs and benefits
- in the case of water quality guidelines, provide assistance to the formulation of regional water quality guidelines and water quality objectives
- in the case of water quality guidelines, provide certainty that there will be no significant impact on water resource values if the guidelines are achieved.

3.2 Compliance Obligations

Sydney Water has developed a Statement of Commitments (SoC). These commitments mainly outline safeguards and mitigation measures to avoid adverse impact on the environment and ensure legislative compliance. They also outline monitoring and reporting requirements. Commitments relevant to the management of the surface water and groundwater are listed in Table 1 Compliance Obligations.

The Minister for Planning issued the Minister's Conditions of Approval (MCoA) for the Desalination Plant project in November 2006 that impose requirements for management of surface water and groundwater (Minister for Planning, 2006). This SWGWMP has been prepared as required under MCoA 4.6c. Relevant DoP Ministers Conditions of Approval (MCoA) and Statement of Commitments (SoC) are listed in Table 1 below with a cross reference to where the condition is addressed in this Plan and/or other project management documents.

Overall environmental compliance is managed in accordance with section 16 of the IBMS Manual. Records of environmental compliance will be submitted as required in the NSW Environmental Compliance Register TEM-5274.

Table 1 Compliance Obligations

	No:	Requirement	Doc Ref:
MCoA Plant	4.6 (c)	A Surface Water and Groundwater Management Plan to detail how surface water and groundwater will be managed to minimise impacts on ecology and water quality. The Plan shall be developed in consultation with the DECC and DPI and shall include, but not necessarily limited to:	This Plan
		Surface Water	
		i) source control methods to reduce sediment load, and separate and divert water flows on the site;	Sections 6.1, 6.6
		ii) measures to avoid contaminated stormwater run-off from the site from entering Quibray Bay, such as directing all	Sections 6.6, 6.7

		hardstand areas to a first-flush system and consideration of stormwater connection shut-off mechanisms;	
		iii) use of appropriately-sized structural mitigation measures such as artificial wetlands, sedimentation basins and gross pollutant traps;	Section 6.7
		iv) bunding of chemical storage areas;	Section 6.9
		Groundwater	
		v) provision for artificial recharge through stormwater retention and infiltration-based management, such as on site wetlands where appropriate;	Sections 6.3, 6.7
		vi) measures to provide for use of stormwater for irrigation on site where practicable;	Section 6.5
		vii) a groundwater monitoring program to establish baseline conditions (including groundwater levels, quality and flows);	Section 7.2
SoC	7	A Stormwater and Groundwater Management Plan will be prepared for the desalination plant site so that stormwater from the site does not pollute sensitive natural ecosystems during operations, including:	N/A (TS10)
		a) Source control methods to reduce sediment load, and separate and divert water streams on the site;	Sections 6.2 6.6
		b) Measures to avoid contaminated stormwater runoff from the site entering Quibray Bay such as directing all hardstand areas to a first flush system and considering measures to shut off the site stormwater connection;	Sections 6.4 6.6, 6.7
		c) Use of appropriately sized structural mitigation measures such as artificial wetlands, sedimentation basins or gross pollutant traps;	Section 6.7
		d) Bunding of chemical storages; and	Section 0
		e) Submission of the Plan to the Department of Planning.	N/A (TS10)
	8	A Stormwater and Groundwater Management Plan will be prepared for the desalination plant site. This will include strategies for groundwater recharge to minimise impacts on groundwater and protect sensitive groundwater dependent ecosystems, including:	N/A (TS10)
		a) Artificial recharge through stormwater retention and infiltration-based management such as on site wetland where site conditions permit;	Sections 6.3, 6.7

		b) Measures to provide for use of stormwater for irrigation on site if practicable;	Section 6.5
		c) Groundwater monitoring program to establish baseline conditions (ie groundwater level, quality and flows at the desalination plant site) and assess level and flows; and	N/A (TS10)
		d) Submission of the Plan to the Department of Planning.	N/A (TS10)
	59	Investigations of methods to optimise water conservation will be developed for implementation during operation of the desalination plant and infrastructure.	Section 6.5

3.3 Environmental Protection License Requirements

As the operator of the Sydney desalination plant VEOLIA complies with all of the requirements outlined in the Environmental Protection Licence. Currently there is no EPL requirement with regard to surface water and groundwater management. The EPL for the operation and maintenance period addresses operational discharges from the marine outlet point as detailed in MWQEMP and the purge water from the delivery pipeline aspects of which are discussed in 6.8.3. This Plan will be updated should a revision to the EPL require it.

Section 4 Potential surface water and groundwater impacts

The aspects of the Sydney desalination plant that could impact on surface water and groundwater are listed in Table 4 Potential Impacts.

Table 4 Potential Impacts

Source	Potential Impact
Drainage and Groundwater	
Increased impermeable surfaces	Increased impermeable surfaces and altered site drainage which reduces groundwater recharge capacities and concentrates surface water runoff
Stormwater Retention Basins	Stormwater retention basins which alter the groundwater recharge regime
Reduced rainfall infiltration	Reduced rainfall infiltration to the soil and decreased or altered groundwater recharge
Surface Water Quality	
Increased Runoff Volume	Increased runoff volume from impermeable surfaces during regular rainfall events mobilising pollutant/contaminants and increasing potential

	pollutant loads to the receiving environment including Towra Point nature reserve and Quibray Bay
Increased impermeable surfaces	Increased impermeable surfaces increasing flow rates resulting in discharges that are potentially highly erosive to stream/drainage line beds and banks
Bisecting of existing drainage channels	Bisecting of existing drainage channels located in or close proximity of the site that may convey runoff of larger upstream catchment areas either through or past the site. A high rainfall event then has the potential for increased flood risk on site
Process Water	
Overflow During Operations	Overflow during operation due to pipe or valve failure
Tank Overflow	The overflow of storage tanks due to equipment or software malfunction
Fuel and Chemical Storage and Handling	
Spills	Fuel and Chemical spills during delivery
Leakage	Leakage of stored chemicals due to rupture of containers
Leakage and Spills	Leakage and spills of fuels and chemicals due to poor storage and handling procedures
Use of Fertilisers, Herbicides and Pesticides	
Use of fertilisers	Use of fertilisers during revegetation and site landscaping programs.
Herbicides and Pesticides	The ongoing use of Herbicides and Pesticides during the operation and maintenance of the desalination plant grounds.
Oil, Grease and Effluent from operations	
Leakage and Spills	Accidental spills of diesel or leakage of hydraulic and lubricating oils from plant and equipment along with rinse water from plant or equipment washing all have the potential to enter drainage lines
Leakage	Leakage of poorly maintained plant equipment into stormwater system
Litter	
Litter Entering Waterways	The site generated litter entering natural waterways near the plant site
Incorrectly stored litter or waste	Incorrectly stored litter or waste affecting the groundwater system through leaching
Spoil Stockpile	

Spoil Stockpile erosion	Spoil Stockpile erosion affecting surface water systems
Surrounding Industry Contamination	
Contamination of Groundwater	Contamination of site groundwater systems from adjacent industry practices e.g. Ampol
Maintenance of Environmental Controls	
Sediment fences	Worn or damaged sediment fences
Drains, Pits and Culverts	Cracked or sediment filled drains pits or culverts becoming ineffective in stormwater management
Stormwater Retention basin	Sedimentation of stormwater retention basins

Section 5 Management and Mitigation

5.1 Water Management Strategy

Water management strategies during the operation and maintenance of the Sydney desalination plant include:

- Surface water management
- Groundwater management
- Erosion and sedimentation control
- Potential water reuse
- Sewage disposal.

Specific procedures for water management have been developed for VEOLIA's operation and maintenance of the plant.

5.2 Surface Water Management and Quality Controls

Significant impacts to surface water quality from erosion are not expected as the site consists of impermeable surfaces, other hardstand areas (crushed rock), and established gardens and lawns. Impacts to water quality may still occur as a result of general operation or maintenance activities such as:

- repair or maintenance of existing structures
- construction of new structures
- landscape maintenance
- fuel, oil and chemical storage areas
- parking areas
- disturbed areas

Water quality control measures have been designed such that they are as close to the potential source of contamination or sediment as possible. The Operations Manager will ensure that appropriate controls are in place and working effectively.

Water quality controls include:

- Stormwater quality improvement devices (SQID) for site runoff to capture gross pollutants and provide oil and water separation, to prevent and minimise the potential for downstream pollution (HumeCeptor™) units have been fitted at the three inlets to the retention basins and the two outlets into the stormwater channel);
- Bunding of fuel, oil and chemical storage areas;
- Minimising disturbance and bare areas, and where this is unavoidable, use of controls such as sediment fences and hay bale filters.

Additionally, rainwater tanks provide limited benefits as source controls for water quality and the stormwater retention basins.

Drainage of the site is toward the stormwater retention basin and stormwater channel along Sir Joseph Banks Drive. Figure 2 shows the stormwater flow paths. Drainage channels on the site are trapezoidal concrete open drains, with box culverts to convey the water under the internal roads. Water entering the retention basins and the stormwater channel pass through SQIDs.

Surface water monitoring is conducted in accordance with WIS-9871 Surface Water Monitoring, the Environmental Monitoring Program WIS-9870 and daily checklists.

The undeveloped north-western section of the site (500ML/day plant footprint/ catchment area) contains landscaped native vegetation and a redundant hardstand car park. Surface water from this area is directed toward a diversion channel designed for groundwater infiltration and to convey water flows from the offsite wetland across the site into the conservation area (Sydney Freshwater Wetland Vegetation community). The sheet-flow discharge design imitates what would have occurred in this area prior to the elevation of the site above the 1:100 year rainfall average recurrence interval (ARI).

5.3 Groundwater Management

Stormwater from the hardstand areas on the site will be directed to the retention basins (described in section 5.7 below) to enable groundwater recharge. Permeable surfaces on the site such as crushed rock allows some groundwater infiltration and recharge at the source. Additionally, there will be no ongoing active-dewatering activities during operation.

During testing soil and groundwater testing for the proposed expansion, low levels of PFAS were found in the groundwater. The report stated that the PFAS was most likely coming from an offsite location as there has been no discharge of materials containing PFAS from the desalination plant. In addition, as a result of a recent leak from a dosing line it has been decided to test groundwater for chlorine, fluoride and ammonia. Consequently monthly sampling and analysis of groundwater samples for PFAS chlorine, fluoride and ammonia is now being carried out on a monthly basis.

A series of piezometers were installed pre-construction at the desalination plant site by SWC to monitor groundwater levels and quality. The SWC groundwater monitoring program provided the guidelines for operational groundwater monitoring.

Groundwater monitoring is conducted in accordance with WIS-9870 Groundwater Monitoring involving the monitoring of four boreholes.

Monitored groundwater level and quality is reviewed against background levels. If this monitoring, during operation, shows a significant reduction of the groundwater levels, then a program of groundwater recharge will be established if required (in addition to the retention basins), in order to achieve a suitable level for groundwater dependent ecosystems.

5.4 Erosion and Sedimentation Control

Significant impacts to surface water quality from erosion have not and are not expected as the site consists of impermeable surfaces, hardstand areas (crushed rock), and established gardens and lawns.

Erosion and Sedimentation will be controlled on site when required i.e. in the event of temporary works on site. Progressive erosion and sediment control plans will be implemented to mitigate erosion and sedimentation during such periods during operation of the Sydney desalination plant.

5.5 Water Reuse

Rainwater is collected from the roofs of various buildings and structures (including but not limited to the RO and the Administration buildings, and the drinking water storage tank). Some of this water is collected in above-ground water tanks and reused on site for landscaping maintenance.

5.6 Sewage Treatment and Disposal

Site amenities are connected directly to the sewerage system via a storage tank and transfer pump.

5.7 Stormwater

Two permanent stormwater retention basins have been established to manage stormwater from the main site. The upper basin (floor RL 3.0) is an infiltration basin for groundwater recharge and the lower basin (floor RL 2.5) is merely a detention basin. These basins are hydraulically connected as shown in Figure 2. The banks of the basins are lined with fabric and overlain with rock to prevent erosion of the side embankments.

Runoff from the site is directed to either one of the three inlets to the upper basin or one of two inlets to the offsite stormwater channel. Each of these inlets is fitted with a stormwater quality improvement device (SQID) which removes hydrocarbons and suspended solids from the stormwater; preventing spills and minimising non-point source pollution entering downstream waterways. A third outlet to the stormwater exists from the 33kV bund which is fitted with an oil/water separator.

The stormwater basins have a retention capacity of 4900 m³ which is larger than the 4200m³ required to mitigate peak flow rates from a 1:100 year ARI storm event.

These volumes are based on:

- review and extrapolation of figures presented in Section 4.2 'Stormwater Flood Peak Analysis' of the Sydney Water Report for Desalination Plant, Flooding and Surface Water Management (GHD December 2006);
- desktop assessment of the required detention basin volume for the 250ML/day plant footprint/catchment area.

Most of the water volume in the basins infiltrates into groundwater or is discharged into the Conservation Area (CA) through subsoil drainage lines. This assumption is based on the sand permeability of the existing underlying soils below the basins, obtained from the Coffey Groundwater Investigation Report, Proposed Desalination Plant Site, (Coffey 18 October 2006). When the groundwater table is high, the subsoil drainage lines may have a continuous flow of groundwater. During periods of high flow, it is possible for these basins to fill and subsequently overflow from the spillway discharge point that is located at the north-western end of the site. The discharged water would then run into the existing open channel in the CA (located immediately adjacent to the site) as shown Figure 2. This runoff is then conveyed through the existing open channel under Captain Cook Drive which flows into Quibray Bay, as shown in Figure 3.

The discharge point is also fitted with a baffle which acts as a secondary safe-guard preventing oil on the surface of the stormwater basin from entering the Conservation Area. Erosion and scour protection including rip rap and a gabion mattress to disperse/calm flows is located immediately downstream of the discharge point.

Testing for oil and grease can be undertaken downstream of the SQID if required.

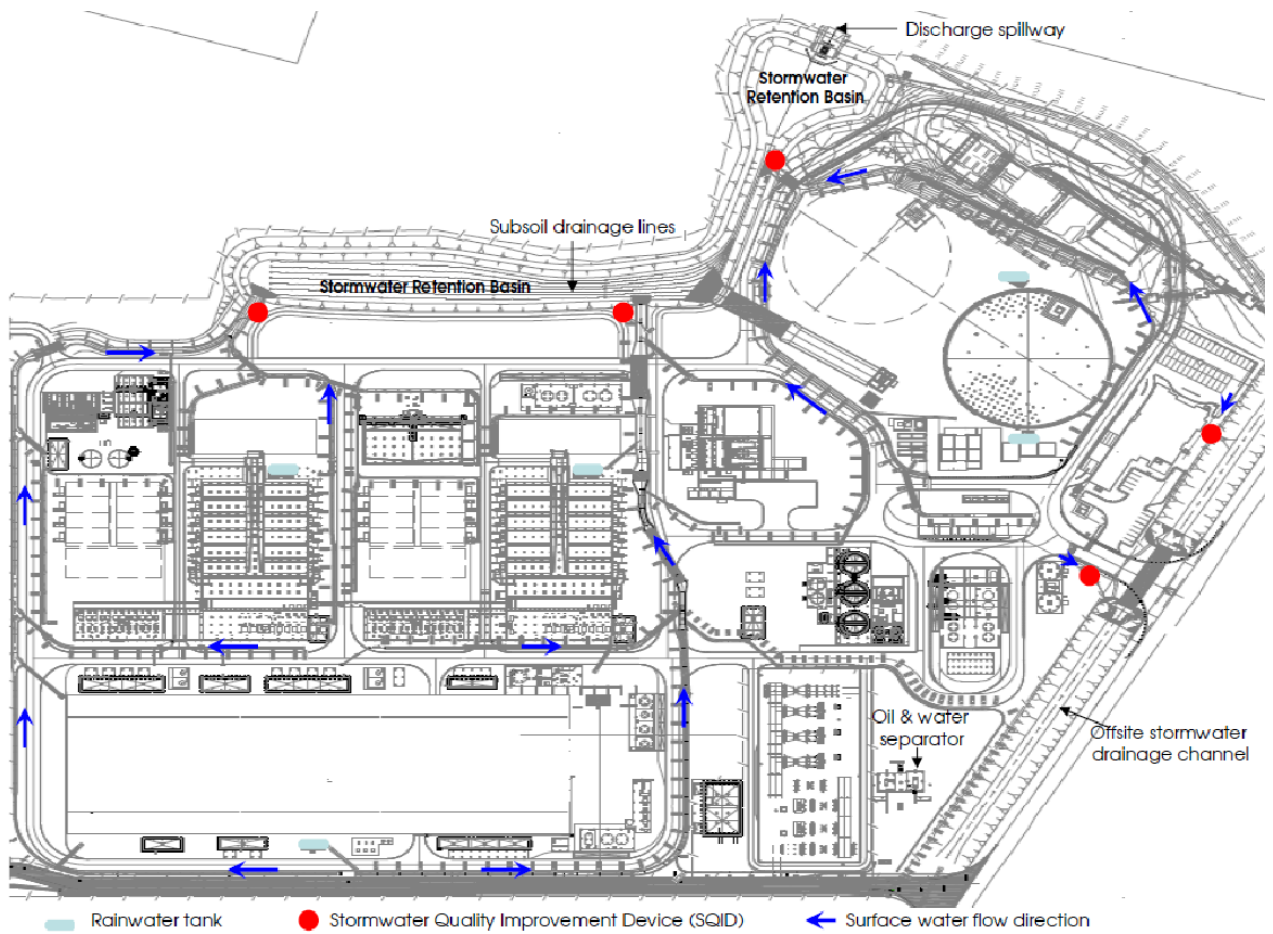


Figure 2: Stormwater Management



Figure 3 Offsite Flows from Retention Basin

Offsite flow from the retention basin (runs into an existing open channel in the Conservation Area, and is then conveyed through the existing open channel under Captain Cook Drive which connects into Quibray Bay).

5.8 Process Waters

The following section describes contingencies for process waters to be redirected or released in the event of an emergency.

Even though the Sydney Desalination Plant was designed and constructed to contain process waters during the entire desalination process, there may be times when process equipment or its software malfunction or fail and cause an excess of water in one more stages of the plant. If this occurs, the following contingencies are in place to direct water as appropriate.

5.8.1 Filtered Water

The filtered water tank that holds the filtered water from the filters has no overflow. If the filters were to overflow, the overflow would be directed to the Waste Water Holding Tank for treatment at the dewatering plant or for overflow to the Seawater Intake.

5.8.2 Wastewater Holding Tank

Should the Wastewater Holding tank overflow, this water is directed into an overflow chamber that is then transferred to the plant's seawater intake to be processed again.

5.8.3 Purge of Delivery Pipeline

The delivery pipeline under Botany Bay may at times require purging, e.g. if desalination water has not been required for an extended period of time the water sitting in the pipe will have zero chlorine residual and high pH.

If this occurs, SWC will provide the appropriate notification to the Operations Manager that purging is required (in accordance with the SW Water Main Flushing Protocol). Pressure (head) from the Prospect Reservoir will be used to push the water back to the desalination plant, which is equipped to receive this purge water and direct it to the outlet pipe. The discharge of pipeline water will comply with the Special Conditions set out in the sites Environmental Protection Licence for the identified activity.

Although in the extremely unlikely event that overflow of the purge water that cannot be managed solely by the Break Tank it will be contained and directed to the stormwater retention basin.

5.8.4 Intermediate Permeate Tanks (1st pass front permeate)

In practice overflow should never occur. If it does occur the overflow is directed to the returns flow chamber and discharged or returned to the intake when there is no remaining hydraulic capacity in the concentrate line and outfall tunnel.

5.8.5 Drinking Water Tank (DWT)

Under normal operations drainage or overflow of the DWT will not occur, unless there is a failure of communication within and between the SWRO plant and drinking water pumping station. The pumping station design rate is 340ML/d which is greater than the plant's 266 ML/d maximum production and a high level in the drinking water tank will lead to a reduction in plant production. In practice overflow should never occur. If it does occur the overflow can be directed to the returns flow chamber (discharged or returned to the intake) which is the preference or to the sedimentation/retention basin. All of these options would require the drinking water to be dechlorinated.

The overflow will be of drinking water quality in accordance with Table 1.1 of TS-09, except that the water will not have been dosed with aqua ammonia. The chemical content of drinking water complies with lowland river ANZECC water quality trigger values; once dechlorinated as shown below in Table 2. Drinking water will not contain any oils or grease, will not contain suspended solids, and will have an acceptable pH range and conductivity for stormwater discharge.

Table 2 Water Quality Parameters

Parameter	ANZECC Guidelines	Drinking Water
pH	6.5 –8.5	7.3-8.5
TSS (mg/L)	50	< 1
Conductivity (µScm-1)	<2200	< 200
Oil and Grease (mg/L)	No visible (<10)	none
Total Residual Chlorine (mg/L)	<0.1	0.25 – 1.5

5.9 Chemical & Fuel Storage

The storage and handling of fuels and chemicals has the potential to pollute surface waters and contaminate soils.

Bulk storage areas for fuels, oils and chemicals are contained within purpose-built impervious bunds to retain any spills. These areas are fitted with sump pumps to transfer any spillage/wash down water contained in the chemical bund area for neutralisation and/or disposal. Depending on the hazardous nature of each chemical, sump pumps will be installed either permanently or on a temporary basis using a portable pump.

Storage complies with DECCW Guidelines “Bundling and Spill Management” and AS 1940-1993 – The Storage and Handling of Flammable and Combustible Liquids.

Large capacity spill kits have been provided at each storage area, with smaller kits contained within site vehicles and at areas of the worksite where handling and use of dangerous goods occur. VEOLIA staff have been provided with appropriate training in spill response. Any spillage will be immediately contained and absorbed with a suitable absorbent material as far as practicable.

Safety Data Sheets (SDS) for all chemicals stored on site are maintained by plant staff and made available to site personnel, as well as being located adjacent to the relevant chemical areas the SDS’s are also available through the Chemalert website. Site personnel are informed of the location SDS’s as a part of the Induction process.

Refuelling of equipment on site, or any other activity which could result in a spillage of a chemical, fuel, or lubricant, is to be undertaken in accordance with the relevant work instruction and/or JSEA.

In the event water is polluted by chemicals and/or fire fighting materials (e.g. foams) the water will be collected, and disposed at an approved Liquid Waste Treatment Facility in accordance with DECCW (EPA) guidelines and provisions made in the Waste Environmental Management Plan (WEMP).

5.10 General

5.10.1 Litter

Litter on the site has the potential to enter stormwater during rainfall events. Litter on the site is collected and appropriately disposed of on a regular basis in accordance with the WEMP.

The SQID located upstream of the basin and stormwater channel will capture gross pollutants from the site runoff.

5.10.2 Fertilisers, Herbicides and Pesticides

Use of fertilisers, herbicides and pesticides may enter the stormwater retention system and eventually enter the neighbouring conservation area where flora and fauna may be impacted.

A reputable contractor will be engaged to maintain the landscaped areas of the site. This contractor will only use VEOLIA approved chemicals and will use the minimum amount necessary.

Table 3 Water Management Measures, Responsibility and Timing

Water Management and Mitigation Measures	Responsibility	Timing
General Operation and Maintenance Activities – Water Management and Reuse		
Reduce water consumption through education of personnel, regular inspection of plumbing for leakages and damage; and installation of water saving devices where possible.	Environmental Management Systems Representative (EMSR) / Operations Manager	Ongoing training / Regular Inspection
Rainwater will be collected in tanks and used for watering landscaped areas within the desalination plant site.	Operations Supervisor/ Landscaping contractor	Ongoing
Surface Water Management and Quality Controls		
Stormwater drain system and retention basin to be monitored for sedimentation or blockages	Operations & Maintenance Supervisor	Ongoing
Landscaped areas within the desalination plant site to be maintained to limit erosion and sedimentation and surface water runoff	Operations & Maintenance Supervisor	Ongoing
Exposed soil due to temporary works carried out are to be covered and contained (i.e. watered) to minimise dust generation and sedimentation of stormwater system if required	Operations & Maintenance Supervisor	Ongoing

Groundwater Management		
Monitoring of the Stormwater Retention Basin for sedimentation, excessive vegetation/tree growth or blockages that would limit the effective recharge of the groundwater system.	EMSR / Operations Manager	Ongoing
Monitoring of groundwater levels and quality as required	EMSR / Operations Manager	As required
Erosion and Sediment Control		
Exposed soil due to temporary works carried out are to be covered and contained (i.e. watered) to minimise dust generation and sedimentation of stormwater system if required	Operations & Maintenance Supervisor	Ongoing
Landscaped areas to be maintained	Operations & Maintenance Supervisor	Ongoing
Hardstand areas, concreted areas and crushed rock areas to be kept clean and free of rubbish	Operations & Maintenance Supervisor	At all times
Stormwater Retention Basins		
To be visually inspected for obvious faults or deficiencies in the water holding capacity. Trees and woody weeds to be regularly removed.	EMSR	Ongoing
Drain systems upstream of the retention basin to be maintained and kept free of rubbish, weeds and excess sediment	Operations & Maintenance Supervisor	At all times
Process Water		
Individual process water sources to be correctly managed to limit the potential for overflow to the stormwater system	Operations Supervisor	Ongoing

Section 6 Monitoring, Inspection, Auditing and Reporting

A regular auditing, monitoring and reporting program for soil and water management will be conducted in accordance with the EGroundwater Monitoring Program WIS-9870 and as follows:

- Regular inspections to ensure that controls are functioning correctly. Observations to be noted on the Site Walk Checklists and issues are to be raised via RIVO, at weekly meetings and reported to the EMSR.
- Inspections after each significant rainfall event (i.e. >15mm/24 hours); additional inspections after rainfall events less than 15mm/24hr will be undertaken if the event caused damage or could reasonably be assumed to breach the integrity of the sediment controls; and
- Water quality monitoring where required; and
- Groundwater level and quality monitoring, where required, will include the use of already established piezometers.

Records are maintained on the local server for which supporting work instructions provide details.

6.1 Surface Water Quality Monitoring

If deemed necessary, water quality monitoring is used in the event of an uncontrolled sediment or chemical discharge to ensure compliance with regulations and also to assess the water quality discharged from the site to waterways, or retention basins for groundwater recharge. The monitoring will be focussed on assessing the quality and quantity of surface water.

If necessary, monitoring is completed by a qualified Process Engineer, Laboratory Technician, or other personnel trained in water sampling techniques. Monitoring criteria will be in accordance with legal requirements and compared with values in non-influenced parts of the system, where contamination from a point source is suspected.

6.2 Groundwater Monitoring

A Groundwater monitoring program compares results of operational phase groundwater monitoring data with pre-construction baseline monitoring data (SWC Groundwater and Surface Water Quality 2006-2007 Final Report, October 2007). The groundwater monitoring program will determine any impact on groundwater conditions and give indication as to any potential requirement for artificial recharge. If artificial recharge is required, options will be developed, assessed and implemented.

6.3 Auditing

Auditing is managed by VEOLIA's corporate document PRO-161 Audit Management Procedure which guides scheduling and conducting audits, auditor qualifications and audit reporting. At Kurnell, there are four levels of auditing taking place:

1. corporate level audit schedule which covers management system audits to identified standards for every Veolia site over the course of 12 months,
2. site specific audit schedule based on auditing specific areas of operations, or specific contract requirements,

3. schedule of client/VEOLIA “collaborative” audits which are focussed on evaluating management systems and compliance with Ministers Conditions of Approval, and
4. third party certification audits

Veolia has a commitment to every project that those projects with a duration greater than 5 years shall obtain certification to the relevant management system standards within 2 years of operation. Specifically, ISO 14000 Environmental Management Systems, ISO 9001 Quality Management Systems and ISO 45001 Safety Management Systems.

6.4 Reporting

Internal and external reporting is defined in the BMS Manual MAN-9490.

To support compliance with the requirements of various contracts, legislative and Minister’s Conditions of Approval, a legislative compliance register; TEM-5274 NSW Compliance Register is maintained. This is complemented by an Environmental Compliance Tracking Program which is reported to SDP and collaboratively reported to the DPIE annually.

The MAN-9673 Incident and Emergency Manual includes an incident notification process where the Director-General and DECCW/DPIE will be notified by the Operations Manager (or delegate) of any incident with actual or potential significant off-site impacts on the biophysical environment as soon as practicable and within 24 hours after the occurrence of the incident. Supplementary written details of the incident shall be provided within seven days of the date on which the incident occurred.

Monitoring and reporting requirements of the DECCW/DPIE, Environmental Protection License (EPL) would be carried out to the satisfaction of the conditions therein and otherwise reported via DECCW/DPIE Pollution Line.

Section 7 Project Responsibilities and Training

7.1 Roles and Responsibilities

In summary, the key responsibilities for surface water and groundwater management are detailed in the table below.

Table 5 Roles and Responsibilities

Role	Responsibility
Operations Manager:	Responsible for ensuring that surface water and groundwater management measures are implemented and maintained and, in the event of identified potential or actual breaches, to implement appropriate corrective or preventive actions to fulfil the requirements of this Plan. Responsible for advising applicable members of Sydney's Desalination Plant Team of complaints received pertaining to surface water and groundwater management or misuse and facilitating the resolution of complaints.
Environmental Management Systems Representative (EMSR):	Responsible for ensuring this Plan is implemented by Sydney Desalination Plant personnel. Undertake and assess data from inspections, monitoring and reporting and provide project-wide advice to ensure consistent approach and outcomes are achieved. Responsible for providing necessary training for Sydney Desalination Plant personnel to cover surface water and groundwater management issues.
Process Manager	Responsible for providing assistance to the Environmental Representative to fulfil the requirements of this Plan and for ensuring that appropriate surface water and groundwater management measures are implemented and maintained, and for reviewing performance of these measures.
Operations & Maintenance Supervisor:	Responsible for providing assistance to the Environmental Representative to fulfil the requirements of this Plan and for ensuring that appropriate surface water and groundwater management measures are implemented and maintained.