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Regulating Stormwater MAR in South Australia

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Abstract

Managed aquifer recharge (MAR) of stormwater has been successfully undertaken in South Australia for over ten years and the number of sites is expanding rapidly.

Depending on the location of the MAR scheme, regulation has been applied under either the Environment Protection Act 1993 (for stormwater discharges to aquifers from catchments of greater than a hectare within the Adelaide metropolitan area, or defined areas in the South East of the state) or for the remainder of the state, under the Natural Resources Management Act 2004 (for draining or discharging water directly or indirectly to a well) which is administered by the Department for Water (DFW) and regional Natural Resources Management (NRM) Boards. With an increasing number of MAR schemes coming on line over the last decade, the EPA prepared the Code of Practice for Aquifer Storage and Recovery 2004, linked to the Environment Protection (Water Quality) Policy 2003, which provides more detail to assist operators to comply with the policy and the Environment Protection Act 1993.

The interest in MAR schemes has grown significantly over recent years, enhanced by the drought situation in Australia and the emphasis on the use of alternative water resources. There is currently around \$350 million being invested in stormwater recycling infrastructure in South Australia with MAR being utilised as the main method of storage.

The EPA, DFW, NRM Boards and Department of Health, in conjunction with stakeholders and industry, have undertaken to streamline the regulatory assessment and ongoing management of MAR schemes.

A 'single point of entry' is being established, legislation amended and a Draft Code of Practice for Managed Aquifer Recharge (MAR Code) has been prepared to provide clear guidance for developers and operators of stormwater MAR schemes. The MAR Code is based on the NWQMS Australian Guidelines for Water Recycling Phase 2C MAR and applies the risk management based approach to identify hazards, determine risks and apply multi-barrier protection measures.

The MAR Code and supporting material is to be delivered via a web based portal for ease of access by the user. The process of determining community agreed environment values and water quality objectives for some of the major storage aquifers in Adelaide has almost been completed and will assist with ongoing management of MAR schemes.

Introduction

'Managed aquifer recharge (MAR) is the intentional recharge of water into aquifers for subsequent recovery or environmental benefit' [NRMC, EPHC & NHMRC (2009)]. MAR of stormwater in Adelaide has become an increasingly important component of integrated water management over the last decade. The regulatory controls applied to MAR, in South Australia, are taken from different pieces of legislation which has led to confusion and

STORMWATER 2010
National Conference of the Stormwater Industry Association
Conference Proceedings

uncertainty for developers and operators of MAR schemes. A number of government agencies are also involved and each of their components has received differing levels of scrutiny over this time. The regulatory approach has been refined, over the last four years, and the final product is now ready for delivery.

MAR Expansion SA

The development of MAR in South Australia was initially promoted by DFW to recharge depleted aquifers and supported by the research undertaken by the CSIRO. The City of Salisbury and the Adelaide Mount Lofty Ranges NRM Board have been major drivers in the establishment of schemes. The aquifers in many areas of Adelaide have proven suitable for viable MAR storage.

The recent drought conditions experienced across Australia, the development of the *Australian Guidelines for Water Recycling* and the support of the National Water Initiative (NWI) has greatly assisted the uptake of alternative water resources across Australian.

In South Australia, over the last 20 years, there has been a great deal of background work done to support the collection and utilisation of stormwater as a resource and MAR has become the preferred option for collection, treatment and storage.

The EPA released the *Adelaide Coastal Waters Study 2007*, which provided evidence of the detrimental effect of sediment laden stormwater, wastewater and stormwater on the sea grass meadows in Gulf St Vincent. The number one priority of this report is reduce the volumes of wastewater, stormwater and industrial inputs being discharged into Adelaide's coastal environment.

Water for Good 2009, the South Australian Government plan to ensure water security for Adelaide into the future discusses the role of stormwater recycling in reducing dependence on traditional water resources. It details how current stormwater harvesting schemes in Adelaide have the capacity to harvest 6 GL/a of stormwater per year and projects initiated over the last 12 months are advancing the state towards the target of 20 GL/a by 2013. The application of MAR to capture, treat and store stormwater is a key component of many of these existing and new schemes. The long-term goal is to harvest up to 60GL/a in Adelaide and 15 GL/a in regional South Australia by 2050.

In excess of \$350 million has been invested in stormwater reuse schemes in Adelaide, the majority utilising MAR.

History

The regulatory framework that has been applied to MAR in South Australia stems from a range of different legislation.

The *Environment Protection Act 1993* (EP Act) provides for the protection of the environment, promotes ecologically sustainable development and applies the precautionary principle to minimise environmental harm. The EP Act contains schedules of prescribed activities of environmental significance which require authorisation and ongoing licensing. Discharge of stormwater into aquifers, from a catchment of greater than a hectare to aquifers in metropolitan Adelaide, and defined areas of the South East of South Australia, are included as a prescribed activity. This schedule was included to protect the states aquifers from being used for the disposal of large quantities of polluted stormwater.

STORMWATER 2010
National Conference of the Stormwater Industry Association
Conference Proceedings

Environment protection policies (EPP) are the second level of environment protection legislation. The *Environment Protection (Water Quality) Policy 2003* (Water Quality EPP) provides more detail on potential polluting activities and lists pollutants of concern. It conforms to the National Water Quality Management Strategy (NWQMS) by setting environmental values (EVs) and water quality objectives (WQOs) for all water bodies within the state. The default EVs and WQOs were set state-wide to apply to all water bodies including underground water and have been used to provide the management targets for MAR schemes. The Water Quality EPP also allows for attenuation zones to be set within aquifers but they must be exempted from the policy. The Water Quality EPP is currently being revised and it is proposed to match the default state-wide criteria to NWQMS values and alter the way it is administered to allow for a 'reasonable and practicable' approach to be applied. Attenuation zones will also be removed although the ability of suitable aquifers to assist as part of the MAR treatment train will be considered and taken into account for individual schemes.

Codes of Practice are attached to EPPs and provide industry specific methods to achieve expected compliance and moving beyond to environmental best practice. The Code of Practice for Aquifer Storage and Recovery 2004, developed in response to growing aquifer recharge at the time, provides regulatory requirements as well as technical background for the development and management of an ASR scheme.

The *Natural Resource Management Act 2004* (NRM Act) promotes 'the sustainable and integrated management' of South Australia's natural resources with specific provision for the 'management of and protection of water resources'. These provisions primarily deal with water quantity issues including prescription, control of use, development of catchment, water allocation plans and environmental flows. The NRM Act is administered by the Department for Water (DFW) and regional Natural Resources Management (NRM) Boards.

The NRM Act contains provisions to grant permits for 'water affecting activities' including drilling, plugging or sealing a well, maintaining a well and 'draining or discharging water directly or indirectly into a well'. DFW issue these permits and regulate discharge of stormwater to aquifers in areas and situations where the EP Act schedule does not apply.

The NRM Act also regulates the taking of water from various surface water catchments and groundwater aquifers and a number have been or are in the process of being prescribed. Within the defined areas where water resources are prescribed, Water Allocation Plans (WAPs) are developed by the regional NRM Boards, in collaboration with DFW and with broad community consultation. WAPs guide the management of water quantity within a prescribed catchment or aquifer and may include clauses specific to the recharge and extraction of MAR water.

The *Public & Environmental Health Act 1987* (PEH Act) contains provisions for the protection of public health including sanitation and the protection of water supply. The PEH Act is administered, at the state level, by the Department of Health (DA). The *Public and Environmental Health (Wastewater Systems) Regulations 2010* (Wastewater Systems Regulations) are attached to the PEH Act primarily provide detail on the management of wastewater systems and the reuse of recycled water. Any potential human health hazards from the storage and end use of water in a stormwater MAR scheme need to be examined and the scheme may need approval from DH. The *Development Act 1993* (Dev Act) provides for the consideration of development proposals. The Dev Act is primarily administered by the Department of Planning and Local Government (DPLG) and local government authorities. Depending on what is to be included in the establishment of a MAR scheme, it may be deemed development and require a Development Application.

STORMWATER 2010
National Conference of the Stormwater Industry Association
Conference Proceedings

Refinement of MAR Regulation

Because of the complexity of the regulatory framework that has applied in South Australia, developers and operators of MAR schemes raised their concerns at the potential confusion and inconsistency of approach. In response to this the South Australian Government commenced a project to review and revise legislation and streamline the application, assessment and ongoing management process for MAR schemes. A stakeholder Steering Committee, comprising industry, research and government agencies representatives has overseen the project. The major component of the project has been the development of the Draft Code of Practice for MAR (MAR Code), by the EPA, to supersede the existing Code of Practice for ASR.

The initial development of the MAR Code was overtaken by the release of the *NWQMS Australian Guidelines for Water Recycling 2006* and the subsequent phase 2 documents:

- *Volume 2A - Augmentation of Drinking Water Supplies (AGWR Phase 2A)*
- *Volume 2B - Stormwater Harvesting & Reuse (AGWR Phase 2B)*
- *Volume 2C – Managed Aquifer Recharge (AGWR Phase 2C)*

The MAR Code is now based on the risk management framework, to protect the environment and human health, that is outlined in these documents applied in the South Australian context. It provides a guide to the planning, development, operation and management of a MAR scheme and includes regulatory requirements. The MAR Code uses the staged risk management model detailed in AGWR 2B and provides simplified planning and assessment tools to assist the planning, assessment and development of MAR schemes. It also utilises technical information and methodologies detailed in AGWR 2B and AGWR 2C.

The scope of the MAR Code has become much broader than the protection of the environment, so it has not been yet linked to the Water Quality EPP and its delivery, as a single printed document has been revisited. It is now being recast, as a series of grouped components, which will be delivered via a single point of entry web-based MAR portal. The MAR portal will now be established on the DFW website and links will be provided to relevant government agencies where necessary and sites that provide supporting information.

Since the streamlining of the MAR regulatory framework began there have been many approaches and combinations proposed and debated however the legislative responsibilities of each agency remain. The EPA has the key role in protecting water quality and minimising environmental harm, DFW with assistance from the NRM Boards deal with the management and protection of the water resource and DH protect human health. The key to the improved delivery of regulatory controls relevant to MAR is to build a process of seamless integration between the agencies that are involved which provides the developer and operator with a single point of entry.

The MAR portal will contain background information and lead the developer and operator through the staged process, as set out in the MAR Code, with a level of detail appropriate to the scale of the scheme. A single application form for the 'discharge of water to aquifers' is being written to serve DFW and EPA needs. Any other necessary application forms and regulatory processes will be explained and linked for easy access. The EPA and DFW are working in a partnership to provide input into the assessment and on going management of MAR schemes in the areas of responsibility and expertise most appropriate to each agency. DH will be linked into the process when necessary. The aim is to provide easily understood, transparent processes with no duplication and a single contact point for the developer and operator.

STORMWATER 2010
National Conference of the Stormwater Industry Association
Conference Proceedings

With regard to legislative change the EPA now proposes to amend the schedule of the EP Act to licence:

- discharge of waters (including stormwater) into underground aquifers unless it is a stormwater scheme discharging less 20 ML per annum
- urban stormwater collection system of City of Mt Gambier

This will provide a more consistent state-wide regulatory approach MAR.

The EPA is also leading the 'Healthy Waters' project to identify and update the community agreed Environmental Values for water quality in the Adelaide and Mount Lofty Ranges Natural Resources Management regions. This includes the aquifers across the Willunga Basin, Metropolitan Adelaide and the Northern Adelaide Plains. Once completed the outcomes of the project will assist with the assessment and ongoing management of metropolitan MAR schemes.

Conclusion

The development of a revised regulatory framework for MAR schemes in South Australia has been lengthy and at times frustrating. However there has been willingness by all those involved including developers, operators, researchers and government agencies to develop a robust, transparent and workable approach that will support all involved. There has been a large investment in schemes and their long term performance and sustainability is necessary for the community to benefit. The regulatory framework has evolved to support this while protecting human and environmental health.

The experience gained by all those involved has been invaluable and we will continue to learn as the new approach is delivered and applied into the future.

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STORMWATER 2010
National Conference of the Stormwater Industry Association
Conference Proceedings

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STORMWATER 2010
National Conference of the Stormwater Industry Association
Conference Proceedings

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