

Community Committee for Recycled Water Storage (Northern Adelaide Irrigation Scheme)

Project Name	Northern Adelaide Irrigation Scheme					
Purpose	Community Committee for Recycled Water Storage					
Date	9/12/2015	Time	5pm – 7pm			
Meeting No.	2	Frequency	Fortnightly			
Facilitator	Jane Wilson, SA Water	Minute Taker	Chloe Ringwood, SA Water			
Venue	Virginia Horticultural Centre, Old Port Wakefield Road, Virginia					
Attendance	Evie Arharidis	P	Kieren Chappell	P	Paul Cleghorn	P
Ab = Absent	Danny De Ieso	P	Dino Musolino	P	Greg Pattinson	P
Ap = Apologies	Louis Marafioti	P	Nick Pezzaniti	P	Michael Picard	P
P = Present	Peter Rentoulis	P	Eddie Stubing	P	Felicia Nguyen	P
	Gerry Harris (proxy for Mark Wilson)	P	Rocco Musolino	Ap	Matt Sheedy	Ap
	Susie Green	Ap	Ross Trimboli	AP	Mark Wilson	Ap

1 Welcome and Apologies

Jane welcomed all members and introduced those that were absent from the first meeting held on 11 November 2015.

The agenda for the meeting was outlined as follows:

1. Welcome and apologies
2. Minutes of previous meeting and review of actions
3. Updated Terms of Reference
4. Public health aspects of recycled water
 - Guest presenters: SA Water - Dr Rudi Regel and Dr Ben van den Akker
5. Other business
6. Next meeting

The apologies were noted (as above).

Committee members were reminded to complete or update the Register of Interest document noting any relevant organisations/activities they are involved in, other than those they are representing. This will ensure any conflicts of interest are identified.

2 Minutes of previous meeting and review of action items

The minutes of the previous meeting held on 11 November 2015 were tabled and accepted without change.

The action items and progress was noted as follows:

1. To obtain an independent hydrogeologist to present on the topic of aquifer structure and hydrology in the Northern Adelaide Plains – Dr Glenn Harrington, Innovative Groundwater Solutions Pty Ltd is being engaged.
2. Arrange a visit to Bolivar Wastewater Treatment Plant and advise Committee members – visit being planned for 17 February 2016 (more details to come).

3 Updated Terms of Reference

An updated version of the Terms of Reference was tabled. This version took account of comments made at the meeting held on 11 November 2015.

The Committee acknowledged the change to Item 4 and agreement was noted.

Agreement was also noted from Members not present at the previous meeting to having their names published on the SA Water website.

The Committee was asked if they were comfortable for SA Water to remain as the media spokesperson for the Committee as discussed at the first meeting. Agreement was noted.

4 Presentation: Public Health Aspects of Recycled Water

Jane introduced two guest speakers from SA Water:

- **Rudi Regel PhD BSc (Hons) Dipl Pr. Man. – Recycled Water Coordinator (SA Water, Wastewater Design & Standards)**
- **Dr Ben Van den Akker - Senior Scientist (SA Water, Research & Innovation Services)**

Qualifications and Training: PhD, Bachelor of Science (Honours) and Bachelor of Environmental Health.

Current affiliations include Adjunct Lecturer at Flinders University, Adelaide University and UniSA.

Jane outlined that there would be two meetings focused on the topic of Recycled Water Quality as this was one of the key themes raised during the first phase of engagement.

The focus of this meeting is public health aspects. The next meeting will focus on the environmental aspects. (13/1/16 meeting).

Rudi presented first covering the topics of guidelines for water recycling and recycled water hazards.

The presentation slides are attached.

A summary of the questions and responses provided during this part of the are provided as follows:

A Member acknowledged that SA Water's monitoring meets all the required industry standards but noted that there is concern within the community about the long-term cumulative environmental effects (i.e. changes to microflora and soil profile) of using recycled water. In response, it was noted that there needs to be robust end use plans established to ensure this doesn't occur. Water quality data will be discussed at the next meeting.

Members noted that many irrigators have been using recycled water (through the Virginia Pipeline Scheme) for over 15 years and are experiencing issues with high salinity. In response, it was acknowledged that salinity levels vary over the year, with salinity in sewage increasing at time of high rainfall as groundwater rises and may enter the sewer within old sections of the network. Saline

sewage from the low lying areas of Pt Adelaide is treated separately at Bolivar, via the Bolivar High Salinity Plant. Sewage is pumped from Pt Adelaide via the Pt Adelaide Relift Pump Station (PARPS) to the Bolivar Sequencing Reactor Batch Plant. It was acknowledged that more could be done to look at ways to provide information about salinity levels to end users.

Further to this, a question was asked about the driver for the changes in salinity levels. In response, it was outlined that many parts of the sewer network connecting to the Bolivar WWTP are low lying gravity sewers that experience infiltration from groundwater. This is further impacted during heavy rainfall.

A Member asked where SA Water is positioned in terms of the treatment process at the Bolivar WWTP and meeting guidelines for public health. It was noted that the Bolivar WWTP and RWTP meet the health based targets for commercial food crops as outlined in the AGWR (2006). The pathogen log removal values are 6.0, 5.0 and 5.0 \log_{10} for viruses, protozoa and bacteria respectively. (An example is provided by B van den Akker, a summary to be provided at the next meeting for Viruses, Protozoa, Bacteria and each treatment process.

It was asked whether SA Water add any other chemicals besides chlorine to kill off bugs in recycled water. Alum (aluminium sulphate) and a polymer are dosed at the DAFF plant as part of the coagulation, flocculation and filtration process – typical chemicals used. There is no pH correction before or after coagulation. Hydrogen peroxide has been trialled for algal control in regional plants with lagoon systems.

One member understood that recycled water from the Glenelg Wastewater Treatment Plant is treated to higher levels than that from the Bolivar WWTP and asked whether there is any scope to improve the recycled water from Bolivar with the addition of membrane filters or some other technology. The Glenelg process achieves recycled water fit for dual reticulation as per the AGWR (2006) and is accredited with pathogen log removal values of 6.5, 5.0 and 5.0 \log_{10} , for viruses, protozoa and bacteria, respectively. It was noted that Glenelg doesn't have the same algae issues that Bolivar has as a result of using open lagoons. Membranes achieve a higher degree of filtration compared to media filtration (i.e. DAFF process) (refer to Table 3.4, pp 95 of AGWR, 2006). The UF membranes (0.04 μm pore size) at Glenelg originally achieved 2.5 \log_{10} virus removal, compared to 0.5 \log_{10} for DAFF media filtration. UF membranes can achieve 4.0 \log_{10} for protozoa removal compared to 2.0 \log_{10} for Bolivar DAFF media filtration. The respective turbidity requirements for Bolivar and Glenelg are 0.5-1.0 NTU and 0.3 NTU, respectively. Glenelg UF plant generally produces water at 0.05 NTU.

A member asked whether SA Water carries out testing of the levels of chemicals added during the treatment process and whether any residue remains in the recycled water after treatment. SA Water monitors a range of chemicals at numerous locations at Bolivar. Recycled water quality/ product water is monitored for a range of organic and inorganic chemicals, including aluminium (between 2010-2015, 62 measurements of total aluminium were carried out and an average of 0.11 mg/L was calculated. The Australian Drinking Water Guideline aesthetic value for aluminium (acid soluble) is 0.2 mg/L, but <0.1 mg/L is desirable. Alum usage is seasonal and is impacted by algal growth in the lagoons).

The Committee had a short break before reconvening for Ben Van den Akker's presentation on quantifying and managing pathogen risk (refer attached presentation slides).

The questions and responses provided during the second part of the presentation are summarised as follows:

One member asked whether SA Water had comparative data between food poisoning and poisoning from recycled water. In response it was noted that the majority of people in Australia/South Australia get gastro from food poisoning rather than drinking water, or using recycled water on crops. A recent example of a food poisoning outbreak which may have been caused by the use of contaminated

water or soils was the imported frozen berries incident which infected a number of people with Hepatitis A.

Clarification was sought on how 'logs' are achieved. It was outlined that a multibarrier system is used, as one part of the system will not address all pathogens. *Log Removal Values* (LRV or 'logs') are achieved by measuring the level of pathogen removal of each barrier a number of times. This information is provided to the Department of Health who then credit SA Water with a LRV. The LRV is always conservative, based on worst case scenario.

Clarification was sought on treatment for unforeseen viruses if sampling doesn't occur every day. In response it was noted that these spikes are captured in the health based targets that SA Water are required to meet through the treatment process. In achieving *Log removal*, there are a number of critical control points, points that can be measured in real time, which can assist in identifying these spikes and taking actions to treat. *Post meeting note: In addition to critical control point monitoring, the plant operator has an intricate knowledge of the wastewater treatment plant and knows when the treatment process is not working as it should. Performance of the plant is also linked to operator Key Performance Indicators. Continuous online monitoring and alarming alerts Operators to any potential deviations in aeration, media filtration, pH, turbidity, conductivity and chlorine disinfection).*

Following on from this, it was asked whether the recycled water in the lagoons was the only test point. It was reiterated that there are multiple control points used for monitoring and that the lagoons are not one of these given they cannot be controlled. Similarly, using average water qualities can't be used in achieving log removal credits.

A question was asked as to whether SA Water could advise the recycled water end users when chlorine dosing is increased. In response, it was noted that customers aren't notified if dosing is occurring within the guidelines and residual chlorine levels differ depending on where in the system the user is accessing recycled water. It was suggested that data could be made available online to assist the end user in making decisions about water use. This was acknowledged as a possibility in the future.

The required standard of recycled water for irrigation north of the Gawler River was questioned. The quality is dependent on the end use (refer presentation slides for required log removal for certain uses). Crops (broad acre, perennial, glass house) are considered as commercial food crops within the AGWR (2006). If spray irrigation is used, the current Bolivar treatment process is satisfactory in terms of health based targets – public health.

Clarification was sought as to why SA Water treats recycled water to a log removal of 4.8 log₁₀ when the required standard for food crops is 4.0 log₁₀. It was noted that SA Water treats the recycled water to a higher level given some food crop applications retain high water levels and therefore higher human consumption levels (i.e. tomatoes and lettuce). Higher treatment is required for spray irrigation of salads crops (i.e. lettuce) relative to drip irrigation of raised crops (i.e. grape vines, apples, pears) to achieve the minimum required health based target for commercial food crops. Treatment processes remove pathogens to different degrees and therefore multiple barriers are required. For example chlorine is good to remove viruses and bacteria and is ineffective against protozoa. In comparison, low doses of UV are effective against protozoa but not viruses.

A question was asked as to whether there had been any research into the best method of storage, above or below ground, from a water quality perspective i.e. is there an increase in pathogen load with storage underground? In response it was noted that there is no regrowth of pathogens underground, as pathogens need a host. The AGWR MAR (2009) outline that a minimum detention time is required for pathogen removal within a target aquifer for a pathogen LRV to be accredited. Detention time is based on when the recycled water is last injected, before being extracted. Conversely, detention time could also mean the time between the water being injected and it ever reaching a third party bore. Current research is examining the mechanisms (attachment etc) of

pathogen removal in aquifers. The CSIRO will provide an overview of pathogen removal research including results from Bolivar at a future meeting.

Further clarification was sought as to whether pathogens actually die off in the aquifer. An example of research undertaken at Salisbury was provided. The CSIRO tested the removal of a range of pathogens in the Parafield Stormwater Harvesting Facility – wetlands and original ASTR bores. Pathogen removal was measured readily in bacteria, but results were more variable with viruses and protozoa (reported in Sidhu *et al.*, 2010). Further pathogen decay testing with stormwater as part of the project was carried out and is reported in the Goyder Institute for Water Research Technical Report 13/17, pp 183. A question was asked as to whether SA Water conducts water quality testing onsite or offsite, and how often the equipment is calibrated. All testing is undertaken in the Australian Water Quality Centre (AWQC), a business of SA Water. The AWQC is NATA accredited and has ISO9001 accreditation. It was suggested that a tour of the AWQC be organised for interested members.

During the presentation, a number of guidelines associated with recycled water were referenced. These documents can be accessed via the following links:

National Water Quality Management Strategy

<https://www.environment.gov.au/water/quality/national-water-quality-management-strategy>

AGWR 2006

<https://www.environment.gov.au/system/files/resources/044e7a7e-558a-4abf-b985-2e831d8f36d1/files/water-recycling-guidelines-health-environmental-21.pdf>

AGWR Augmentation of Drinking Water Supplies

<https://www.environment.gov.au/system/files/resources/9e4c2a10-fcee-48ab-a655-c4c045a615d0/files/water-recycling-guidelines-augmentation-drinking-22.pdf>

AGWR Stormwater Guidelines

<https://www.environment.gov.au/system/files/resources/4c13655f-eb04-4c24-ac6e-bd01fd4af74a/files/water-recycling-guidelines-stormwater-23.pdf>

AGWR Managed Aquifer Recharge Guidelines

<https://www.environment.gov.au/system/files/resources/d464c044-4c3b-48fa-ab8b-108d56e3ea20/files/water-recycling-guidelines-mar-24.pdf>

DHA – SA Health Recycled Water Guidelines

http://www.sahealth.sa.gov.au/wps/wcm/connect/412d39004d1e315b8a26fe2ba18c3740/Guideline_SA+Recycled_Water_Guidelines_Oct2012.pdf?MOD=AJPERES&CACHEID=412d39004d1e315b8a26fe2ba18c3740

5 Other business

NAIS procurement process

Jane updated the Committee on the approach to the market for NAIS. The Expression of Interest (EOI) closed on 24 November 2015 and SA Water is currently evaluating proposals. It is anticipated that this phase will be finalised by the end of February 2016. A Selected Request for Proposal process will follow with short-listed respondents. The preferred proponent is expected to be selected by mid-2016.

A Committee member asked how the respondents can develop a proposal without knowing who their end users are. It was outlined that the EOI requested proposals that addressed end use at a high level. The next stage of the process will drill down into the specific detail of end use as well as how to transfer the recycled water etc.

Media activity

It was noted that since the last meeting there had been some media activity related to NAIS. This was driven by both parties of Government. This media activity has highlighted the focus that the SA Government has on NAIS.

Bunyip Water project

A Committee member asked about purple pipes they had seen on the side of the Northern Expressway and questioned where they were planning to be laid, where the connection will be and where the recycled water will be transported to.

Jane explained that this is a project executed by Bunyip Water in order to transport recycled water to the Barossa.

Light Regional Council added that they had received federal funding (\$10m) to harvest stormwater from the Gawler River. As part of the funding arrangement an agreement was entered into with Bunyip Water to construct and operate the scheme. In addition, Council sourced further funding to access recycled water from the Virginia Pipeline Scheme (through an arrangement with Trility Pty Ltd), to supplement the stormwater supply.

Some members of the Committee expressed that a previous proposal by property owners to harvest Gawler River water was rejected by the Natural Resources Adelaide & Mt Lofty Ranges (NRM) board and it seems this proposal has proceeded without the same scrutiny.

In response to a question asked about storage for the scheme, it was noted that Gawler River water would be held in an above ground storage pond in the Barossa region. It was also noted that there is an aquifer storage scheme in Kangaroo Flat which currently stores stormwater. Investigations are currently occurring to establish whether this could also be used to store recycled water recycled.

Communication

It was noted that communication the outcomes of the first phase of engagement and the formation of the Committee will be distributed to the broader community over the next few weeks.

The Committee was also reminded that information about NAIS and the Committee (including meeting papers) is being placed on the SA Water website.

6 Next meeting

The next meeting is scheduled for 13/01/2016 from 5-7pm at the Virginia Horticultural Centre. The focus of the meeting will be the environmental aspects of recycled water quality. The guest speaker for the meeting will be Rudi Regel, Recycled Water Coordinator (Wastewater Design and Standards).

Future meetings are being planned to occur every fortnight in order for the outcomes of the Committee to be fed into the next stage of the procurement process. A proposed schedule was tabled as follows:

Date	Meeting topic	Guest presenter
13 January 2016	Recycled Water Quality – overview continued	SA Water, Dr Rudi Regel
27 January 2016	Bolivar Managed Aquifer Recharge Research and	CSIRO, Dr Declan Page,

	Findings	Dr Joanne Vanderzalm, and Dr Peter Dillon
10 February 2016	Hydrogeological principles and Managed Aquifer Recharge	Dr Glenn Harrington, Innovative Groundwater Solutions
17 February 2016	Visit to Bolivar Wastewater Treatment Plant and Recycled Water Treatment Plant (DAFF plant)	SA Water and Allwater
24 February 2016	Above ground storage structures Licensing, Approvals and Monitoring	SA Water Asset Planning EPA, DEWNR, DHA (Dr David Cunliffe)
9 March 2016	Workshop and location identification (basis for draft plan)	Facilitated session

Open Action Items Register

No.	Action	By Whom	Date Raised	Status
1.	To obtain an independent hydrologist to present on the topic of aquifer structure and hydrology in the Northern Adelaide Plains.	SA Water	11/11/15	Underway
2.	Arrange a visit to Bolivar Wastewater Treatment Plant and advise Committee members	SA Water	11/11/15	Underway
3.	Arrange a visit to AWQC and advise Committee members	SA Water	9/12/15	Underway