



Independent Pricing and Regulatory Tribunal
New South Wales

Appendix C8

Network Operator and Retail Supplier Licence
Water Industry Competition Act 2006 (NSW)

Application
Kyeema Wastewater Pty Ltd

November 2019

Table C8 Risk assessment

| Provide the preliminary risk assessment for the scheme from source to end use. |
|--|
| <p>The preliminary risk assessment should:</p> <ul style="list-style-type: none">▼ Accurately identify any hazards present in the source water or likely to result from the proposed treatment process▼ Address intended, inadvertent and unauthorised end uses (and therefore routes of exposure) to the water▼ Identify any reasonably foreseeable risk event with the potential to expose people or the environment to hazards▼ Outline the broad mitigation measures where the risk of exposure to a hazard is unacceptable to human health or the environment in order to reduce the risk of exposure▼ Identify critical control points (CCPs) and water quality targets. |
| <p>The preliminary risk assessment should also identify the events and circumstances that could adversely affect the applicant corporation's ability to carry out the activities for which the licence is sought (including any activities undertaken by a nominated third party), the probability of the occurrence of any such event or circumstance, and the measures to be taken by the applicant corporation to prevent or minimise the likelihood of any such event or circumstance.</p> |
| <p>The preliminary risk assessment should demonstrate the application of a consistent methodology for identifying hazards and assessing potential impacts and risks to health and the environment. We strongly recommend that the applicant corporation utilises an established risk management system, such as outlined in <i>AS/NZS ISO 31000 (Risk management – Principles and Guidelines)</i>, which is consistent with the approach outlined in:</p> <ul style="list-style-type: none">▼ The <i>Australian Drinking Water Guidelines</i> (ADWG)(element 2), for drinking water▼ The <i>Australian Guidelines for Water Recycling</i> (AGWR)(element 2), for non-potable water. |
| <p>The preliminary risk assessment should consider risks specific to the area of operations for which an application is sought. It should also address business and financial risks, and demonstrate/contain a statement that the licensee has consulted with NSW Health and the NSW Environment Protection Authority regarding health and environmental matters. A statement noting that the proposed treatment system meet the water quality targets for the intended end uses should also be included with the preliminary risk assessment.</p> |
| Provide the preliminary risk assessment in Appendix C8. |
| <p>The size of the proposed sewage treatment system does not trigger the requirement for an Environment Protection Licence issued under the <i>Protection of the Environment Operations Act 1999</i>. Therefore, no consultation has been undertaken by the applicant with the NSW Environment Protection Authority regarding this licence application.</p> |



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Preliminary Risk Assessment

Kyeema Subdivision

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Document Control Sheet

| Document and Project Details | | | | | |
|-------------------------------------|--|-----------------------------------|--|---------|-------|
| Document Title: | Preliminary Risk Assessment – Kyeema Subdivision | | | | |
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| Date of Issue: | 09 August 2019 | | | | |
| Job Reference: | 2411_Preliminary Risk Assessment_001.doc | | | | |
| Synopsis: | This Preliminary Risk Assessment has been prepared to accompany the Kyeema Wastewater P/L WICA application for retail supplier and operator licences for the Kyeema Subdivision. | | | | |
| Client Details | | | | | |
| Client: | Paul Carmody | | | | |
| Document Distribution | | | | | |
| Version Number | Date | Status | DISTRIBUTION – NUMBER OF COPIES (p – print copy; e – electronic copy) | | |
| | | | Client | Council | Other |
| 001 | 09/08/19 | DRAFT | 1e | - | - |
| 002 | | FINAL | 1e | | |
| Document Verification | | | | | |
| Checked by: Mark Saunders | | Issued by: Jasmin Kable | | | |

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1 Scope

Table C.8 and E.3 requirements in Application.

Preliminary risk assessment for the scheme from source to end use.

- Identify potential risks that may impact the safe and reliable operation of the sewerage system (and associated components), specially focussed on risks associated with the following:
 - o Potential impacts to public health and/or water quality
 - o Environmental impacts including noise, odour and general environmental impacts
 - o Operational reliability and process performance.
 - o Retail activities - financial viability and customer service.
- Identify early, potential risk mitigation/ control measures that can be incorporated in the design, construction and operation of the system/s in order to sufficiently mitigate these risks.
- Identify critical control points (CCPs) and water quality targets

2 Introduction

This document forms the Preliminary Risk Assessment required for both the Network Operator and Retail Supplier WICA licences through IPART. The licensee has consulted with Innoflow Australia P/L and relevant governing bodies regarding the public and environmental health matters associated with the Kyeema Scheme.

The owners, management and employees of Kyeema Wastewater P/L and Innoflow Australia P/L are committed to adopting a coordinated approach to the management of risk throughout the company's operations and retail management, to ensure that any issues which could affect the performance, value or reputation, are identified and addressed. They are committed to:

- The safety and well-being of our people, customers, contractors and the general public, which must not be compromised under any circumstances;
- The environment in which we operate; and
- Either company's performance and value.

Innoflow is recognised throughout Australasia as the leading on-site wastewater solutions provider with extremely high in-house quality control procedures. Since starting 21 years ago, Innoflow has never had any serious incidences.

As part of Innoflow Australia P/L third party engagement, a Health and Safety Plan, Quality Control Plan and Quality Assurance Plan will be developed for the Kyeema scheme and can be supplied upon request prior to commencement of construction. Hazard identification for the scheme will occur prior to project commencement and at all other times as required throughout the project. The Quality Control Plan will be prepared to ensure all works are carried out to satisfy the requirement standards stipulated in ISO 9000/9001. The Quality Insurance Plan will

be developed as a guide to facilitate the establishment of quality assurance activities within processes and procedures used to deliver products and service in support of the proposed works.

The Sewage Management Plan (DWC, 2019) details the risks associated with the end-use irrigation of the treated effluent. The Specific Safety & Environmental Plan (Innoflow Australia P/L, 2019) details the safety protocols associated with the scheme and provides templates for reporting.

3 Regulatory Context

In regards to public health, relatively few restrictions need to be placed on non-drinking water uses of tertiary treated and disinfected recycled water. End use controls and onsite constraints can also be used to minimise both human exposure to hazards and the impact on receiving environments; such as signage, use of buffer zones, and control of plumbing and distribution systems.

The Australian Guidelines for Water Recycling: Managing health and environmental risks (Phase 1) (AGWR, 2006) were developed to provide guidance on the supply, use and regulation of recycled water schemes. It prescribes an approach to the management of public health and environment risks. This approach involves consistent methodology to identify the hazard, assess the potential impact and risks, and outline mitigation measures to prevent or minimise the likelihood of the risk occurring. The guidelines use a risk management framework comprising of twelve (12) elements with multiple barriers to control hazards. The framework is summarised by four (4) main categories: commitment to responsible use and management of recycled water; system analysis and management; supporting requirements; and review.

The principles of sustainable use of recycled water are based on three main principles:

- protection of public and environmental health is of paramount importance and should never be compromised;
- protection of public and environmental health depends on implementing a preventative risk management approach; and
- application of preventative measures and requirements for water quality should be commensurate with the source of recycled water and the intended uses.

The Framework incorporates the principles of Hazard Analysis (risk assessment) and Critical Control Points (HACCAP) and quality assurance; with the identification and management of critical control points central to the provision of sewage treatment for the subdivision.

IPART has adopted the AGWR Framework for assessing applications for approval to treat recycled water under the *Water Industry Competition Act 2006* (NSW).

4 Risk Assessment Methodology

4.1 Definitions

Effective risk management involves identifying all potential hazards and events and assessing the level of risk they present to public and environmental health. The assessment of risk for the Kyeema Scheme followed standard protocols outlined in the AGWR. The following provides definitions of the key terms associated with the risk assessment as determined by the AGWR:

Hazard *a biological, chemical, physical or radiological agent that has the potential to cause harm to people, animals, crops, plants or organisms; to the soil, air or water; or to the general environment.*

Risk *the likelihood that a hazard will harm exposed populations or receiving environments in a particular timeframe, combined with the severity of the impact (risk = likelihood x impact).*

4.2 Risk Assessment Matrix

Risks were assessed as per the qualitative environmental and public health risk assessment criteria detailed in the AGWR, with the resultant risk assessment matrix (likelihood x consequence) used to assess risks for potential hazards associated with the scheme.

Qualitative measures of likelihood

| Level | Descriptor | Example |
|-------|----------------|--|
| A | Rare | May occur only in exceptional circumstances. May occur once in 100 years. |
| B | Unlikely | Could occur within 20 years or in unusual circumstances. |
| C | Possible | Might occur or should be expected to occur within a 5- to 10-year period. |
| D | Likely | Will probably occur within a 1- to 5- year period. |
| E | Almost Certain | Is expected to occur with a probability of multiple occurrences within a year. |

Qualitative measures of consequence or impact

| Level | Descriptor | Example |
|-------|---------------|---|
| 1 | Insignificant | Insignificant impact or not detectable. |
| 2 | Minor | Health – minor impact for small population. Environment – potentially harmful to local ecosystem with local impacts contained to site. Operations – operational impact results in unscheduled visits by Innoflow. |
| 3 | Moderate | Health – minor impact for large population. Environment – potentially harmful to local ecosystem with local impacts primarily contained to site. Operations – process is unavailable for a couple of days or associated costs are in the order of \$5,000. |
| 4 | Major | Health – major impact for small population. Environment – potentially lethal to local ecosystem; predominately local but potential for off-site impacts. Operations – process is unavailable for a week or associated costs are between \$10-50k. |

| | | |
|----------|---------------------|--|
| 5 | Catastrophic | <p>Health – major impact for large population.</p> <p>Environment – potentially lethal to regional ecosystem or threatened species; wide-spread onsite and off-site impacts.</p> <p>Operations – process is unavailable for more than two weeks or associated costs are greater than \$50k.</p> |
|----------|---------------------|--|

Qualitative risk analysis matrix – level of risk

| | 1 Insignificant | 2 Minor | 3 Moderate | 4 Major | 5 Catastrophic |
|--------------------|--------------------|------------|---------------|------------|-------------------|
| A (rare) | Low | Low | Low | High | High |
| B (unlikely) | Low | Low | Moderate | High | Very High |
| C (possible) | Low | Moderate | High | Very High | Very High |
| D (likely) | Low | Moderate | High | Very High | Very High |
| E (almost certain) | Low | Moderate | High | Very High | Very High |

5 Scheme Description

5.1 Background

Kyeema Wastewater P/L in third party agreement with Innoflow Australia P/L are proposing to collect domestic wastewater generated by the 50-lot Kyeema subdivision within on-lot STEP (interceptor) tanks and pump the primary treated sewage via a pressure effluent sewer to a centralised Sewage Treatment Plant (STP). The treatment technology installed at the STP will comprise of AdvanTex™ packed bed reactors, with the secondary treated effluent (and disinfected) to be 100% reused onsite via pressure-compensating subsurface irrigation within a designated turfed irrigation area. The proposed STP meets the water quality targets for the intended end use of open space irrigation.

5.2 Governance

The scheme Network Operator Licence and Retail Supplier Licence will be held by Kyeema Wastewater P/L, with the Network Operator responsibilities contracted out to a Third Party, Innoflow Australia P/L. The governance responsibilities of the scheme are detailed within the contract held between the two parties.

5.3 Health Hazards

Water quality requirements for recycled water are based on the likely exposure volumes that can be ingested. Table 14 of the Sewage Management Plan (DWC, 2019) details the following log reductions that were assumed for this scheme, with the targets based on those provided in Table 3.8 of AGWR for 'Open Space Irrigation of Treatment Sewage (municipal use)' for conservatism. The log reduction value represents an order of magnitude decrease in pathogen concentration, with the higher number of log reductions. End use control barriers for the

irrigation area will include UV disinfection and subsurface irrigation, which will minimise potential contact with humans and animals.

Assumed Treatment Log Reductions for Proposed System

| Measure | Viruses | Protozoa | Bacteria |
|--|--------------|-------------|-----------|
| Treatment Measures | | | |
| Advanced Secondary Treatment | 1-2 | 1-2 | 1-3 |
| UV disinfection | 1-3 | >3 | 2-4 |
| On-site Measures | | | |
| Subsurface irrigation of above ground crops | 4 | | |
| Withholding periods | 1 | | |
| No public access during irrigation, limited contact after | 3 | | |
| Buffer zones | 1 | | |
| Total (Target) | 11-14 (5) | 13-14 (3.5) | 12-16 (4) |

5.4 Environmental Hazards

The most significant environmental hazards in recycled water are generally chemical and physical. The key environmental hazards as identified by AGWR are: boron, cadmium, chlorine, hydraulic load (water), nitrogen, phosphorus, salinity, chloride and sodium. A number of hazards have been identified for the sewage collection, treatment, storage and end use as part of the Kyeema scheme. A risk assessment table has been developed to identify the actions and controls which will aid in mitigating risk and reduce the likelihood of their occurrence.

5.5 Critical Control Points

A CCP is an activity, procedure or process that is essential to prevent a hazard or reduce it to an acceptable level. The choice of critical control points were reviewed as part of the risk assessment and included:

- Sewage Treatment Plant
- UV disinfection

Quality and critical control points

Critical alert limits – what

Alert value

Critical value

Monitoring procedures:

What – i.e. influent pH

How – i.e. sensor

When – i.e. continuous, online

Where – i.e. buffer tank

Who – i.e. innoflow

Corrective actions – i.e.

Critical limits have been defined as part of the preventative measures outlined for each CCP identified. A critical limit represents a quantitative or qualitative tolerance level which defines the limits of acceptable performance for each CCP. Alert criteria and corrective actions have been defined for each CCP, with an exceedance of a critical limit indicating a potential health or environmental risk.

6 Incidents and Emergencies

Innoflow Australia P/L and Kyeema Management P/L will include incident management and emergency response protocols within its operation and maintenance manuals for the system to ensure that public and environmental health risks are managed effectively and efficiently. These protocols will be defined through the development of the HACCP and will be developed in consultation with EPA, NSW Health and other relevant authorities and will be consistent with existing emergency response regulation.

6.1 Employee Awareness and Training

Both Kyeema Waster P/L and Innoflow Australia P/L are individually responsible for ensuring its employees and contractors are familiar with the operation of the scheme and aware of the potential consequences of system failures, and of how their decisions can affect the safety of the scheme.

Any staff used on-site must be accredited, qualified, and have the appropriate level of training.

A site induction will be required for anyone doing work related to this scheme. This will be carried out and recorded by, or by those appointed and trained by for this purpose. For STP work, this includes familiarisation with Innoflow's Site Safety and Environmental Plan (2019).

6.2 Notifications

Kyeema Wastewater, as the licence holder will, as soon as practical within 48 hours, notify the NSW Department of Health and IPART should any of the following incidents occur:

- a system failure that may potentially impact on the end use of the recycled water or place public health at risk;
- an emergency or an incident that potentially places public health at risk; and

- any changes to the operation of the treatment process that may potentially impact on achieving the required microbial criteria.

Notification should include details of corrective and future preventive action.

7 Summary

Based on this preliminary risk assessment, it can be seen that the proposed sewage scheme provides suitable factors of safety and barriers of protection to ensure (subject to appropriate management) that risks to human health are managed.

DRAFT

Risk Assessment Table

Confidential draft

| Activity | Risk | Impact | Unmitigated Risk | | | Control Strategy | Mitigated Risk | | |
|------------------------|--|--|------------------|-------------|-----------|---|----------------|-------------|----------|
| | | | Likelihood | Consequence | Risk | | Likelihood | Consequence | Risk |
| Sewer Line | Burst of Sewer | Spill of influent to environment | Unlikely | Moderate | Moderate | Ensure the installation was done as per specification | Unlikely | Minor | Low |
| | Blockage of Sewer | Little or no flow to pump stations | Possible | Minor | Moderate | Education of end user | Possible | Minor | Moderate |
| | Cleaning products | Cleaning chemical that may influence the treatment | Possible | Minor | Moderate | List of approved chemicals to be provide for the end users. | Possible | Minor | Moderate |
| STEP tanks | High level of solids, papers disposal in toilets | Pump Failure | Possible | Minor | Moderate | Macerator pumps, duty/standby | Unlikely | Minor | Low |
| | High flows | Pump Station overflow | Possible | Minor | Moderate | High level alarms | Unlikely | Minor | Low |
| | Bad smell emitted from the pump station | Complaints | Possible | Minor | Moderate | Odour control | Unlikely | Minor | Low |
| | Tank breakage | Spill of influent to environment | Unlikely | Moderate | Moderate | Ensure the installation is certified for the tank design life. | Unlikely | Minor | Low |
| | High or low pressure due pipe blockage | Pump Failure | Possible | Minor | Moderate | Pump failure alarm | Possible | Minor | Moderate |
| | High level of sludge in the tank | Low tank capacity | Possible | Minor | Moderate | Desludge the pump station more often | Possible | Minor | Moderate |
| Pump Sation | High flows | Pump Station overflow | Possible | Minor | Moderate | High level alarms | Unlikely | Minor | Low |
| | Bad smell emitted from the pump station | Complains | Possible | Minor | Moderate | Odour control | Unlikely | Minor | Low |
| | Tank breakage | Spill of influent to environment | Unlikely | Moderate | Moderate | Ensure the installation is certified for the tank design life. | Unlikely | Minor | Low |
| | High or low pressure due pipe blockage | Pump Failure | Possible | Minor | Moderate | Pump failure alarm | Possible | Minor | Moderate |
| Treatment plant system | Incoming wastewater quality out of specification | Effluent quality not complying with targets | Possible | Moderate | High | Test influent quality | Unlikely | Minor | Low |
| | Metals, organic chemicals and other potential contaminants | Public Health and environmental impacts | Possible | Minor | Moderate | Trade waste agreement, ongoing awareness and education. | Possible | Minor | Moderate |
| | Population increase | Unable to treat hydraulic load at treatment plant | Possible | Moderate | High | Buffering and overflow tanks. Pump out when it is necessary | Unlikely | Minor | Low |
| | Noise and smell emitted from the treatment plant | Complaints | Possible | Minor | Moderate | Odour control and insulated control sheds | Unlikely | Minor | Low |
| | Unauthorized visitors | Exposure to effluent/Sewage | Possible | Minor | Moderate | Ensure all hazardous areas are identified with sign posts and treatment plant secured | Possible | Minor | Moderate |
| | Catastrophic events | Environmental health risk and contamination | Possible | Major | Very High | Emergency procedures eg. backup generator | Unlikely | Moderate | Moderate |
| | Incorrect installation | Treatment Plant Failure | Unlikely | Moderate | Moderate | Commissioning | Unlikely | Minor | Low |
| | High concentration of oil and grease entering the treatment system | Impact on biological process | Possible | Minor | Moderate | Installation of grease traps | Unlikely | Minor | Low |
| | Power Failure | System stop to operate | Possible | Minor | Moderate | Power failure alarm and pump out the system if it is necessary | Possible | Minor | Moderate |
| | Mechanical failure (floats, splitter valve, biotube) | Loss of process, high level, low level | Possible | Minor | Moderate | High level, low levels alarms | Possible | Minor | Moderate |
| | Pump Failure | less treatment quality, overflow, odour complaints | Possible | Minor | Moderate | Pump failure alarm | Possible | Minor | Moderate |
| | High level of solids | Sludge build up | Possible | Minor | Moderate | Regular service monitoring | Unlikely | Minor | Low |
| | High level | Overflow | Possible | Minor | Moderate | High level alarm | Unlikely | Minor | Low |
| | Tank Overflow | Spill of influent to environment | Possible | Moderate | High | High level alarms, pump out if necessary | Unlikely | Moderate | Moderate |
| | Tank leak | Exfiltration out of tank | Unlikely | Minor | Low | Tank repair | Unlikely | Minor | Low |
| | Tank leak | Infiltration inside of tank | Possible | Minor | Moderate | Flow monitoring | Possible | Minor | Moderate |
| | DO, Ph and turbidity out of the range | Impact on biological process | Possible | Minor | Moderate | Routine Servicing | Unlikely | Minor | Low |
| | Solenoid valves failure | Overflow | Possible | Minor | Moderate | Routine Servicing | Unlikely | Minor | Low |
| Disposal Field | Breakout at land application | Public Health and environmental impacts | Possible | Minor | Moderate | Visual check | Possible | Minor | Moderate |
| | Breakout at land application | Livestock | Possible | Major | Very High | Fully fenced disposal field | Possible | Minor | Moderate |
| Maintenance | Electrical Shock | Fractures, fatality, Disaster | Possible | Moderate | High | Allow only registered Electricians/Appropriately qualified staff to deal with Electrical aspects; Isolate all power prior to working on electrical connections; Visually inspect all electrical equipment prior to handling; Keep all liquids away from electrical connections. | Unlikely | Moderate | Moderate |
| | Waste Handling/Exposure | Health impact | Possible | Minor | Moderate | Ensure All appropriate PPE is worn; No Eating or Drinking or Smoking around Treatment plant; Ensure employees employ good hygiene practices; Ensure any wounds are appropriately dealt with & not exposed to | Unlikely | Minor | Low |
| | Confined Space risk, falling, sewer gases, lake of oxygen | Health impact | Possible | Major | Very High | Ensure all personnel entering, or overseeing are appropriately qualified in Confined Space entries | Unlikely | Moderate | Moderate |
| | Cleaning components, like pumps, biotube filter, textile ... | Health impact | Possible | Minor | Moderate | Ensure All appropriate PPE is worn; Ensure employees employ are trained; Ensure employee has the correct tools. | Unlikely | Minor | Low |