AN INTEGRATED REGULATORY APPROVALS APPROACH TO A FRAGMENTED REGULATORY SYSTEM

Neil McGuinness, Paul Zahra, Martin Anda
ENV Australia, Perth, WA

ENV Australia Pty Ltd
Level 7, 182 St Georges Terrace, Perth WA
Contact: (08) 9289 8360.

ABSTRACT
Tuart Lakes Lifestyle Village (TLLV) is a lifestyle village of 470 dwellings on 25 hectares with considerable water and wastewater constraints approximately 50km South of Perth, Western Australia. It involves the use of a Wastewater Treatment System that will be owned and operated by TLLV as a non water utility service provider (a first for WA).

The development of the site highlighted significant inadequacies in the regulatory approval system. The government approach to the approvals process is fragmented and required separate uncoordinated approvals from each agency.

Each government department would only manage its own respective regulatory framework which created major development delays and expensive solutions to address the regulatory concerns and duplication of approval requirements.

An interagency recycled water approvals framework has been proposed to address many of these concerns.

INTRODUCTION

Tuart Lakes Lifestyle Village (TLLV) is being developed by National Lifestyle Villages to house approximately 800 residents in 470 dwellings on 25 hectares. The water recycling system will receive a combined wastewater stream (primarily from a domestic source) for beneficial reuse around the development within gardens and public open space.

ENV Australia Pty Ltd (ENV) was engaged to produce technical reports and facilitate the regulatory approvals process. Approvals were required from the Department of Environment and Conservation (DEC), Department of Health (DoH) and the Economic Regulation Authority (ERA). TLLV will be connected to scheme water but does not have access to the sewer, which is some 3km away. Thus the project presents the opportunity to construct and operate a recycled water system utilising a service provider other than Water Corporation. The recycled water system will reduce the total water demand for the project and provide a beneficial use for an otherwise wasted resource.

The approvals process required specific knowledge of the complicated regulatory pathway for recycled water projects in Western Australia.

To assist in the approval process ENV staff undertook the following tasks and prepared key documentation:

- Water balance model,
- Contaminated sites assessments,
- Flora and fauna assessments,
- Preparation of asset management plans,
- Preparation of health risk assessments,
- Preparation of environmental risk assessments,
- Land capability assessments,
- Nutrient and Irrigation Management Plans, and
- Ongoing water monitoring.

An aerobic wastewater treatment system is being provided by Aquasol Pty Ltd. The location on the site is shown in Figure 1.

This paper:

- Identifies the significant issues associated with the proposed recycled water scheme;
- How they have been addressed;
- The indicative costs of the scheme and likely benefits to similar schemes; and
- Proposes an interagency government approval framework for the future, with a suggested lead agency.

BACKGROUND

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BACKGROUND

The TLLV site is located approximately 50km south of Perth in Baldivis, Western Australia, as shown in Figure 1, on the Swan Coastal Plain.

The site is located within the City of Rockingham as indicated in Figure 1. The site is not located within a public drinking water protection zone, nor does it contain any Aboriginal heritage sites. An environmentally sensitive area within close proximity to the site includes Lake Cooloongup, which is one of six wetlands included within the Rockingham Regional Park and recognised by the Australian Heritage Commission for their heritage and conservation values.
The regional geology indicates the site is located within the Spearwood dune system, which consists of yellow brown sands over limestone (Golder, 2008). The Site is bounded by Mandurah Road and Lake Cooloongup Reserve to the west, surrounding land uses include intensive horticulture to the east and rural and semi rural properties to the north and south. Horticulture properties adjoining the eastern boundary, including a significant established commercial market garden and retail facility.

**AIM**

The chief aim of the ENV on behalf of the client National Lifestyle Villages Pty Ltd (NLV) was to gain approval from all relevant government agencies for the TLLV recycled water system.

This required the preparation of numerous technical reports that addressed the individual concerns of the key regulatory and licensing agencies (the DEC, DoH and the ERA).

**METHODOLOGY**

**Supporting studies and reports**

ENV staff co-ordinated the completion of a number of supporting technical studies and reports that were required to underpin the regulatory approval processes. These studies included:

- A Nutrient and Irrigation Management Plan (Golder and Associates Pty Ltd);
- Water Balance (GHD);
- A Health Risk Assessment (GHD);
- A Land Capability Assessment (GHD);
- An Environmental Risk Assessment (GHD);
- An Operational Sampling Plan (GHD);
- An Operator Training Manual (GHD);
- An Asset Management Plan (ENV); and
- An Operation and Maintenance Plan (Aquasol).

**Wastewater Treatment Plant**

The wastewater treatment plant process at TLLV is depicted in Figure 1. It incorporates anaerobic and aerobic treatment along with Return Activated Sludge to facilitate biological wastewater treatment.

Three biological aeration tanks to promote biological digestion and removal of:

- Biochemical Oxygen Demand (BOD$_5$) and breakdown of ammonia;
- A flocculant system to add flocculant for phosphorus removal;
- A clarifier tank to separate the clear water from the solid sludge, which is returned to the anaerobic tank to provide bacteria to drive the process and facilitate nitrogen removal;
- A final polishing tank, dosed with ozone for additional nitrogen removal and removal of odour from the odour capture (vent) system;
- A filter system including a coarse zeolite filter and then a membrane filter to remove any remaining solids in the effluent; and
- A chlorine dosing system to disinfect the water prior to being collected and used for irrigation purposes.

Figure 2 details the treatment process.

**Stakeholder engagement**

Numerous briefing sessions were held with the government departments to detail the proposed development and associated recycled water system. These were held throughout out the life of the project, but most importantly at the start to determine the individual agencies requirements and respective approval frameworks.

**Applications**

Applications were prepared for approvals from three Government Agencies and one Local Government, for the recycled water system, as follows:

- **Department of Health**:  
  1) Recycled Water Scheme Application;
  2) Application to Install an Apparatus for the Treatment of Sewage
- **Department of Environment and Conservation**:  
  1) In the form of a Works Approval Application, which allows production of recycled water up to a capacity of 100kL/day.
  2) A Licence Application that will be required when the capacity of wastewater treatment facility exceeds 100kL/day.
- **Economic Regulation Authority**: in the form of an Operating Licence Application; and
- **City of Rockingham**:  
  1) Planning approvals for the site (including rezoning the WWTP land).
2) Initial assessment of the WWTP prior to it going to the DoH for assessment.

3) Building licences associated with the WWTP.

*Public consultation was also undertaken by the ERA and the DEC as a part of their normal assessment processes with the proposal being advertised for periods of 30 days

Baseline groundwater monitoring and treatment system validation
Baseline groundwater monitoring was undertaken on the site to ensure that the recycled water would not cause a deterioration in existing groundwater quality. Validation monitoring will be undertaken following the commissioning of the system and will monitor the influent and effluent for the microbiological, chemical and physical quality parameters indicated in Table 1.

<table>
<thead>
<tr>
<th>Table 1: Validation and Verification Monitoring Requirements from the Interim Guidelines for Management of Private Recycled Water Schemes</th>
</tr>
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<tbody>
<tr>
<td><strong>Parameter</strong></td>
</tr>
<tr>
<td>pH</td>
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<tr>
<td>Turbidity</td>
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<tr>
<td>Dissolved Oxygen</td>
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**Outdated Legislation/Approval Instruments**

Many of the key documents that are currently used by the WA Government agencies are redundant in terms of currency with industry standards from a local and national perspective as indicated below:

- Health Act 1911
- Health (Treatment of Sewage and Disposal of Effluent and Liquid waste) Regulations, 1974;
- Environmental Protection Act 1984.

These documents are highly prescriptive in nature and have no risk management focus or approach. They also only consider essentially centralised water solutions (i.e. mains sewer) or on-site effluent disposal. There is no provision within them to accommodate novel or modern technologies such as those associated with recycled water systems.

**Liaising with multiple regulatory agencies**

This led to a number of inefficiencies within the project, particularly when key staff at the respective agencies were unavailable for significant periods of time. The communication between agencies on these type of projects is also not well established or co-ordinated and this caused some issues, particularly when technical clarifications were required by the ERA.

**Project Costs**

The project costs relating to the approvals process have been significant and include the following:

- $500,000 for professional consultancy services to prepare supporting documentation and applications for approval to Government regulators;
- $600,000 for the design and contract of the Wastewater Treatment Plant;
- $290,000 for the design and construct of the POS and outside home irrigation areas; and
- There will also be ongoing monitoring costs associated with the verification of the recycled water system, at approximately $30,000/yr.

**Considerable overlap in regulatory requirements**

When developing the sampling and analysis document there was considerable overlap between the DEC and the DoH in terms of the level and type of chemical analytes to be sampled (both from the influent and effluent, as well as the background baseline analysis of the groundwater). The

**KEY ISSUES IDENTIFIED**

**Appointing an approved service provider**

The regulators were somewhat reticent and conservative in assessing the proposed system, given that it was being provided by a non Water Corporation provider (the State’s largest licensed water utility). Technical and financial competency and capacity to operate and maintain the system were the most significant issues. The proposed relationship between TLLV and the provider of the treatment technology (Aquasol) was also of interest to the ERA, as the Asset needs to be maintained and operated competently for the “life of the asset”. This was subsequently required to be clearly articulated in an:

1. detailed operation and maintenance plan;
2. operator training manual;
3. operational sampling plan; and an
4. asset management plan.
compliance costs for this additional monitoring, for relatively low risk schemes can be a significant cost burden, ultimately impacting the viability of schemes of this type.

**Incomplete, complex Western Australian Draft Recycled Water Guidelines and Inconsistencies with other States and National Requirements**

Existing recycled water guidelines in WA are currently in draft form and appear to be inconsistent with the requirements of other states and the National Recycled Water Guidelines. They currently require a Recycled Water Quality Management Plan to be prepared for all types and scales of recycled water schemes (independent of risk and exposure). The primary function is to identify and control critical control points (CCP’s). These documents are specialised, highly technical and inherently expensive to prepare. The document has been prepared by the Department of Health’s Water Unit, but there is no similar document in existence for the environmental regulator (DEC).

**Gaps in regulators knowledge of wastewater and recycled water system technology**

Western Australia has never had a decentralised recycled water system (on this scale) approved for use previously (in a domestic setting). Consequently, regulators are somewhat, understandably conservative in their approach to proposals of this type. Within the government departments (DoH and DEC) who assess the proposed treatment train and management systems, there was an acknowledgement by senior staff that they are unfamiliar with the wastewater technology used at TLLV and many of the risk management concepts that were proposed. ENV staff worked closely with these staff members to assist the process, providing appropriate levels of technical advice and input (where required).

**Lengthy approval timeframes**

The DEC Works Approval took 11 weeks to be approved, which is record turn around time. Anecdotally, it has been reported that previous similar applications have taken up to 12 months to be assessed. The ERA licence assessment process involves both an assessment of the financial and technical capacity of both the project and proponent. This inevitably involved referral to a third party for the technical review which may involve a period in excess of 6 months. It needs to be noted that the ERA application was not able to be accepted for lodgement until:

1. The DEC had issued their Works Approval;
2. The DoH had issued their 2 approvals.
3. The Council had issued planning approvals for development of the site.

Cumulatively, this has resulted in a projected approval timeframe that will be likely to exceed 9 months.

**SUGGESTED RECYCLED WATER APPROVALS FRAMEWORK**

A more efficient approvals framework would be to:

- Create a central approving authority that coordinates the requirements of each current regulatory authority,
- Create a single inter-agency guidance document for the approving authority, and
- Provide appropriate technical support for the agencies from a centralised working group of dedicated professionals.

![Figure 3: Suggested Solution](image)

The DoW have a Recycled Water Branch that is desperately under-resourced both in terms of technical knowledge and resources. This Agency would seem to be the logical lead Agency to advance recycled water initiatives within Western Australia, given it’s intrinsic connections to industry, Local Government and other Government Agencies.

**RESULTS**

The project has received in-principal approval to construct the Recycled Water System from the DoH, and the Works Approval from the DEC. The licence to operate the facility is still pending from the Economic Regulation Authority at the time of writing this paper.

**Application to Other Similar Projects**

The key regulatory processes have been clearly identified and will be able to be utilised for other similar developments that are proposed for WA. Currently no water or wastewater service provider (other than the Water Corporation) is licensed with the ERA to operate within the Perth Metropolitan Area.

The process that was followed for the TLLV project has clearly identified:
1. The level, type and nature of technical documentation required for the respective approvals;
2. Required level of stakeholder liaison;
3. Environmental monitoring requirements; and
4. Treatment system technology requirements;

for similar recycled water schemes to be approved by regulatory authorities.

Feedback from the Government Departments has been positive and it appears that projects of this type are providing a “learning platform” for many of its officers. The only way to advance recycled water system uptake within Western Australia is for projects of this type to be consistently presented to regulators with the required level of detail and stakeholder engagement.

CONCLUSION

The existing regulatory approvals system for recycled water proposals in WA is cumbersome, inefficient and outdated, leading to projects such as this one often being stalled or rejected. The estimated approval timeframe for this project will ultimately be approximately 9-12 months from inception to completion.

This is impacted significantly by:

- The age and appropriateness of the regulatory tools that are used by the agencies;
- The respective knowledge of agency staff of current treatment technologies and risk management techniques;
- The lack of co-ordination between agencies with respect to assessment of recycled water project applications.

The preparation of the technically robust supporting documentation, site investigations and early stakeholder consultation remains as the most prudent way to navigate the convoluted application pathway.

There is urgent need for a centralised government approving authority, that is appropriately resourced either externally or internally with skilled professionals. The DoW have a Recycled Water Branch that is desperately under-resourced both in terms of technical knowledge and resources. This Agency would seem to be the logical lead Agency to advance recycled water initiatives within Western Australia, given it’s intrinsic connections to industry, Local Government and other Government Agencies.

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- GHD Pty Ltd
- Golder and Associates Pty Ltd

REFERENCES


Figure 1: Location of Tuart Lakes Lifestyle Village
Figure 2: Tuart Lakes Lifestyle Village Wastewater Treatment Process (Aquasol Pty Ltd, 2009)