1. Introduction

Lockyer Valley Regional Council (LVRC) obtained funding under the National Water Infrastructure Development Fund (NWIDF) to undertake a pre-feasibility study to identify supply options for securing water for agricultural sustainability. The NWIDF implements the Australian Government's commitment to start the detailed planning necessary to build or augment existing water infrastructure including dams, pipelines or managed aquifer recharge. The objective of the Fund is to help secure the nation’s water supplies and deliver regional economic development benefits for Australia, while also protecting the environment.

This Statement of Work details the activities undertaken to complete the pre-feasibility study.

2. Objective

The objective of the pre-feasibility study was to evaluate water supply options that will increase the security of supply of water to the Lockyer Valley for agricultural use.

The scope of the study was to:

> Include a literature review, collect data and undertake research to establish the existing knowledge base
> Undertake stakeholder engagement.
> Identify concept options
> Prepare a pre-feasibility analysis of concept options and detailed planning

This pre-feasibility study does not include:

> A detailed assessment of the demand for, or willingness of end users to pay for, water from the various supply options
> A cost benefit analysis of pursuing any of the identified supply options.

3. Literature review

The literature review assessed the existing knowledge base so that the pre-feasibility study could build on this base. Table 2-1 details the previous reports that were referred to in the literature review. The report analysis drew on a wider base of references beyond the literature review and a full list of documents referenced in the report is included at Attachment 1.

<table>
<thead>
<tr>
<th>Year</th>
<th>Author</th>
<th>Client</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1979</td>
<td>The Division of Land Utilisation, Department of Environment and Resource Management</td>
<td>State of Queensland</td>
<td>Land Degradation in the Lockyer Catchment</td>
</tr>
</tbody>
</table>
4. **Stakeholder engagement**

Table 3-1 details the stakeholder engagement meetings undertaken. Community engagement was led by Lockyer Valley Regional Council.

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Date</th>
<th>Attendees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department of Natural Resources and Mines</td>
<td>13/03/17, 11.30am</td>
<td>Fred Hundy – DNRM, Paul Cranch – LVRC, Stephen Walker – Cardno, Dan Wood – Cardno, Sean Murphy - GWAS</td>
</tr>
</tbody>
</table>
Based on literature review, stakeholder engagement and further research and analysis, a long list of potential water security options was generated. The long list of options is summarised in Table 4-1.

**Table 4-1 Options long list**

<table>
<thead>
<tr>
<th>Category</th>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface water</td>
<td>Water from Wivenhoe/Somerset dam</td>
<td>A new large diameter trunk main supplying raw water to Atkinsons Dam, Lake Clarendon and Lake Dyer</td>
</tr>
<tr>
<td>Surface water</td>
<td>Water from other area in south east Queensland</td>
<td>As above but with water sourced from a source other than Wivenhoe/Somerset</td>
</tr>
<tr>
<td>Groundwater</td>
<td>Recharge of aquifers with surface water</td>
<td>There are nine existing recharge weirs in the Lockyer Valley. Increase the volume of water going to groundwater through more weirs, increasing the effectiveness of existing weirs (potentially through desilting) or other infrastructure such as injection wells. Possibly discharge directly to creeks</td>
</tr>
<tr>
<td>Groundwater / recycled water</td>
<td>Recharge aquifers with recycled water</td>
<td>Recharge of groundwater aquifers with recycled water from either the WCRWS or local treatment plants. Possibly discharge directly to creeks</td>
</tr>
<tr>
<td>Groundwater</td>
<td>Treatment of saline groundwater</td>
<td>There are some saline groundwater resources in the Lockyer Valley that could be treated for use</td>
</tr>
<tr>
<td>Groundwater</td>
<td>Water from coal seam gas extraction</td>
<td>When coal seam gas is extracted, water is a by-product. There are coal seam reserves nearby to Lockyer Valley (not currently being accessed) and further away in the Surat Basin</td>
</tr>
<tr>
<td>Category</td>
<td>Option</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>--------</td>
<td>-------------</td>
</tr>
<tr>
<td>Recycled water</td>
<td>Recycled water from local wastewater treatment plants</td>
<td>QUU owns and operates five wastewater treatment plants in the Lockyer Valley from which recycled water may be sourced.</td>
</tr>
<tr>
<td>Recycled water</td>
<td>Western Corridor Recycled Water Scheme (WCRWS) – Higher class water</td>
<td>The WCRWS (although currently in care and maintenance mode) can be operated to supply high quality (Class A or A+) via an offtake from the existing pipeline. If the WCRWS is discharging to Lake Wivenhoe, water could be taken from there. Recycled water could then be transferred to the Lockyer Valley using new infrastructure or discharged into waterways.</td>
</tr>
<tr>
<td>Recycled water</td>
<td>Western Corridor Recycled Water Scheme (WCRW) – Lower class water</td>
<td>WCRWS is operated to supply low class (Class B or C) water directly to the Lockyer Valley through an offtake from the existing transfer pipeline</td>
</tr>
<tr>
<td>Recycled water</td>
<td>Greywater reuse</td>
<td>Centralised or decentralised greywater (typically water from laundry, taps and showers) capture, treatment and reuse</td>
</tr>
<tr>
<td>Surface water</td>
<td>Stormwater harvesting</td>
<td>Stormwater harvesting from large open areas and storage in tanks or dams for later use. Could be transferred to existing storage or recharged into aquifers</td>
</tr>
<tr>
<td>Water trading</td>
<td>Trading of permanent and seasonal water</td>
<td>Trading of permanent and seasonal water from other supply schemes in the Water Plan area</td>
</tr>
<tr>
<td>Efficiency</td>
<td>Improve on-farm irrigation efficiency</td>
<td>Enable irrigators to use higher efficiency irrigation equipment and/or farming techniques</td>
</tr>
</tbody>
</table>

6. Options assessment

From the long list of options, a number of alternatives were removed from further consideration because they have significant flaws that mean that they cannot meet the project objective or because there are substantial cost constraints. The project objective is to sustainably provide water for agriculture in the Lockyer Valley. This objective was further defined to include the following measures which were used to filter options:

- Supply of water in the very long term (sustainability) – agriculture should be a sustainable land use far beyond traditional planning horizons (20-50 years). Sustainability means water supply and agricultural production in perpetuity. The sustainability of each option was assessed.
- Supply of sufficient volume of water to meet demand (yield) – the likely yield of each option was quantified for each option
- Supply option cost (cost) – levelised cost was determined for options based on the particular parameters of the option or with reference to levelised costs reported in literature. At this stage, only options with an obviously high cost or higher cost than a close alternative have were excluded.

7. Conclusions and recommendations

Based on the analysis and investigation undertaken, conclusions regarding potential options for water security in the Lockyer Valley were made. The final recommendations of the report are as follows:

1. The demand for and perceived value of potential water security options depends on whether volumetric entitlements are in place for groundwater abstraction or not. This is because
groundwater when available is a substitute to potential water security options. Therefore, the proposed amendments to the Moreton Water Plan should be resolved as soon as possible to reduce the uncertainty over water security in the Lockyer Valley.

2. Based on the identified need to secure water supply for existing agriculture in the Lockyer Valley and the existence of potential supply options identified in this pre-feasibility study, it is recommended that:

A. The service need (demand) across the region be defined in detail
B. The identified shortlisted water supply options be further progressed
C. The above, (A) and (B), be progressed utilising the Business Queensland Preliminary Business Case and Detailed Business Case frameworks (as the preferred options likely require capital funding support from the Queensland Government and the potential capital investment may exceed $50M - $100M).

Particular issues identified in this pre-feasibility study that the Preliminary Business Case and Detailed Business Case need to consider are:

1. The demand for different water products from both existing irrigators and potential new entrants across the region and by locality across varying end uses including horticulture and intensive animal husbandry

2. The impact on demand for other water products arising from proposed amendments to the Moreton Water Plan to groundwater use within the Lockyer Valley

3. The potential for access to water resources which may include:
   a. Existing allocations held by others, including the medium priority allocations in Mid-Brisbane
   b. Existing Strategic Reserves in south east Queensland
   c. Recycled water from the Western Corridor Recycled Water Scheme either through a direct offtake or sourced indirectly from Wivenhoe Dam.

4. The potential for the Lake Wivenhoe to Cressbrook Dam pipeline to form part of a bulk transfer system as an alternative to a new pipeline

5. Other public infrastructure requirements necessary to support the identified demand and supply options be identified

6. In meeting the identified demands across the region, the option or combination of options, with the highest net economic and social benefit to the Lockyer Valley be identified and prioritised.

7. Environmental benefits arising from increased water security in the Lockyer Valley.
Attachment 1 – List of references


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