SEPTIC TANK EFFLUENT DISPOSAL SCHEMES

Public Private partnership Feasibility Study

Mr. Richard Crabb
Central Local Government Region of SA
05-10-2005

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**Attachments**

Questionnaires (Zip folder)
Abbreviations & Definitions

CLGR  Central Local Government Region
STEDS  Septic Tank Effluent Disposal Scheme
EPA  Environment Protection Authority
EP  Equivalent Person
WWTP  Wastewater Treatment Plant
1. Executive Summary

STEDS provide approximately 10% of all public wastewater services in South Australia. Around 130,000 residents have their wastewater treated STEDS. A further 68,000 people currently meet the criteria for connection to similar services.

The Central Local Government Region of South Australia (CLGR) requested Copa Water to examine alternative delivery mechanisms for Septic Tank Effluent Disposal Schemes (STEDS) for the Region. In particular the proposal was to evaluate the feasibility of private sector involvement and the potential for Public Private Partnerships (PPPs) and other forms of procurement.

1.1. Scope of the Review

A feasibility study of the STEDS was commissioned by the CLGA in Nov 2004, after Copa Water (then part of CREATES team) responded to the Expression of Interest in April 2004.

The feasibility study is to:

- examine the practical feasibility of aggregating the provision of STEDS services on a regional basis to be tested, initially in the Central Local Government Region;
- examine the practicality and cost of a Public Private Partnership model, or other similar arrangement, for the provision of wastewater services to councils in the Region; and
- explore the opportunity for the private sector, other providers of wastewater services and relevant parties with expertise in managing and funding infrastructure of this type, to present innovative proposals that have the potential to improve the management and provision of wastewater services on a cost effective basis.

The study was undertaken between April 2004 and September 2005. The review was based on the information gathered from the six Councils (Northern Areas, Barossa, Wakefield, Yorke Peninsula, Clare & Gilbert Valley and Light) by way of a questionnaire and the information available in the public domain.
1.2. Findings of the Review

The key findings of the review are:

- **Staff** - There was a large variation in the Councils' responses on staffing, indicating the difference in management in cost apportionment, attention to detail and administrative procedures that exist within the participating Councils.

- **Compliance** - All schemes have a requirement to comply with the Department of Health’s approval conditions. Also some townships must be licensed by the EPA for the satisfactory discharge of treated wastewater and the satisfactory performance of the lagoons and treatment plants. There is a significant level of non-compliance.

- **Reuse** – Varies from “No current reuse” to “substantial reuse” – based on Council

- **Condition of existing assets** – Generally in good condition. Some of the lagoons need liner replacement.

- **Human Resources** – Skills developed on job rather than by Training. These skills are lost due to the transient nature of the staff and must be regained by new personnel. Sustained interest in the scheme is therefore difficult and on-going operation and maintenance suffers when local staff fails to take real ownership of the scheme. This occurs as the management of the scheme is often not a core duty of the responsible officer.

- **Technology** – New technologies such as pressure sewer, vacuum sewer and private development are introduced.

- **Upgrades** - Country towns are growing. Several factors are influencing this growth viz, lower land values, community lifestyle, retirees, tourism. As a consequence many townships require extensions both to the communal waste collection systems and to the treatment components.

- **Public Private Partnership** – is feasible and can give immense overall benefits to the community. One such partnership model could be:
  - CLGR and/or Councils with a Private partner retain the authority to deliver STEDS under a public policy framework
  - **Private partner** undertakes an accelerated program to undertake upgrades/ augmentation/ capital works using the future revenue from rates to fund the works.
  - **Private Partner** implements O&M plans and procedures to make the existing assets compliant.
  - **Private Partner** operates and maintains the STEDS.
- **Private Partner** liaises with Regulatory Authorities
- **Private Partner** maintains Asset Plans
- **CLGR & Private Partner** – Undertake planning to meet the future demands in a timely and sustainable manner
- Finance is likely to be raised by the CLGR/Councils
  The major benefits of aggregation would be to the Council rather than to the Private partner.

- **Aggregation** – improves the efficiencies in planning, procurement, design, construction, operation and maintenance. One entity will liaise and be responsible for the sustainable development and operation. This will also give the Councils the opportunity to deliver better service to their customers by way of increased focus on their core tasks. Aggregation also accelerates the upgrade/ construction program to meet the increased demands.
2. Feasibility Study

2.1. Background to Study

On 1st April 2004 the Central Local Government Region of South Australia called for Expressions of Interest to examine alternative delivery mechanisms for septic Tank Effluent Disposal Schemes for the Region.

CREATES team was established from member companies at the forefront of the industry to participate in the Expression of Interest. The CREATES submission was subsequently selected as one of two proponents for more detailed evaluation. CREATES team has since been led by Copa Water. Due to the revised brief from CLGR, the scope of some members of CREATES team has been reduced. Consequently, this submission is made by Copa Water with its partners.

This stage involved the preparation of a feasibility study of the project objectives covering six Councils within the Central Local Government Region.

After several discussions, correspondence was received on 19th November 2004 outlining general guidelines for the feasibility study. The following is an extract from that correspondence and identifies the primary purposes of the feasibility study:

First, the Central Region is in no way committed to entering into a PPP arrangement. We are doing no more than testing feasibility which, subject to the outcome of that testing, could lead to a transaction with one of the two private firms.

Second, although this work is being undertaken at the request of, on behalf of and potentially for the benefit of the Region's 15 Member Councils we can not commit individual Councils. That is, even if the results of the project proved favourable and the Region collectively made a positive decision, it would remain open for individual Councils not to participate in any PPP arrangement. Equally, the Region appreciates that any transaction would have to be some minimum size to attract investment by your group.

Third, any new set of arrangements would require State Government co-ordination because of its subsidy support.

Fourth, we place no weight at all on innovation for its own sake. Nor do we place any weight on balance sheet effects per se. Our decision-making will be based on comparisons and benefits associated with:-
(a) Current arrangements – i.e. individual Councils acting alone;

(b) Aggregation of schemes across Council’s but without private sector involvement (beyond that sector’s “normal” role in design and construction activities);

(c) An aggregation approach combined with a PPP.

That is, we would wish the analysis to deal very specifically with the issues whether (b) has benefits over (a) and whether (c) has additional benefits over (b).

Sixth, we would respect any reasonable requirements made by the proponents in relation to confidentiality;

Seventh, we advise that we are quite willing to respond to questions from, or to have discussions with, the proponents as the feasibility work proceeds. This would be handled separately with each proponent and we would not propose to pass on the information given to or ideas exchanged with either of the proponents to the other.

Subsequent to the receipt of those guidelines and after a lengthy time period, the project management was changed by the CLGR. The guidelines were modified to place a greater emphasis on STEDS Operation and Maintenance Services as follows;

- What benefits would aggregation of schemes within CLGR bring
- Would an aggregated body require all Councils in the CLGR to participate, if not what would be the minimum critical mass
- What would be the advantages/disadvantages of the aggregated body (say a STEDS entity under the Local Government Act):
  - Employing its own O&M staff/subcontractors
  - Contracting out the O&M to a wastewater provider
- What would you envisage the organisation management structure would look like if it were:
  - Employing its own O&M staff/subcontractors
  - Contracting out the O&M to a wastewater provider
2.2. Participating Councils

The six participating councils are:
- Clare & Gilbert Valleys Council (contact John Carrangis/Mary Ostojic)
- Light Regional Council (contact David Hassett)
- Northern Areas Council (contact Alan Thomson)
- The District Council of Yorke Peninsula (contact Jan Truter)
- The Barossa Council (contact Ian Baldwin)
- Wakefield Regional Council (Elca McCarthy)

2.3. Methodology

A questionnaire was sent to the participating Councils requesting information on the staff, O&M costs, asset details, design details, upgrade and reuse. Further information was obtained from the Reports available in the public domain. Copies of the Questionnaire are attached as Appendix A.

2.4. Summary of Participating Councils’ Data

A summary of the information from the Councils is presented here.

Table-1:

<table>
<thead>
<tr>
<th></th>
<th>Northern Areas</th>
<th>Barossa</th>
<th>Wakefield</th>
<th>Yorke</th>
<th>Clare</th>
<th>Light</th>
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<tr>
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<td>$19,509</td>
<td>$18,624</td>
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<td>$69,453</td>
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<td>$2,000</td>
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<tr>
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<tr>
<td>Infrastructure Coordinator</td>
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<td>$369,926</td>
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<tr>
<td>$211,260</td>
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<td>$279,737</td>
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<td>$248,871</td>
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<td>$211,260</td>
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<td>$187,177</td>
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<th>Maintenance Contractor</th>
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<td>$15,000</td>
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<th>Emergency Maintenance</th>
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<th>Northern Animal Plant</th>
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<td>$35,000</td>
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<td>$3,600</td>
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<td>$53,550</td>
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<th>TOTAL</th>
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<tr>
<td>1930 10126 3635 12429 3918 4158</td>
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<table>
<thead>
<tr>
<th>Cost/ EP</th>
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<tbody>
<tr>
<td>$28 $69 $33 $31 $58 $84</td>
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<table>
<thead>
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<th>Schemes</th>
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<tbody>
<tr>
<td>2 7 1 6 3 4</td>
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<table>
<thead>
<tr>
<th>Cost/ Scheme</th>
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</thead>
<tbody>
<tr>
<td>$1,930 $10,126 $3,635 $12,429 $3,918 $4,158</td>
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<table>
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<th>Connections</th>
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<tbody>
<tr>
<td>127 5,102 60 1,649 1,852 1,862</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>O&amp;M Cost/ Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>$419 $136 $2,023 $236 $123 $188</td>
</tr>
</tbody>
</table>
Total O&M costs PA for 6 Councils - from Council's data | $1,835,504
---|---
O&M Cost/EP- as per STEDS Report review App C | $63
Total O&M costs PA for 6 Councils - from the above thumb rule | $2,280,348
O&M Cost/Scheme- as per STEDS Report review App C | $86,417
Total O&M costs PA for 6 Councils - from the above thumb rule | $1,987,591

2.5. O&M costs

From Table-1, the O&M costs based on EP could be about $2.28 mil PA for the six Councils.

2.6. Staffing

From Table-1, it can be seen that there is a large variation in the Councils’ responses on staffing, indicating the difference in attitudes to cost apportionment, attention to detail and administrative procedures that exist within the participating Councils.

Although the information has been provided for various categories of support, it remains unclear as to the break-up of these costs in regard to effort expended for new works, upgrade works and operation of existing schemes.

The wages on per EP basis vary from $1.5/EP to $16.5/EP.
2.7. **Quality Standards**

Few responses were received with details of water quality results from the various schemes. STEDS testing appears to be sporadic, and quality results do not always comply with the Department of Health approval conditions.

2.8. **Compliance**

All schemes have a requirement to comply with the Department of Health’s approval conditions. Also some townships must be licensed by the EPA for the satisfactory discharge of treated wastewater and the satisfactory performance of the lagoons and treatment plants.

There is a significant level of non-compliance. This can occur due to the following factors:

- Lagoons are under capacity and overflows from lagoons to existing streams exceed desired nutrient levels;
- Lagoons are leaking due to failures in the impermeable protective layers;
- Erratic water quality results occur due to poor lagoon maintenance and inadequate attention to disinfection systems;
- There is a lack of systematic maintenance.

2.9. **Water Reuse**

**Clare and Gilbert Valleys Council**

Some re-use to Clare golf club. Additional reuse planned for Clare with investigations proceeding into reuse at Saddleworth and Riverton.

**Light Regional Council**

Reuse for horticultural purposes at Freeling and Greenock. Watering to the golf club at Kapunda and to reserve areas at Kapunda and Roseworthy.

**Northern Areas Council**

No current re-use.

**The District Council of Yorke Peninsula**
A considerable degree of reuse occurs. Discharge to golf courses at Ardrossan, Tiddy Widdy Beach, Maitland and Yorketown; ovals at Point Pearce and Port Victoria; Lucerne plots at Point Pearce and Port Vincent; viticulture at Sultana Point; reserves at Black point and Maitland and woodlots at Rogues Point, Port Julia, Dipper, Foul Bay, Point Turton, Hardwicke Bay, Bluff beach, Chinamans Well and Balgowan. The discharge to woodlots can only be regarded as a means of disposal rather than an effective reuse of the treated water.

**The Barossa Council**

Water is being reused at Tanunda and Lyndoch for viticulture and at Mount Pleasant for the golf course. Investigations are proceeding for the reuse of water at Nuriootpa and Williamstown.

**Wakefield Regional Council**

No reuse is current. Current planning includes the reuse of water at the Port Wakefield golf course, an olive plantation at Blyth.

It is clear that Councils have a growing awareness of the environmental value of reuse and attempts are being made in all six councils to varying degrees to utilize the water. As most Councils rely on lagoons for treatment with an end point of large evaporation ponds, large quantities of reclaimed water are lost through evaporation or overflow to water courses.

Some reuse has outcomes with low financial benefit and where reuse occurs in commercial enterprises the water is given little value by the Councils.

All reuse options are single use only i.e. returned to the environment.

### 2.10. Condition of the existing assets

A recent audit of 36 schemes undertaken by eight consultants for the STEDS advisory Committee reported on a number of aspects of the existing schemes. In general the schemes were found to be in good condition based on an expected 50 year life. The oldest scheme is 43 years old. Approximately 120 townships have had or are in the process of having a STED scheme installed.

One scheme was in poor condition and needs replacement. Others have non-complying lagoons and several, which have been built with vitreous clay pipes, have fractures due to root intrusions.

The audit reflects the general condition of schemes within the six council areas (see Section 2.1.4). To gain some idea of the overall scope of upgrade and maintenance work required within the state, a simple interpolation maybe possible.
2.11. Human Resources

Councils operate with considerable variation in human skills. Within the six councils investigated the key personnel are:

Staff Positions
- Directors of Environmental Services
- Directors of Works and Engineering
- Environmental Health Officers
- Works Supervisors
- Maintenance Workers
- Administration Officers

Contractors
- Electricians
- Plumbers
- Drain Cleaners
- Liquid Waste Companies
- Irrigation Companies

Consultants
- Engineering consultants

In South Australia no comprehensive training is available in the operation and management of STEDS, sewage and other schemes. Nor is there any adequate training in the area of wastewater treatment. Council skills are learned on the job, mainly by trial and error or by default. Often, because of the robustness of the schemes and past deficiencies in monitoring, on-going maintenance has been lax and sometimes neglected.

Knowledge of the treatment processes is seriously deficient but basic skills in maintaining the operation of the infrastructure can generally be developed within the Council Staff or Contract resources. In time, the staff obtains local knowledge of the Council schemes, but this knowledge is often lost due to the transient nature of the staff and must be regained by new personnel. Sustained interest in the scheme is therefore difficult and on-going operation and maintenance suffers when local staff fails to take real ownership of the scheme. This occurs as the management of the scheme is often not a core duty of the responsible officer.
2.12. Past Technologies

Guidelines for the documentation of STEDS have been developed to a high standard over a number of years. STEDS has provided a less expensive alternative to sewerage in country towns where local residences, public facilities and commercial properties had previously operated with septic tanks and individual soakage.

STEDS differ from sewerage by providing a communal system with connections directly to existing or upgraded septic tanks. By excluding gross solids the minimum pipe size, minimum pipe grades and dry weather design flows can be relaxed when compared to conventional sewerage requirements.

STEDS funds were used at Coober Pedy for the construction of sewerage. This was unusual and generally the funds have been related to septic tank effluent.

In other instances where projects have been funded outside of the STEDS arrangements, Council schemes, private developments and shack free-holding have seen a variety of schemes introduced in South Australia. They have included:

- Pressure systems with common rising mains delivering both septic effluent (i.e after the septic tank) and sewage (from a holding tank with no septic tank) to communal treatment facilities.
- Private sewerage schemes (Private and Council operated)
- Vacuum systems.

2.13. Environmental Standards

The Environment Protection Authority and the Department of Health are the two government agencies with responsibility to regulate environmental and health aspects of STEDS. Over the last decade, policies have been undergoing change. There have been new understandings of environmental impacts and a growing emphasis on sustainability.

The standards are likely to continue to change and consequently impact on the provision of individual schemes. At the present time standards tend to be rigid regardless of local circumstances. Regulators often err on the side of conservatism. As knowledge grows it may be that remote locations could be subject to less restrictive guidelines depending on the level of risk involved.
2.14. Operation and Maintenance Methods

Councils adopt various methods for operating and maintaining their schemes. Some see it as a core requirement of their business activities while others do not. As a consequence, Council’s vary in their levels of staffing to achieve adequate management of their schemes.

Some develop a real ownership of the tasks involved while others view them as hindrances to their preferred roles. With concerns of litigation, some Councils prefer to offset the risk by placing O&M in the hands of private contractors. This lack of any real consistency makes it difficult to propose a sensible alternative linking all Councils. Some have done it well others not so well.

The recent audit of 36 STED schemes suggests that the majority of schemes are operated in a reasonable manner with maintenance carried out on an “as needs” basis. Documentation and pro-active plans were not prevalent. Nevertheless the majority of schemes were classified as “well operated” or “reasonable O&M”.

2.15. Reclaimed Water Reuse

Current reuse within the six councils was identified in Section 2.1.5. It can be concluded that reuse has not been an imperative in the past. In more recent times the emphasis on water has greatly increased the community’s desire to maximise the use of water. Opportunities are being sought for the effective reuse of water both as an environmental imperative and more recently as a financial benefit.

As the desire for reuse grows, more opportunities will occur. This may bring greater risk (i.e flushing toilets, car washing etc), more specific regulation and with it greater control and attention to detail in the management of schemes. A higher level of wastewater expertise may become important in the day to day operations of the schemes.

2.16. Finances

The current financial arrangements for STEDS have been well outlined in the December 2002 report “Review of STEDS in South Australia” by Tonkin Consulting.

Councils in South Australia have the responsibility of providing wastewater services when a non-SA Water scheme is involved. They choose when a scheme should proceed and also how it will be funded.

Finances may come from:
• A council’s own resources;
• State Government grant administered through the Local Government association (STEDS);
• Private suppliers of finance and services, such as United Utilities Services to the Onkaparinga Council;
• Developers contributing to new developments e.g. Sellicks

The mean construction cost per connection of a STED scheme was estimated at $4,300 in 1999. This assumed that a satisfactory septic tank was already installed on each property. When compared to other technologies in the deliverance of satisfactory wastewater scheme for small townships. STEDS has been shown to be very effective. Other technologies may be preferred in specific situations where topography and geotechnical considerations render them more cost effective.

The major concern for Councils is the long-term sustainability of the schemes. The current average charge of $195 per connection per year obtained from an assessment of existing schemes where charges vary from $50 to $360 is considerably less than that required to achieve an economic break-even position.

The recent audit of STEDS suggests that an amount of $360 is average sustainable price /per connection per year. For some schemes the actual price is considerably more.

### 2.17. Upgrade and Extension Requirements

Country towns are growing. It is believed that several factors are influencing this growth viz, lower land values, community life style, retirees, tourism. As a consequence many townships require extensions both to the communal waste collection systems and to the treatment components.

The following details are known upgrades and extensions within the six Council areas:

**Clare and Gilbert Valleys Council**

- Clare – current proposal for upgrading existing infrastructure estimated at around $3M.
- Riverton and Saddleworth - Miscellaneous works $25,000

**Light Regional Council**

- Kapunda – Upgrade works are currently under consideration. The lagoons are at capacity and other infrastructure upgrades are required.
• Freeling - Investigations are proceeding into the failure of the lagoons. A large increase in town size is anticipated and a new treatment plant plus upgrades in existing infrastructure are anticipated in conjunction with the developer.
• Greenock - System is nearing capacity and investigations proceeding into lagoon performance.
• Roseworthy - currently at capacity

Northern Areas Council
• Jamestown - Town growth will require assessment of lagoon capacity

The District Council of Yorke Peninsula
A large number of extensions are anticipated throughout the Council area. Tourism, holiday homes and retirement are contributing to expansion of the towns along the extensive coast line. No specific details were supplied.

The Barossa Council
• Nuriootpa - Extensive upgrade of the town’s lagoon system and reclaimed water use is underway at an estimated cost of $5.5M.
• Tanunda - Investigations have been undertaken to upgrade the town’s system at an estimated cost of $2M.
• Other townships - Upgrade works to the value of approx. $1.7m is expected over the next five years.

Wakefield Regional Council
• Hamley Bridge - Reconstruction of the lagoons is required due to failure of the impermeable layer.

It is not possible with this review to provide an accurate cost of all upgrade works to be undertaken within the six Council areas. What seems to be a reasonable prediction is that over the next five years a combined sum of $18 to $22M is likely to be spent on the existing schemes.

2.18. New Proposals

The following schemes are currently being considered within the participating Council areas.

Clare and Gilbert Valleys Council
• Mintaro - A proposed STED scheme has been valued at $550,000.
• Auburn – Soakage is poor and population increasing. A scheme is required.

Light Regional Council
• Wasleys - A scheme would be desirable but not planned

Northern Areas Council
• Gladstone - A scheme is currently on tender call for the Gladstone collection system with a further call soon to be made for the wastewater treatment system.

The District Council of Yorke Peninsula
• Port Victoria – A small scheme has been commenced at Port Victoria. The main township has still to be undertaken.
• Stansbury – Developer participation has allowed an initial scheme to be undertaken. It is intended that the township STEDS will be undertaken as a separate development.

The Barossa Council
• Springton - State government funding has been received for STEDS (500 persons) and tenders called for the collection system. Tenders will be called for the wastewater treatment system in the near future.
• Eden Valley – Placed on the STEDS program for funding (160 persons).

Wakefield Regional Council
• Owen – A scheme is required to overcome poor soakage (220 persons).
• Brinkwath – A scheme is required (215 persons).
• Port Wakefield – A first stage has already been implemented for a section of housing and commercial interests along the highway. Additional stages are required for the township (total population 670 persons).

There is much investigation required to arrive at a real cost for all schemes proposed by the six councils. It appears that a sum between $16 to $18M would be an appropriate assumption.
2.19. Review of Environmental/Public Health Issues

The development of environmental and public health standards has been proceeding over many decades. However the last decade has seen substantial effort in defining guidelines in South Australia for the water industry as disposal to water bodies has become unacceptable, the reuse of water is promoted and technology allows a greater degree of certainty in achieving water standards.

The new guidelines are not site specific. They have a generality which impacts adversely on cost effective facilities. For example, buffer distances to treatment facilities have significant cost implications in regard to:

- Township growth,
- Rising main length to the treatment works
- Distribution of reclaimed water

Irrigation management plans have the potential of committing Councils to exorbitant costs without accurate knowledge of long term effects. The requirement of removing grass cuttings to eliminate high levels of phosphorous when actual phosphorous sustainability is unknown can also be an unnecessary cost. In such cases the addition of alum at the treatment plant may achieve a better result for much less cost.

The implications of the guidelines, which may be appropriate for a metropolitan area, may be too severe for local areas. The long-term effects of more relaxed requirements may have no real consequence. A scientific understanding of the past environmental and health impacts is required in those areas of non-compliance or where communities have been unable to afford communal systems.

2.20. Risk Limitations and Responsibilities

Bearing in mind possibilities already outlined to ensure that each township has realistic constraints placed on development, there are risks in operation and management that must be borne by Councils as owners of the schemes.

The risks can be reduced by:

- Low risk design
- Low risk technologies
- Effective preventative maintenance
- Skilled operators
- Continuity of responsibility
- Effective occupational and health safety procedures
- Effective water quality monitoring and review
- Contingency plans for emergencies
- Public education
• Adequate financing to sustain the above

Councils may divest a large proportion of their risk by placing schemes under contract with private service providers or in private ownership.

2.21. **Asset Security**

The underlying thrust of this study is to establish a proposal which achieves the fundamental requirement of providing assets with an assurance of sustainability. Also it is to suggest a way in which assets which already exist may be secured for the future.

That the shortfalls of the current schemes are well understood by State and local government is shown by the scope of studies and reports either recently completed or currently underway. Although it is recognized that STEDS has been a very practical and relatively economical way of providing communal wastewater systems, new management structures and financial arrangements have to be found if the demand and sustainability of schemes is to be secured.

On the one hand the environmental and health consequences of failing wastewater collection and treatment systems may be unacceptably serious and on the other the current cost impacts of sustaining systems are currently too great on community, state and local government finances.
3. Summary of Review

3.1. Councils acting alone

Advantages
- Within their scope and capability, Councils have a say and responsibility on how the assets are maintained and upgraded.

Disadvantages
- Human Resource skills are limited. The skills required for planning, supervision, operation, maintenance, liaison etc are not fully available.
- Acceleration of Program, if required is not achieved.
- Efficiencies are low due to economies of scale
- Different Councils will have different standards, compliances and efficiencies
- Alternative Technologies and Alternative delivery mechanisms may be appropriate in some cases- They may not be investigated
- Duplication of tasks across various Councils, example preparation of Plans, spares, data bases, different Contracts etc.
- Risk in Operation & Maintenance
- Different people contacting regulatory agencies.

3.2. Aggregation across Councils

Advantages
- Within their scope and capability, Councils have a say and responsibility on how the assets are maintained and upgraded.
- Human Resource skills could be improved.
- Acceleration of Program, if required can be achieved.
- Efficiencies can be improved due to economies of scale
- Councils can adapt same standards, compliances and efficiencies
- Duplication of tasks across various Councils can be greatly reduced.
Disadvantages

- Human Resource skills are fully not available.
- Alternative Technologies and Alternative delivery mechanisms may be appropriate in some cases- They may not be fully investigated

3.3. Aggregation combined with PPP involvement

Advantages

- Within their scope and capability, Councils have a say and responsibility on how the assets are maintained and upgraded.
- Human Resource skills are not limited.
- Efficiencies will be significantly improved due to economies of scale
- Councils can adapt same standards, compliances and efficiencies
- Duplication of tasks across various Councils are eliminated
- Acceleration of Program can be achieved.
- Alternative Technologies and Alternative delivery mechanisms may be appropriate in some cases- They could now be investigated

Disadvantages

- Individual Councils/ Communities not in control of own territory
4. **Copa Water capabilities**

### 4.1. Copa Water Team

The original Creates team comprised the following participants:

- Macquarie Bank
- Coriolis Water Services (Australia) Pty Ltd
- IDSM Pty Ltd
- Hickinbotham Holdings Pty Ltd
- Simon Engineering (Australia Pty Ltd)
- Aeroflo Pty Ltd
- Wallbridge & Gilbert Engineering Pty Ltd

Since then, due to the Corporate restructures, change in Scope and in particular the unlikely need for private sector funding etc, the team now comprises of:

- Copa Water Pty Ltd
- Hickinbotham Holdings Pty Ltd
- Pettifor Civil
- KBR
- Wallbridge & Gilbert Engineering Pty Ltd

### 4.2. What we offer

We can offer you comprehensive services in the Design, Construction, supervision of construction, planning, upgrades, operation and maintenance, asset maintenance, Bio solids management, water reuse strategies etc.

Further, we offer only one layer of management and the people on site are the people with complete skills to complete the Project.

The core skills of our team are:

- **Copa Water Pty Ltd** – Overall management, design, construction, operation, maintenance
- **Hickinbotham Holdings Pty Ltd** – Liaison, advice on legislation, construction
- **Pettifor** – Civil works, sewerage
- **KBR** – Network analysis
- **Wallbridge & Gilbert Engineering Pty Ltd** – Planning, design, documentation, supervision and contract administration of
sewerage and water reuse reticulation and septic tank effluent disposal schemes.

4.3. Copa Water

Copa Water Pty Ltd, a subsidiary of CDS Technologies Limited, is one of Australia’s leading D&C contractors in the wastewater treatment industry. Copa Water has successfully completed over 500 wastewater treatment plants and services over 50 wastewater treatment plants.

<table>
<thead>
<tr>
<th>Business</th>
<th>Copa Water delivers integrated engineering, construction and maintenance services in wastewater and storm water sectors.</th>
</tr>
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<tr>
<td>ABN</td>
<td>27 066 909 591</td>
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<td>Turnover 2004 / 2005</td>
<td>&gt;$22 mil</td>
</tr>
<tr>
<td>Number of Employees</td>
<td>&gt;40 Fulltime Staff</td>
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<td>Bankers</td>
<td>NAB</td>
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<tr>
<td>Auditors</td>
<td>KPMG</td>
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<tr>
<td>Web</td>
<td><a href="http://www.copawater.com.au">www.copawater.com.au</a></td>
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<td>Offices / Facilities</td>
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<td>QLD  Brisbane</td>
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<td>SA  Royal Park, Adelaide</td>
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<tr>
<td></td>
<td>VIC  Melbourne</td>
</tr>
</tbody>
</table>

4.4. Copa Water Plants in SA

Over the last 22 years, Copa Water successfully delivered projects at:

- Maitland
- Mt Compass
- Normanville
- Southend
- Renmark
- Ardrossan
- Woodlane
- Caloote
- Pelican Point
- Barossa Valley
- Gawler River Campus
- Kia Marina
- Yorktown
- Port Pirie
- Cadell
- Kangaroo Island Lodge
- Chinaman wells
- Jacob’s Creek
- Caurnmont
- Port Victoria
- Port Vincent
• Berri
• Marks Landing
• Strathalbyn
• Brenda Park
• South Punyerloo
• Onkaparinga
• Port Broughton
• Moonta Bay
• Bow Hill
• Port Augusta

4.5. **Copa Water Plants under regular service or operations and maintenance - SA**

We currently service or operate and maintain the following plants in SA

• Normanville
• New Haven Village
• Sunset Cove Resort
• Southend
• Links Lady Bay
• Caloote Landing
• Mount Compass
• Woodlane
• Kia Marina
• Pelican Point Power Station
• Twelve Apostles
• Port Elliot
• Strathalbyn Race Course
• Jacobs Creek (Orlando)
• Caurnamont
• Brenda Park
• Marks Landing
• Gawler River
• Blackwood Golf Course
• Copper Coast

4.6. **Copa Water Plants under regular service or operations and maintenance - NSW**

We currently service or operate and maintain the following plants in NSW

• Acacia Ponds
• Alberto Culver
• Arnotts Biscuits
• ASMS
• Banksia Grove Village
• Bay Village Retreat
• Bayway Village
• Bethshan Inc
• Blaxland Crossing Trust
• Brahma Kumaris Raja
• Briars Motors Lodge Bowral
• Burrawang Resort
• Christian Brothers Winbourne
• Conjola Lakeside
• Crescent
• Head
• Creer and Berkely
• Dartbrook Coal
• Eaglehawk Holiday Park
• Hawkesbury High School
• Hunter Valley Gardens
• Kenhurst Study Centre
• Kosaido Thomson- Camden Lakes
• Lockies Hotel Motel
• Luddenham Catholic School
• Metcash Trading
• Nelligen Park
• North Parkes Gold Mine
• North parks Gold Mine (UNDER) M111SP101
• Northern Beaches School
• Northolm Grammar School
• Panthers Wallacia Golf Club
• Peak Gold Mine
• Racecourse Beach
• Regal Oaks
• Rowland Retirement Village
• Sea Winds Village
• Shadrack Resort
• Shell Service Centre Sutton Forest
• ST George Monastery Winmalee
• Tallong Campus
• Tuggarah
• Lakes Village
• Vineyard Hotel Motel
• Speedibake
• Trend laboratories
4.7. Hickinbotham Holdings Pty Ltd

The Hickinbotham Group was founded in 1954 by Alan Hickinbotham with his father, Alan Robb Hickinbotham, and has since grown to become one of South Australia’s most important and diversified company groups with core businesses in the construction, land development, environment, commercial property, water trading, viticulture and wine industries. The Hickinbotham Group is one of only a small number of South Australian companies that have been listed in BRW’s Top 500 private companies for the past few years.

The four building companies owned by the Group – Hickinbotham, Statesman, Country Homes and Charterhouse – all have proven brand names and cater to every segment of the market, from modest brick veneer homes for the first homebuyer to highly specified architect-designed luxury mansions. Altogether, the Group constructs more than one in every ten new homes built in South Australia, making it the largest building organisation in the State.

The Group is also one of South Australia’s major land developers, through its development arm Land Australia, which specialises in high quality large-scale residential estates incorporating environmental innovations.

The Group can also claim to be one of Australia’s largest private vigneron. Its famous Clarendon vineyard has supplied fruit for Penfold’s premium brands, including Grange and 707, as well as Clarendon Hills and the Group’s own premium Clarendon brand. The huge Paringa Vineyard in South Australia’s Riverland underpins the export success of the powerful Paringa label and the newly established Finniss Vineyard near Langhorne Creek will source fruit for a new brand specifically tailored for the export market.

The Group also takes particular pride in the innovative environmental projects it has pioneered, including the Wastewater Reclamation Plant it constructed for the District Council of Renmark Paringa, and the aquifer storage and recovery trials it undertook in conjunction with the CSIRO at Andrews Farm, from which national ASR standards were developed.

This strong spirit of innovation and a commitment to education saw the Group finance and build Australia’s first privately owned public school at its Woodend estate in 1995, and endow and construct St Columba College, Australia’s first joint ecumenical Anglican/Catholic school at Andrews Farm in 1997.
The Group has a substantial asset base including the Golden Grove Shopping Centre at Surrey Downs, which it progressively developed in the 1980s, and other significant property holdings.

4.8. Pettifor Civil

Pettifor Civil has been operating for the past 20 years in the Civil / Earthmoving industry and currently employs 26 people at Willunga Depot. The workforce is a group of highly motivated and skilled individuals that include 5 former SA Water / United Water Employees.

The following is a summary of the types of Construction works that Pettifor Civil have successfully completed for SA Water, Local Government Authority and private clients.

- Project Management and construction of complete Wastewater / STED (Septic Tank Effluent Drainage) gravity drainage systems.
- Construction of above ground and below ground wastewater pumping stations.
- Construction of wastewater rising mains.
- Construction of water reticulation systems in UPVC, DICL and MSCL pipe.
- Construction of water pumping station and control valve installations.
- Construction of stormwater systems
- Construction of complete sub divisions.
- Maintenance work on stormwater, wastewater and water systems.

4.9. KBR

Kellog Brown & Root Pty Ltd (KBR) is a premier provider of engineering, project and construction management services.

From an established network of offices in the Asia Pacific region, KBR serves clients from India and Pakistan through South-East Asia and China to Australia and the South Pacific. Its 2,000 staff, representing a broad range of technical expertise, enables the company to contribute to any phase of a project from initial feasibility through concept design, development, financing, construction and logistics, to long-term operation and maintenance.
The company is headquartered in Australia and is the Asia Pacific affiliate of Halliburton, a business unit of the American-based Halliburton Company. KBR employs 45,000 people worldwide and is an international, technology-based engineering and construction company providing a full spectrum of industry-leading services for public infrastructure and to the hydrocarbon, chemical, energy and forest products industries.

Parent company Halliburton, founded in 1919 in the United States of America, is the world’s largest provider of products and services to the petroleum and energy industries, employing about 88,000 people in 120 countries. The company serves its customers with a broad range of products and services through its Energy Services Group and Engineering and Construction Group business segments.

KBR capability covers:

- industrial
- water and waste
- defence
- water resources
- transport (rail, road and airports)
- utilities
- urban development
- project management
- event management
- buildings
- environmental sciences
- marine and maritime facilities.

KBR differentiates itself in the market by employing seasoned professionals whom, supported by processes and systems:

- are skilled in determining the client’s real needs
- have a depth of experience in the operations and maintenance aspects of design
- believe that engineering is an aid to production as well as to construction
- intimately appreciate the need for inherent safety in design
- do not walk away from projects after they are handed over
• understand that the prime purpose of a project is to deliver a business benefit.

4.10. Wallbridge & Gilbert

Wallbridge & Gilbert was established in Adelaide in 1979. The Directors and owners, G V Wallbridge, S M Gilbert, P C McBean, A D Woods and N Lelos offer the full breadth of consulting services in Civil, Structural and Environmental Engineering and are supported by over sixty permanent, qualified staff. The company is wholly Australian owned.

The wide range of projects undertaken extends from multi-storey commercial developments and major civic buildings through industrial buildings to heritage and restoration work. Wallbridge & Gilbert has also completed many civil engineering projects such as large residential land developments, septic tanks effluent drainage schemes, environmentally sensitive tourist developments and site remediation works.

Wallbridge & Gilbert has been in practice for over 20 years and has offices in Adelaide, Melbourne, Darwin, Whyalla and Port Pirie. Our growth has been based on a reputation for the design of economical and buildable works which satisfy the clients needs. These designs often involve use of innovation and clever design but are always guided by knowledge of the practical and the economical.

Current major projects being undertaken by Wallbridge and Gilbert include the following:

- Adelaide Airport New Terminal ($220M)
- Lyell McEwin Hospital Redevelopment ($87M)
- RAAF Stage 1 Redevelopment, Edinburgh ($29M)
- Elizabeth City Centre Redevelopment ($62M)
- West Lakes Mall Redevelopment ($62M)
- Advertiser Building ($40M)
- Big W Warehouse Monarto ($25M)
- Uni SA City West Development, Stage 2 ($30M)
- Uni SA City East Health Science Building ($16M)
STEDS PROJECTS

The following projects have been undertaken by Wallbridge & Gilbert:

- D C Laura – Laura
- D C Streaky Bay – Streaky Bay
- D C Lower Eyre – North Shields Peninsula
- D C Mt Remarkable – Wilmington
- Alexandrina Council – Milang
- Barossa Council – Stockwell
- D C Gumeracha – Kersbrook
- D C Mt Remarkable – Melrose
- D C Tatiara – Wolseley
- Adelaide Hills Council – Verdun
- Adelaide Hills Council – Charleston
- Port Pirie Regional Council– Napperby
- D C Willunga – Maslin Beach
- D C of Barunga West - Pt Broughton (current)
- D C Mt Remarkable – Booleroo Centre (current)
- Flinders Ranges Council – Quorn (current)

Wallbridge & Gilbert have also been engaged by the Local Government Association to prepare their Standard Detail Drawings, which are used on all STEDS projects.

In addition to the STEDS projects listed above, Wallbridge & Gilbert have extensive experience in the design of sewer and effluent drainage extensions for land divisions in the Metropolitan and rural South Australia.

Following is a summary of the scope of works typically undertaken by Wallbridge & Gilbert for septic tank effluent drainage schemes:

- Preliminary engineering survey and geotechnical investigations.
- Preparation of preliminary scheme layout and preliminary construction cost estimates.
- Preparation of design report for Council review and community consultation.
- Final engineering survey, including location and depthing of septic tanks, selection, levelling and pegging of final drain locations.
- Final design and documentation, including gravity drains, pump stations, pumping mains, treatment lagoons and disposal systems.
- Tender call, assessment and recommendation.
- Obtaining of approvals from relevant Government authorities.
- Construction supervision, full time on-site representation.
- Contract administration.
- Preparation of as-constructed drawings.
- Final certification.
5. Asset Management Plans and other Plans

Copa Water has extensive experience in the preparation and implementation of Asset Management Plans, Environmental Management Plans, Occupational Health & Safety Plans, Project Quality Plan, O&M Manuals etc, all as part of Project execution.

As each of these documents could be bulky, we attach an index for each of these Plans to show the extent of scope.

5.1. Asset Management Plan (Typical index)

1. Strategic View .................................................................
   1.1 Asset Environment
   Figure 1: Wastewater Treatment Plant Schematic
   1.2 Asset Details
       1.2.1 Extent of the Asset
       1.2.2 Wastewater Treatment Plant Processes
   1.3 Asset Conditions and Performance
       1.3.1 Component Operation
       1.3.1.1 Preliminary Treatment
       1.3.1.2 Influent Pumping Station
       1.3.1.3 Biological Treatment Area
       1.3.1.4 Effluent Disposal System
       1.3.1.5 Sludge Handling System
       1.3.1.6 Reclamed Effluent System
       1.3.2 Component Conditions
       1.3.3 Condition Reports

2. Analysis .................................................................
   2.1 Risk Analysis
   2.2 Financial Analysis
       2.2.1 Asset Valuation
       2.2.2 Lowest Life Cycle Cost Analysis

3. Tactical Plan .................................................................
   3.1 Level Of Service
       3.1.1 Treatment Standards & Compliance Targets
       3.1.2 Service Delivery
       3.1.3 Environmental
3.1.4 Legislation
3.1.5 Customer Level of Service

3.2 Operational Plan
  3.2.1 Procedures
  3.2.2 Operations Task Sheet
  3.2.3 Safety Procedures
  3.2.4 Operational Budget

3.3 Maintenance Levels of Service

3.4 Maintenance Plan
  3.4.1 Procedures
  3.4.2 Maintenance Task Sheet

3.5 Competencies

3.6 Capital Investment Planning

3.7 Management Responsibilities

3.8 Contingency Plan

3.9 Resource Plan
  3.9.1 Manpower
  3.9.2 Materials
  3.9.3 Energy
  3.9.4 Spares

4. Quality Management ............................................................
  4.1 Performance Measurement
    4.1.1 EPA Requirements
    4.1.2 Monthly System Performance Indicators

4.2 Performance Reporting Schedules

4.3 Plan Review

APPENDIX A - Reports and Manuals

APPENDIX B - Drawings
5.2. Environmental Management Plan (Typical index)

1. Purpose and Scope .................................................................
   1.1. Purpose ..............................................................................
   1.2. Scope ..............................................................................

2. Management System .........................................................
   2.1. Relationships ......................................................................
   2.2. Documentation and Document Control ..............................
   2.3. Records ............................................................................

3. Implementation and Operation ............................................
   3.1. Responsibilities ..............................................................
   3.2. Communication ..............................................................

4. Planning .............................................................................
   4.1. Legal Requirements ........................................................
   4.2. Risk Assessment ..............................................................
   4.3. Environmental Aspects and Impacts ...............................
   4.4. Environmental Objectives and Targets .........................
   4.5. Environmental Sub Plans ..............................................

5. Processes ...........................................................................
   5.1. Environmental Training .................................................
   5.2. Supplier Selection and Management ...............................
   5.3. Sub-Contractors ..............................................................

6. Inspections, Monitoring and Review ...................................
   6.1. Monitoring ........................................................................
   6.2. Calibration ........................................................................
   6.3. Monitoring Equipment ...................................................
   6.4. Monthly Reporting and Evaluation of Environmental Performance
   6.5. Action Register & Non-conformance ..............................
   6.6. Audits ............................................................................
   6.7. Environmental Inspections ............................................

7. Incidents, Complaints and Emergency Response ...............
   7.1. Environmental Incident Reports and Complaints Register
   7.2. Emergency Response .....................................................

Appendix 1 - Environmental Policy ........................................

Appendix 2 - Environmental Responsibilities ..........................
Appendix 3 - Legislation, Licences / Permits, Guidelines & Standards

Appendix 4 - Draft* Summary of significant environmental risks (aspects)

Appendix 5 - Project Objectives and Targets

Appendix 6 - Environmental Management Sub Plans and Procedures

WATER QUALITY
WASTE and POLLUTION
SEDIMENT and EROSION CONTROL
LAND DISTURBANCE and REHABILITATION
CONTAMINATED SOIL and SOIL REMEDIATION
AIR QUALITY
NOISE and VIBRATION
HAZARDOUS SUBSTANCES and DANGEROUS GOODS
FLORA and FAUNA
COMMUNITY IMPACT
TRAFFIC MANAGEMENT
CULTURAL HERITAGE

Appendix 7 - Summary of Environmental Monitoring Programs

Appendix 8 - Environmental Inspections / Audits

Appendix 9 - Contacts
5.3. Occupational Health & Safety Plan (Typical index)

1. Introduction ........................................ Error! Bookmark not defined.

2. Scope .................................................. ...........................................
   2.1 Project Details .................................................................
   2.2 Detailed Scope of Works ..............................................
   2.3 Typical Project Hazards ..............................................

3. Policy and Objectives ........................................
   3.1 OH & S Policy .................................................................
   3.2 Safety ..........................................................................

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6. Conclusions/ Recommendations

Overall, we concur with the CLGR analysis that aggregation combined with PPP will deliver many benefits.

This approach will deliver an accelerated program, where the PPP can undertake Procurement, Supervision of Capital works, Operation and Maintenance, Asset maintenance, Liaison with regulatory authorities, Plans under the overall control of a Council elected body.

From table-1, a potential saving of about 10% of the estimated $2.28 million annual O&M budget could be achieved by this approach.

6.1. What benefits would aggregation of Schemes within the CLGR bring

Aggregation would lead to a significant improvement in efficiencies and will eliminate duplication of tasks across the Councils.

Activities such as preparation of O&M plans, Asset registers, Irrigation management plans, Environmental monitoring plans, Liaison with regulatory authorities etc could be undertaken centrally, which will also bring in uniformity in standards, presentation and compliance.

Standards will be uniform across the schemes.

Augmentation and upgrade of capital works or new capital works will be centrally planned with the benefit of accelerated program.

Due to much larger scope of work, Sub contractor's price will be more competitive.

6.2. Would an aggregated body require all Councils in the CLGR to participate, if not what would be the minimum critical mass

Though aggregation of all Councils is desirable for optimisation of efficiencies, we agree that some Councils may not be able to join such an aggregated body at least in the short term.

The minimum critical mass would be at least 2 Councils in one region to join the aggregated body. We currently operate and maintain over 30 plants in SA and are geared to serve even one Council.
6.3. What would be the advantages/disadvantages of the aggregated body (say a STEDS entity under the Local Government Act):

**Employing its own O&M staff/subcontractors**

**Advantages:**
- Compared to the next option, this option does not have any significant advantages

**Disadvantages:**
- Risk in O&M and compliance rests with the aggregated body
- A significant project management structure is needed within the body to deal with the sub contractors
- Administration costs will be higher
- Uncertainty in having fixed costs
- Specialist skills may be lost when employees leave and new employees need training
- Sufficient skills may not be employed due to shortage of skilled personnel
- Overall costs will be higher

**Contracting out the O&M to a wastewater provider**

**Advantages:**
- Risk in O&M and compliance transferred to service provider
- Minimal project management team is required by the aggregated body
- Administration costs will be lower
• Overall costs will be lower
• Accelerated program possible
• Wastewater provider has access to a larger pool of specialist skills
• Wastewater provider will have personnel with a variety of experience in alternative technologies as well
• All specialist skills will be employed.

Disadvantages:
• Individual Councils/ Communities not in control of own territory

6.4. What would you envisage the organisation management structure would look like if it were:

Employing its own O&M staff/ subcontracts

![Organisation Management Structure Diagram]
Contracting out the O&M to a wastewater provider

One of the possible structures is based on Welsh Water Model – modified.

- The infrastructure is owned and governed by the aggregated body
- Aggregated body is specifically limited in the service scope (regional wastewater services) it can provide the community to ensure it stays focused on core services and deliverables.
- There is a community governance structure in place which provides input and guidance on the services provided, however the broad service delivery is provided by the private sector.
- Optimal risk transfer between public and private sector is achieved through negotiation of the scope of services provided, and individual project delivery contracts (fixed price, or alliance project management).

6.5. Recommendations

We recommend that the best solution is for an aggregated body, which will improve the efficiencies, eliminates duplicating tasks, implements uniform standards and plans, working in conjunction with a wastewater service provider to provide operation & maintenance, asset protection, asset maintenance, upgrade and augmentation works.
Distribution & Approval

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Public Private partnership Feasibility Study

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