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# ASSET MANAGEMENT IN THE CONTEXT OF OPERATION AND MAINTENANCE CONTRACTS

## 1. INTRODUCTION

This paper addresses the issues associated with asset management in the context of operations and maintenance contracts. The paper:

- identifies the key issues associated with the asset management function for services contracts;
- outlines the various contractual approaches to asset management;
- assesses how each approach deals with the key issues and risks;
- sets out the advantages and disadvantages of each contracting approach;
- and suggest an approach likely to maximise the value added to the asset management planning process by both parties.

## 2. WHAT ARE THE KEY ASSET MANAGEMENT ISSUES?

In developing an operation and maintenance contract, a utility usually has a good grasp of the physical services that it wishes to include in the contract, such as network or treatment plant operation, burst main repairs, billing services and the like. The allocation of responsibility for these physical services between the contractor and the client utility is usually clear cut. When it comes to asset management, however, the allocation of responsibilities between the contractor and the client is not so straightforward, and careful consideration of this allocation is required in order to obtain an optimal outcome.

In considering how best to manage the asset management function in the context of an operation and maintenance contract there are a number of key issues that need to be considered. These issues are described below.

### 2.1 Defining what is maintenance and what is capital

This is an area that needs to be clearly defined in any services contract, particularly in contracts where the contractor is responsible for maintenance activities (and receives a fixed fee for these tasks) and where the client is responsible for providing capital for new works, system improvements and major upgrades. The issue largely arises where part of an asset needs to be replaced (pump, length of pipe etc.). For options where the client is providing the capital, unless there are unambiguous rules set in the contract, the contractor has an incentive to claim capital work wherever possible, as this does not come out of the contractor's fixed fee.

### 2.2 Maintaining asset condition knowledge

The level of asset condition knowledge held by the client can vary significantly depending upon the contract model adopted. Whether or not having a thorough knowledge of asset condition is critical depends on a number of factors including the organisation's strategic business objectives, the term and scope of the contract and the nature of the contract partner.

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### **2.3 Measuring/specifying asset condition**

Contract forms that involve the contractor taking responsibility for renewal and capital investment decisions require a mechanism to ensure that the asset base is not being run down, particularly for longer term contracts. Specifying and measuring asset condition at the end of the contract period is extremely difficult and is compounded by factors such as:

- most of the assets being buried;
- an imperfect knowledge of the condition of the asset base in the first instance;
- the age, material and condition of the asset base, and the influence of these factors on asset performance. For example burst rates in a particular area may increase over the life of the contract purely because of the age and characteristics of the pipelines, rather than because the level of service provided by the contractor has decreased; and
- the difficulty in determining (and measuring) what is an appropriate asset condition at the end of the contract.

### **2.4 Optimising opex and capex solutions**

Achieving the lowest lifecycle cost is a key asset management objective. To achieve this a mechanism is required that links the operational implications of various investment decisions into the capital planning process. The cost of capital also needs to be considered, and particularly the difference in the cost of capital for the client and the contractor. For example, capital investment decisions made by the client may well be different to capital investment decisions made by the contractor purely because of the varying cost of capital.

### **2.5 Capital program management**

Determining how the capital program is managed, in terms of the delivery of the capital program, is not a critical issue in determining how asset management planning should be carried out. Nevertheless the delivery of the program needs to be consistent with the allocation of asset management planning responsibilities, and must dovetail with system operation. Further, one party should not be incentivised to maximise capital (as opposed to operational) solutions because of the subsequent fees received in managing the capital program.

### **2.6 Flexibility in varying the capital program**

Business objectives, regulatory requirements and shareholder aspirations may change over the period of the contract. This may require flexibility in determining the amount of capital expenditure to be made from year to year. If flexibility to vary the capital expenditure on an annual basis is a business requirement then this needs to be taken into account in determining the contracting approach.

### **2.7 Certainty of long term costs**

The opposite of flexibility is certainty of cost. For example a contract option that locks in expenditure over the long term into a fixed tariff provides certainty of costs over that term, which may suit a long term pricing model. Conversely, costs to the business will vary from year to year if the capital program is funded directly by the client, as the program will rise and fall over time.

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## **2.8 Value adding**

The amount of potential value added to the business by the contractor is proportional to the contractor's role in business decisions, provided that the contractor is incentivised to act in the interests of the client. From an asset management perspective, for a contractor to be able to add value the contractor would need to be involved in the asset management planning process.

## **2.9 Asset condition and serviceability risk**

The allocation of asset management planning responsibilities needs to follow the allocation of asset condition and serviceability risks. Asset condition and serviceability risks cannot be allocated to a contractor if the contractor is not responsible for asset management planning and determining the capital investment decisions.

## **2.10 Asset cost risk**

Similar to the allocation of condition and serviceability risk, the allocation of risks associated with the cost of the assets in the long term (from an operations and maintenance perspective) must be consistent with the allocation of asset management planning responsibilities.

## **2.11 Exit arrangements**

A final key issue that needs to be considered is the transition process and transfer of information at both the end of the contract and in the event of early contract termination. A potential loss of strategic knowledge (in relation to the assets) needs to be avoided.

## **3. WHAT ARE THE OPTIONS FOR ASSET MANAGEMENT PLANNING?**

There are three broad options for carrying out asset management planning in service contracts, with these being:

- asset management planning being carried out by the client;
- asset management planning being carried out by the contractor; and
- asset management planning being a shared task carried out jointly by the client and the contractor.

Each of these approaches are outlined below.

### **3.1 Asset management planning by the client**

This is the usual approach used in services contracts. Under this approach the client is responsible for asset management planning and capital program development. The contractor is required to identify assets where capital expenditure is required in order to allow the required service standards to continue to be met. If a need was demonstrated and the capital was not provided by the client then the contractor would be relieved of the appropriate performance obligation relating to the particular asset.

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### **3.2 Asset management planning by the contractor**

This approach can take two forms, depending upon who provides the capital for the renewal activities.

#### **3.2.1 Client supplied capital**

Under this approach the contractor carries out the asset management planning and capital program development. Approval of the capital program and the provision of funds is provided by the client.

Under this arrangement the client may still need to retain a strategic planning capability to deal with growth issues and the provision of services (new schemes) to any unserved areas, as well as a capacity to review (and regulate) the contractor's proposals.

#### **3.2.2 Contractor supplied capital**

This approach is close to a full concession (where the contractor/concessionaire is responsible for almost all aspects of the business, and bills consumers directly. Under a concession the contractor is typically required to invest capital to meet defined population coverage requirements). A modification, however, is that the contractor provides all capital for maintenance of the existing asset base, with the client providing capital only to meet growth needs or because of a need driven by a change in law (or change in service standard made by the client).

### **3.3 Shared asset management planning**

Asset management planning can be treated separately to the provision of operations and maintenance services, and a joint asset management or technical services team developed. Funding of the shared team is through a separate payment structure to the provision of O&M services, however asset management planning still forms part of the contract. Funds for the capital program, when developed, are provided by the client.

## **4. HOW DO THESE CONTRACT OPTIONS DEAL WITH THE KEY ISSUES?**

Each of the above contract options deal with the various asset management issues (as discussed in Section 2) in different ways. The way that the various options deal with the issues is summarised in the table overleaf.

Issue	How issue is handled			
	AMP by client	AMP by contractor (client capital)	AMP by contractor (contractor capital)	Shared AMP with separate payment structure
Defining maintenance and capital	Needs clear contractual guidelines – potential ongoing challenges to definitions. Need strategic review of replacement decisions. Maintenance risk on replaced plant and equipment.	Needs clear contractual guidelines – potential ongoing challenges to definitions.	No interface issues as contractor responsible for both maintenance and capital. Could be an issue where growth is concerned. Implications associated with differences between client and contractor costs of capital. Also transition issues with payout of unamortised costs.	Needs clear contractual guidelines. Potential for ongoing challenges to definitions, depending upon relationship. Creative tensions to optimise outcomes.
Maintaining asset condition knowledge	Client retains knowledge of asset base (contractor reports data but threat that there is no mechanism to turn data into useful information). Lacks operational link.)	Prime knowledge of asset condition held by contractor. No resource within client to make use of data and/or information. Issue of strategic ownership of knowledge, particularly as time progresses.	Prime knowledge of asset condition held by contractor. No resource within client to make use of data and/or information. Client can take an audit role (and recover “time slice” of information for rebidding purposes).	Client retains knowledge of asset base. Has an operational link into the planning process.
Measuring/specifying asset condition	Not a critical issue as client carrying out AMP. Requires oversight of contractor performance and maintenance plans.	Potential for asset condition to be unnecessarily improved to reduce opex.	Difficulty in ensuring asset condition adequately maintained.	Not a critical issue as client involved in AMP. Requires oversight of contractor performance and maintenance plans.
Optimising opex and capex solutions	Potential for client to refuse capital solutions because of competing short term considerations. Relief of performance requirements if contractor identified need (justified) not funded by client (contractor needs to nominate circumstances and outcomes of failure).	Potential for contractor to propose capital solutions to reduce opex. Relief of performance requirements if contractor identified need (justified) not funded by client (contractor needs to nominate circumstances and outcomes of failure). More emphasis on forward notice and justification for capital budgeting. Incentivate for optimisation.	Opex and capex will be optimised based on business case or performance standard outcomes. Optimised at contractor cost of capital, which may be different to client’s cost of capital.	Opex and capex should be optimised if AMP team is balanced with mutual goals. Relief of performance requirements if contractor identified need (justified) not funded by client (contractor needs to nominate circumstances and outcomes of failure). More emphasis on forward notice and justification for capital budgeting. Shared assessment of risks.

Issue	How issue is handled			
	AMP by client	AMP by contractor (client capital)	AMP by contractor (contractor capital)	Shared AMP with separate payment structure
Capital program management	Could be by client or by contractor. Notionally better by contractor because of operational interface, however no flexibility if contractor not performing.	Could be by client or by contractor. Notionally better by contractor because of operational interface, however no flexibility if contractor not performing. If carried out by contractor, contractor payment structure (and incentive to maximise capital solutions) becomes an issue.	By contractor.	Could be by client or by contractor. Notionally better by contractor because of operational interface, however no flexibility if contractor not performing.
Flexibility in varying the capital program	Flexible. Would be an issue if capital not provided for a justified contractor business case. Reduced flexibility because of contractor cost outcomes (capitalisation of resources etc.) if contractor implementing the capital program.	Flexible. Would be an issue if capital not provided for a justified contractor business case. Improved flexibility compared to AMP by client.	Inflexible. Contractor pricing based on anticipated capital spend and locked in for duration of the contract.	Fully flexible. Would be an issue if capital not provided for a justified contractor business case.
Certainty of long term costs	Relative certainty with regards to opex. Capex certainty at the discretion of client.	Relative certainty with regards to opex. Capex certainty at the discretion of client. Potential for lower opex because of contractor tendency to unnecessarily improve assets, however resulting capex higher.	Certainty of total costs.	Relative certainty with regards to opex. Capex certainty at the discretion of client.
Value adding	Contractor adds no value to the asset management planning process.	Takes advantage of contractor expertise in AMP but no skills transfer to client.	Takes advantage of contractor expertise in AMP but no skills transfer to client.	Optimises contractor and client expertise. Optimisation of resources to achieve high potential for adding value to client's business. Greater potential for skills transfer under a shorter contract timeframe.

Issue	How issue is handled			
	AMP by client	AMP by contractor (client capital)	AMP by contractor (contractor capital)	Shared AMP with separate payment structure
Asset condition and serviceability risk	Risk retained by client.	Risk transferred to contractor provided that necessary (justified) capital provided by client.	Risk transferred to contractor.	Risk transferred to contractor provided that necessary (justified) capital provided by client. Better framework to avoid divergence.
Asset cost risk	Client retains risk of capex requirement, opex risk transferred to contractor. Issues with increased opex requirement for equivalent level of opex due to asset age profile. Cannot include any asset condition related KPIs into the contract.	Risk transferred to contractor provided that necessary (justified) capital provided by client. Issues with increased opex requirement for equivalent level of opex due to asset age profile.	Risk transferred to contractor. May require an interim sharing/transition of risk until contractor obtains a better understanding of the risk	Risk transferred to contractor provided that necessary (justified) capital provided by client. Issues with increased opex requirement for equivalent level of opex due to asset age profile. Better framework to avoid divergence.
Exit arrangements	Not an issue as all information held by client.	Recovery mechanism required to enable information and skills transfer/recovery. Extended transition and exit plan required.	Recovery mechanism required to enable information and skills transfer/recovery. Extended transition and exit plan required.	Not an issue as all information held by client. Need a mechanism to ensure that some skills not solely retained by the contractor.

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## **5. ADVANTAGES AND DISADVANTAGES OF EACH OPTION**

The advantages and disadvantages of each option have been summarised in the table overleaf.

From the various advantages and disadvantages and the material provided above, it can be seen that the shared asset management planning approach is likely to provide the optimum outcome. The other options each have positive aspects, however they each have significant drawbacks.

An approach that could be used to implement a shared asset management planning arrangement is outlined below.

	<b>AMP by client</b>	<b>AMP by contractor (client capital)</b>	<b>AMP by contractor (contractor capital)</b>	<b>Shared AMP with separate payment structure</b>
<b>ADVANTAGES</b>	<ul style="list-style-type: none"> <li>• Client familiarity with asset base and control of knowledge (provided adequate knowledge management system)</li> <li>• Client familiarity with role</li> <li>• Flexibility in setting capital program</li> <li>• No issues in contractor commencement and termination</li> <li>• Clear allocation of responsibilities</li> <li>• Does not limit potential market of suppliers</li> </ul>	<ul style="list-style-type: none"> <li>• Potential application of contractor knowledge</li> <li>• Flexibility in setting capital program</li> <li>• Re-benchmarking of AMP process at each contract turnover (for short term contracts)</li> <li>• Opex and capex considered concurrently</li> <li>• Contractor ownership of outcomes</li> <li>• Contractual drivers for delivering the AMP</li> <li>• Clear allocation of responsibilities</li> <li>• Removes master-servant relationship</li> </ul>	<ul style="list-style-type: none"> <li>• Removes maintenance and capital definition interfaces</li> <li>• High certainty of costs to client for the long term but likely to be a premium paid for the risk transfer</li> <li>• Well suited to price based regulation</li> <li>• Potential application of contractor knowledge</li> <li>• Opex and capex considered concurrently and forces optimisation</li> <li>• Contractor ownership of outcomes</li> <li>• Clear allocation of responsibilities</li> </ul>	<ul style="list-style-type: none"> <li>• No marking up across boundary – resource optimisation</li> <li>• Potential transfer of knowledge and skills to client</li> <li>• Opex and capex considered concurrently</li> <li>• Capital program has ownership of both parties</li> <li>• Provides both verbal and written communication interface</li> <li>• Client familiarity with asset base and control of knowledge (provided adequate knowledge management system)</li> <li>• Flexibility in setting capital program</li> </ul>

	<b>AMP by client</b>	<b>AMP by contractor (client capital)</b>	<b>AMP by contractor (contractor capital)</b>	<b>Shared AMP with separate payment structure</b>
<b>DISADVANTAGES</b>	<ul style="list-style-type: none"> <li>• Master-servant relationship</li> <li>• Contractor is organisationally divorced from creation of the AMP and ownership of the outcomes</li> <li>• Interface issue where contractor can nominate any amount of projects that require work but doesn't carry any responsibility for prioritising them</li> <li>• Significant disconnect in considering opex and capex</li> <li>• Potential communication problem as no process of engagement to understand actual issue</li> <li>• Potential for capital plan to ignore operational implications</li> </ul>	<ul style="list-style-type: none"> <li>• Transition issues</li> <li>• Contractor partially incentivised to reduce effort to increase margin</li> <li>• Tendency towards conservatism (with focus on opex reduction)</li> <li>• Client needs to maintain separate strategic planning capability</li> </ul>	<ul style="list-style-type: none"> <li>• Master-servant relationship reversed – client completely reliant on contractor</li> <li>• Capital categorisation issues and scoping of risks</li> <li>• Inability to effectively control asset condition at end of contract</li> <li>• Client has no flexibility in capital spend</li> <li>• Transition issues</li> <li>• Limits field of capable contractors further</li> <li>• Capital investment decisions based on contractor's cost of capital rather than client's</li> <li>• No transfer of knowledge to client</li> <li>• Increased political risk</li> <li>• Client needs to maintain separate strategic planning capability</li> </ul>	<ul style="list-style-type: none"> <li>• Relies on maintaining relationships as no clear interface</li> <li>• Potential declining contractor incentive late in the contract</li> <li>• Lack of ability for contractor to reward himself</li> </ul>

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## 6. APPROACH TO SHARED ASSET MANAGEMENT PLANNING

Asset management includes both an operations and maintenance (O&M) and a capital expenditure component. Day to day O&M would be carried out solely by the contractor, and the contractor would be responsible for routine preventative and breakdown maintenance to ensure that the assets are properly maintained. This paper is focussed on the capital expenditure side of asset management and ensuring that there is an appropriate link between this and the day to day O&M. The capital expenditure components that need to be addressed are:

- Growth – which includes both population/load growth within the existing serviced areas as well as system extensions as a result of new developments/developer works;
- Renewal – renewing/replacing existing above and below ground assets that have either reached the end of their useful life or unable to meet customer service requirements;
- Water and Effluent Quality – works required to meet new (or existing) water and effluent quality standards;
- Hydraulic (backlog) – works required to deliver the required water flow and pressure to the existing population (vice versa for wastewater); and
- Improvements – works associated with safety, aesthetics, operational improvements, etc.

If the above areas were to be allocated to a single party (i.e. the client or the contractor) on the basis of the party in the best position to manage, then the allocation would be as follows:

Client	Contractor
Growth Water and Effluent Quality	Renewal Hydraulic Improvements

Such an allocation, however, ignores the linkages between the various works components. For example, a renewal or replacement activity considered on its own may not adequately address growth issues; similarly operational improvements in a particular area may avoid the need to spend a large amount of capital.

Therefore, for the assets to be managed appropriately and capital expenditure optimised, the AMP process requires input from both the client and the contractor. The potential for the development of optimal (and breakthrough) capex/opex project solutions will be enhanced if both parties are involved together in the AMP process.