

# DEPARTMENT OF NATURAL RESOURCES & MINES

## Planning Guidelines for Water Supply and Sewerage

### Chapter 10

## IMPLEMENTATION

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## Implementation

### 1.0 Purpose

The purpose of developing an implementation strategy for the preferred option or strategies arising from a planning study is to determine:

- the criticality of the project to the service provider's capital works and operational programs
- the most cost-effective means of implementing the option with minimal risk.

### 2.0 Key Principles

Stakeholders, including asset owners, need to be aware of issues and risks associated with the implementation of projects proposed through a planning study.

A rational approach to project prioritisation is essential to effectively deliver a capital works program.

The recommended implementation strategies should be based on a thorough review of potential risks and how they will be managed.

### 3.0 Why is an Implementation Strategy Important?

In many instances there would be advantages for an implementation strategy to be developed as part of a planning study. Service providers require information on the criticality of a project, how it is to be implemented and an estimated timeframe because:

- The project has to compete with other projects for priority in the capital works program (new or replacement works). Non-asset projects ( eg demand management) also have to compete for funding and resources.
- Implementation of the most appropriate infrastructure delivery option will provide beneficial results to the service provide.
- Some projects require a significant lead time for consultation, approvals, land acquisition etc.
- Service providers need to be aware of the resources required to manage and implement the project and the capital works program.
- Failure to deliver the capital works program to meet quality, timelines and cost objectives may result in non-compliance with service standards or regulatory requirements.

For smaller service providers and for routine projects the implementation strategy is relatively straightforward. However, for larger service providers with competing demands to meet growth and other stakeholder requirements, effective project and program management is essential.

The implementation strategy should quantify parameters used to prioritise projects within a capital works program.

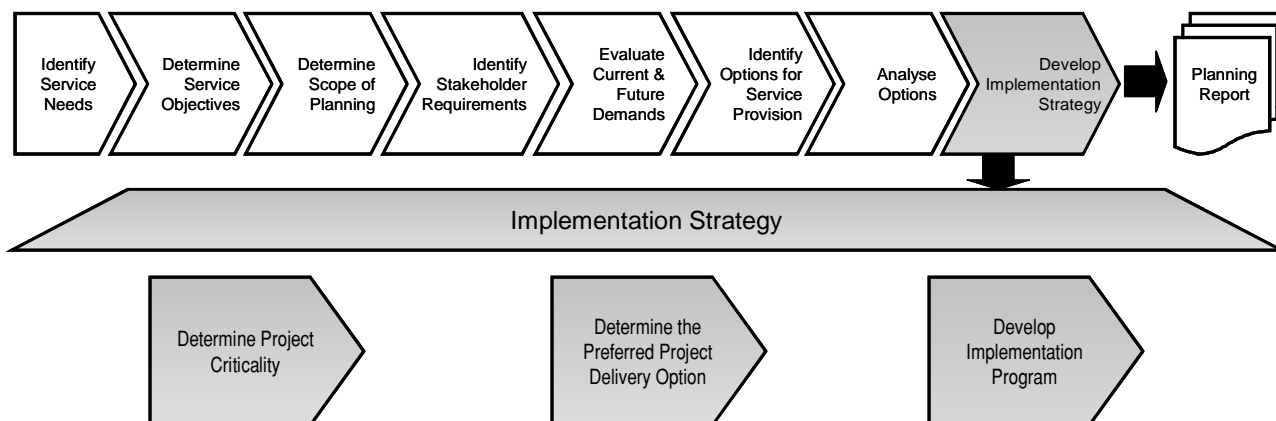
### 4.0 When Should an Implementation Strategy be Developed?

The implementation strategy should be developed once the preferred option has been selected. However, in certain circumstances project delivery may influence the selection of the preferred option. The implementation strategy should be documented in a planning report.

## 5.0 Key Elements

Key elements of the implementation strategy development are illustrated in Figure 5.1.

**FIGURE 5.1 – Key Elements**



### 5.1 Determine Project Criticality

Projects identified in planning studies have to compete with other projects (new or replacement works) within a service providers capital works program. Non-asset projects (eg demand management) also have to compete for funding and resources.

The planning process can provide a rationale for determining the relative importance of a project to meet the service provider's objectives. The process would need to be consistent across all planning studies. Consequently the prioritisation methodology has to be clearly documented by the service provider.

A suggested approach could be one similar to that adopted for the multi-criteria analysis (refer to Chapter 9 – Analysis of Options). It would typically involve:

- Determining project NPV or NPV/EP serviced.
- Assigning a rating and weighting to the anticipated benefits of the project to the service provider. These could include:
  - alignment with the service provider's strategic direction as outlined in its Corporate, Business or Total Management Plan
  - criteria such as service reliability, quality, quantity, operational efficiency, environmental improvement etc.
- Assigning a rating and weighting to the likely risks if the project does not proceed. These risks could be social, political, regulatory, financial, environmental, public health, workplace health and safety, etc.
- Assigning criticality scores to the project based on:
  - NPV and/or NVP per EP
  - total benefit score
  - total risk (if the project does not proceed) score.

The service provider would prioritise projects within a proposed program based on the relationship between the above for each project.

## 5.2 Determine the Preferred Project Delivery Option

The method of infrastructure or project delivery may need to be determined and evaluated in the planning stage, as different options will likely result in different financial impacts. For example, the financial impact of funding a treatment plant using traditional project delivery will be totally different from that of funding it through a build, own, operate, transfer (BOOT) arrangement.

Infrastructure delivery needs to be consistent with a service provider's delivery policy and procedures. A summary of infrastructure delivery options is outlined in Table 5.1.

**TABLE 5.1 – Summary of Alternative Infrastructure/Project Delivery Options**

Option	Process	Applicability
Sequential Design & Construction	Involves separate stages for design and construction. These stages could be undertaken by in-house teams or external contractors.	Suited to a large proportion of urban water and sewerage projects including projects where a reasonably detailed concept design needs to be developed (eg a dam or a pipeline) in an environmentally sensitive area, or where (due to the nature and location of the works) there is little scope for post-tender innovation.
Design & Construction (D&C)	A single company is responsible for both design and construction of the project, based on meeting explicit performance requirements. A service provider takes over and operates the infrastructure.	Suited to projects over \$1M where there are many options which could meet performance requirements. It is applicable for a group of treatment works or major pumping stations.
Build, Transfer, Operate (BTO)	A private sector company is responsible for design, construction and operation of a facility (normally 20-25 years). Ownership is transferred to the service provider after commissioning on payment of most of the capital cost.	Suited to projects over \$5M involving a water treatment works or sewage treatment works, where operational costs are a significant proportion of the total life cycle costs, and where service providers wish to maintain ownership of its facilities.  May also be suitable for a group of projects such as a group of small town sewerage schemes.
Build Own Operate Transfer (BOOT)	A private sector consortium is responsible for design, construction, operating, owning and financing a facility for the life of the project (normally 20-25 years). At the end of this period ownership of the facility is transferred to the Service provider.	Suited to "greenfield" projects over \$20M involving a water treatment works or sewage treatment works, where operational costs are a significant proportion of the total life cycle costs and where projects are easily separable from the rest of a service provider's business.
Alliance	Where several companies or service providers work together to deliver the project.	In special circumstances.
Concession	This is an extension of BTO where a private sector company is responsible for operation and maintenance of the system together with capital investment required over the life of the concession, typically 20-30 years.	In special circumstances.
Build Own Operate (BOO)	Similar to BOOT, except that the private sector consortium is responsible for the facility in perpetuity.	In special circumstances.
Public Private Partnership (PPP)	A PPP is a risk-sharing relationship between the public and private sectors to deliver timely public infrastructure and services. Objectives include:	In special circumstances

Option	Process	Applicability
	<ul style="list-style-type: none"> <li>▪ Delivery of improved services and better value for money through appropriate risk-sharing;</li> <li>▪ Encouraging private sector innovation;</li> <li>▪ Optimising asset utilisation; and</li> <li>▪ Integrating whole-of-life management of public infrastructure.</li> </ul>	

This table has been adapted from Water and Sewerage Infrastructure Delivery Options, Department of Land and Water Conservation (DLWC), Local Government and Shires Association, NSW, 1999.

Factors that should be considered in selecting the most appropriate infrastructure delivery option include (DLWC, 1999):

- Net present value of costs and revenues.
- Size and complexity of project – as the size and complexity of a project increases, a greater opportunity exists to explore options for infrastructure delivery.
- Policies on procurement and management of assets.
- Finance – a BOOT scheme may be more attractive to taking on additional debt.
- Regulatory approvals – the need for a detailed concept design for regulatory approvals for certain projects may limit options to sequential design and construction.
- Timing – D&C may lead to quicker project completion.
- Design needs – D&C, BTO, Concession or BOOT may be favoured if the best design process skills are with a contractor or operator.
- Construction – BTO, Concession or BOOT may be favoured for a “greenfield” site with high project cost and some complexity and scope for innovation.
- Operation – sequential or D&C may be favoured where a service provider’s operational efficiency for similar facilities is high. BTO, Concession or BOOT may be favoured where the desired technology is best available through private sector options, or where the WSP wishes to introduce a competitive element to provision of services in its area.
- Risk management – sequential would be favoured where detailed site investigations are necessary to adequately develop and cost a concept design or where there is considerable uncertainty in demand/load projections. BTO, Concession or BOOT would be favoured where the service provider wishes to transfer management of design, construction and operation interface risk to the private sector.

For each project a risk management plan should be prepared to identify how all potential risks for the delivery of the project would be managed. Each infrastructure delivery option would have a different risk profile. The client can then select the option which allows various risks to be allocated to the most appropriate party (client or contractor). Service providers should ensure that true risk transfer will actually exist.

Where innovative financing arrangements are being considered, service providers should take into account:

- up-front technical, legal and financial costs
- compliance with the Statutory Bodies Financial Arrangements Act 1982.

### **5.3 Develop Implementation Program**

Factors impacting on project implementation would include:

- relative criticality within the service provider's capital works program
- regulator imposed deadlines
- the service provider's financial position
- funding cycles
- approval timeframes
- time constraints
- the need for further planning/design studies (eg design report)
- extent of further stakeholder consultation
- project complexity
- land acquisition
- availability of contractors/subcontractors
- availability of materials
- seasonal factors that could delay construction.

Quantification of the approval timeframes is required to advise stakeholders on the lead times required between project inception and project completion. Lead times for some infrastructure projects (eg dam projects) would be in the order of 10 to 15 years to undertake all pre-construction activities.

For high risk projects, the program should nominate an appropriate period after which a post construction evaluation of project costs, benefits and risks is undertaken.

The implementation program should include an estimate of annual cash flow.

For high risk projects it would be desirable to undertake a detailed risk management study to reduce the probability and consequence of risk events.

The implementation plan should include a skills matrix and a training program for service providers that have limited available operating or management skills.

## 6.0 Checklist

Is a consistent approach to quantifying project criticality being applied across all planning studies?

Has the appropriate infrastructure delivery option been identified? How?

Have implementation risks been identified and appropriate strategies developed to minimise risk and/or direct them to the most appropriate party?

Does the service provider have the resources to implement the proposed program? How have you made sure of this?

Does the program include a post-completion audit to be undertaken of the high risk projects?

Are you confident that the project can be implemented within the proposed timeframe at minimal risk? What is the basis of this confidence?

## 7.0 Bibliography

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