SAFE AND SECURE WATER PROGRAM

SECURING WATER SUPPLY AND SEWERAGE SERVICES FOR NSW REGIONAL COMMUNITIES

SAFE AND SECURE WATER PROGRAM

Cost Benefit Analysis Guiding Principles

March 2018
Introduction

This document provides guiding principles for Cost Benefit Analysis (CBA) under the Restart NSW – Safe and Secure Water Program (SSWP).

As a requirement for any construction phase funding to be received through the SSWP, a business case is required that includes CBA completed in accordance with the NSW Treasury Guidelines (NSW Government – The Treasury: Policy and Guidelines Paper – NSW Government Guide to Cost Benefit Analysis TPP 17-03, March 2017) (NSW Treasury Guidelines).

This document provides an overview of the Guiding Principles for a CBA prepared as part of a Business Case for the SSWP. This document should be read in conjunction with the NSW Treasury Guidelines.

Safe and Secure Water Program

The SSWP was established under the NSW Government’s Restart NSW fund, which was set up to improve economic growth and productivity in NSW.

The SSWP is a $1 billion program to address regional water issues and security of supply. The SSWP will fund eligible water and sewerage projects that deliver water security, public health, environmental and safety to regional communities.

The SSWP supports one of the key strategic objectives of the NSW government, as highlighted by the State Infrastructure Strategy – support the critical needs of regional industries and communities by ensuring water security and quality of supply.

Details on the process for SSWP funding, including project and applicant eligibility, are available at the SSWP website at http://www.water.nsw.gov.au/urban-water/safe-secure.

Cost Benefit Analysis Requirements

CBA is an evidence-based method for systematically organising and presenting information to help government understand all of the affects of policies and projects, including economic, social and environmental affects. CBA helps decision makers identify the best means to improve social welfare and assess competing proposals.

CBA provides a basis for the common comparison of total benefits and costs of a project to the NSW community, which includes the specific project area (but not as a separate entity). CBA allows the full range of potential economic, social and/or environmental affects to be quantified and valued. Where reasonable, all project costs and benefits should be quantified and a monetary value applied. The quantified costs and benefits are then converted into a common unit, by aggregating the values into the Net Present Value (NPV) of any current and future costs and benefits due to a project. A CBA framework is focused on the benefits for a specified reference group or community. A CBA framework also considers the timing of each of the affects, where future affects are ‘converted’ into today’s terms so that all affects can be meaningfully compared regardless of timing.

The SSWP was established under the NSW Government’s Restart NSW Fund, which was set up to improve economic growth and productivity in NSW. Delivering these improvements is the premise that frames CBA requirements under the SSWP.

Any CBA undertaken as part of the SSWP must be undertaken in accordance with NSW Treasury Guidelines. For the SSWP a toolkit has been developed to assist applicants in streamlining the CBA process. This toolkit has been developed specifically for the SSWP and it is expected to be applicable to the majority of eligible projects.

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SSWP applicants are encouraged to utilise the toolkit wherever possible. The types of projects for which the tool can be applied include:

- Town water security
- Drinking water quality,
- Wastewater management projects; and
- Safety of high risk dams.

For projects where the scope is high-value and/or complex in nature, the applicant should consult with Department Of Industry - Water (DoI Water) to clarify requirements. For example the toolkit may not be suitable for projects where the urban area is expected to have major future growth potential or a significant industrial presence with high water usage, where the project has potential benefits associated with non-NSW owned major industries such as mining, or where there are other beneficiaries identified as external to NSW. In these instances a customised CBA is likely to be more appropriate to ensure all project costs and benefits are appropriately identified and assessed. It is essential that all costs and benefits are assessed in accordance with NSW Treasury Guidelines and are clearly documented and justified by their reference source.

Proponents should contact DoI Water seeking clarification as to the applicability of the toolkit for all projects exceeding $10M, prior to commencing their CBA. Applicants are also encouraged to contact DoI Water to answer questions regarding both the use of the tool and the development of customised CBA’s. Questions should be emailed to sswp.water@dpi.nsw.gov.au in the first instance. Customised CBA’s that do not use the tool should apply costs and benefits in a manner generally consistent with those identified and adopted under the tool (refer to Table 1) and in accordance with NSW Treasury Guidelines. Customised CBA’s must be undertaken by suitably qualified consultants that are highly conversant with and experienced in CBA and the application of the NSW Treasury Guidelines.

Key Features and Steps of a CBA

Some key features for undertaking a CBA, using best practice methods and in accordance with NSW Treasury Guidelines are outlined below.

- Define the project including all significant inputs required to achieve project objectives. This should include clear definition of the base case, which is generally a ‘business as usual’ or ‘no policy change’ case (i.e. retain the status quo). The benefits and costs of all other options considered are calculated relative to the base case (i.e. the incremental change).
- Identify project affects. Note that a CBA includes first round affects, both direct and indirect, but not secondary affects. Direct affects reflect the revenues of the project less the opportunity costs of resources (such as land, labour and capital). Indirect affects are affects on third-parties and include environmental, social and health costs and benefits. An example of secondary affects would be a project creating additional income, where the expenditure of this income may in turn generate further employment and income (see p 12 of NSW Treasury Guidelines).
- Quantify the changes – identify areas affected by the project and quantify their affects.
- Estimate monetary value of these changes. This may be on a Per Person, Per Household or applied value. These affects may occur annually (Per Person Per Year) or on a one-off payment, such as the initial cost of construction. All amounts should be valued using “real prices”, which excludes inflationary effects on costs and benefits.
- Estimate the Net Present Value – use a discount rate to put all project costs and benefits into a net present value; 7 % is the adopted discount rate. Sensitivity analysis is undertaken using 3% and 10% and are calculated automatically in the model.

Further, proponents should undertake sensitivity analysis on the key range of variables adopted for calculating costs and benefits. This requires running the model again with different input variables and reporting these results separately.
As per Section 7.5 of NSW Treasury Guidelines some items are excluded from a CBA, for example:

- **Sunk costs** – in CBA all costs must relate to incremental new expenditure only, all past (or sunk) costs are irrelevant and should be excluded from analysis.

- **Depreciation** – the capital cost of a project is incurred at the time that expenditure is incurred for labour, machinery and other inputs for construction, or in the case of an existing asset when it is diverted from its current use to use in the project being evaluated. These inputs are valued at their opportunity cost. **Depreciation should not be included in a CBA because this would double count the up-front capital cost.**

- **Interest** – as future costs and benefits are discount to present value terms in a CBA, the discount rate reflects the use of capital resources for the project or program over time. **Including interest cost or dividend returns to equity would double count the cost of capital implicit in the discount rate.**

- **Transfer payments** - are financial transfer between groups that do not involve the use of economic resources. **These transfer payments should be excluded from a CBA because they do not have a net affect on the net benefits of the program, as the benefits to one group are offset by the costs to another group.**

### Additional Reference Documents

There are a number of additional key reference documents that may be utilised for projects being developed under the SSWP, including:

- **Simplified Business Case Guidelines** (Department of Premier and Cabinet)
  

- **Infrastructure NSW Contingency Management Guidebook** (Feb 2014)
  

- **NSW Reference Rates Manual** - Valuation of water supply, sewerage and stormwater assets (updated annually). In particular page 64 provides information detailing useful life of assets. The most recent version of this document can be provided by contacting sswp.water@dpi.nsw.gov.au

### Treatment of Commonwealth Funding

Funds received for infrastructure projects by way of a grant from the Commonwealth using a competitive grant application process are considered, for the Safe and Secure Water Program, to be of economic benefit to the project and to NSW, and may be considered in the cost benefit analysis. As the NSW population accounts for approximately 32% of the total population in Australia, 68% of the grant amount may be applied as a capital input (capital cost reduction) to the project.

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3 For example, a Commonwealth Government program that disburses funding through an Expression of Interest (EOI) process. EOI processes determine whether a project is suitable to progress to an application. Completing an EOI process provides no assurance or guarantee of receiving funding assistance and is decided on merit based on transparent criteria, e.g., the National Water Infrastructure Development Fund.
Quantification of Costs and Benefits

Where valuation of goods and services is possible, two key concepts are relevant: the opportunity cost principle and the willingness-to-pay (or willingness-to-accept) principle.

Opportunity cost\(^4\) represents the monetary and non-monetary benefits foregone by undertaking a project. Committing resources to a particular project or program will preclude their use elsewhere. The value of the resources used is their ‘opportunity cost’. This is the value of those resources in their most attractive alternative use. In general, market forces will generate a price for capital, labour and other inputs that reflect the opportunity cost of the resources.

Based on the opportunity cost principle, some benefits can be estimated based on the avoided costs of related services. For example, whenever a water supply is compromised, or whenever sanitation coverage is problematic, the risk of disease, particularly gastrointestinal/diarrhoeal disease is increased. In NSW, and elsewhere, illnesses are more likely in: small private water supplies; in the absence of quality water supply and sewerage systems; in systems that do not have risk-based drinking water management systems; and locations that do not meet National Health and Medical Research Council (NHMRC) Guidelines health criteria. The costs associated with illness include healthcare costs (both to the health system and patient), productivity costs due to lost activity in the workplace or home, and mortality costs based on the estimated years of life lost by different age groups. These represent the avoided costs (benefits) obtained from improving the water or wastewater system.

Willingness to pay (WTP) is the maximum amount an individual or a firm is willing to pay for a good or service. In CBA, goods or services are generally valued at the highest amount of money that individuals or firms are willing to pay for them. Benefits and costs in a CBA should be valued at market prices, whenever prices or reasonable proxies are available. Market-based valuation relies on analysis of market information on consumer behaviour and/or prices in similar, complementary or related markets. Prices in competitive markets reflect what individuals are willing to pay.

The toolkit developed for use in the SSWP CBA has adopted a number of benefits relevant to projects which apply to the broad scope of the SSWP. These benefits have been identified based on existing studies, reports and data in the water and wastewater fields and are based on the valuation principles of opportunity cost and willingness to pay.

An outline of the key types of benefits identified and used in the CBA Toolkit are listed below:

- Avoided social costs of water borne disease (for both water and sewerage projects)
- Avoided costs of on-site sewerage systems (including septic, on-site pump out and aerated wastewater treatment systems)
- Avoided costs of household water filtration systems
- Avoided costs of water carting (in the case of water supply failure)
- Willingness to pay to avoid water restrictions
- Willingness to pay to recycle water (to houses, the environment, Council or business/ industry)
- Willingness to pay to provide fish passage associated with water security or dam safety projects
- Willingness to pay to avoid receiving water quality affects
- Willingness to pay to avoid loss of riverine habitat.
- Value of Statistical Life (for dam safety projects)

A summary of the CBA toolkit reference sources and applied benefits is shown in Table 1. This information is provided to assist proponents in understanding and developing CBA under the Program. All reference sources where required have been converted to Australian dollar and adjusted for CPI to reflect the value for 2017.

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### Table 1 – CBA Toolkit Reference Sources and Applied Benefits

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Unit</th>
<th>Source</th>
<th>2017 Adopted Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoided Cost of Pump Out Sewerage System Servicing</td>
<td>$/Household/Year</td>
<td>Based on information provided by industry representatives in the sewerage and wastewater industry.</td>
<td>$3,318</td>
</tr>
<tr>
<td>Avoided Cost of Septic System Maintenance</td>
<td>$/Household/Year</td>
<td>Based on information provided by industry representatives in the sewerage and wastewater industry.</td>
<td>$395</td>
</tr>
<tr>
<td>Avoided Cost of AWTS Servicing</td>
<td>$/Household/Year</td>
<td>Based on information provided by industry representatives in the sewerage and wastewater industry.</td>
<td>$375</td>
</tr>
<tr>
<td>Avoided Cost of Water Carting</td>
<td>$/kL</td>
<td>DPI Water (2017) – Average Costs of Water Carting</td>
<td>$27</td>
</tr>
<tr>
<td>WTP to Contribute to Fishways</td>
<td>$/Household</td>
<td>NSW DPI (2016). New South Wales Department of Primary Industries Macquarie River Fishways Cost-</td>
<td>$32</td>
</tr>
<tr>
<td>Benefit</td>
<td>Unit</td>
<td>Source</td>
<td>2017 Adopted Value</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>---------------</td>
<td>------------------------------------------------------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Value of Statistical Life WTP</td>
<td>$/Person</td>
<td>Best Practice Regulation Guidance Note - Value of Statistical Life December 2014</td>
<td>$4.35M</td>
</tr>
</tbody>
</table>

It is not a requirement of the program that proponents use this information provided all applied benefits are consistent with NSW Treasury Guidelines and benefits are clearly documented and justified by their reference source.

Applicants must take care to ensure benefits do not involve double counting. Applicants can consult with DoI Water by emailing sswp.water@dpi.nsw.gov.au in the first instance to seek advice on what may or may not be acceptable.
All affects or benefits must be thoroughly researched and defendable for their adoption in a CBA. Ideally the affect or benefit would be from a recent study from a reputable source and in an environment / location similar to the study area.

Where an applicant proposes to use quantitative factors for affects or benefits they should be consistent with Box 2.4 of the NSW Treasury Guidelines⁵, “Evidence to support valuation” for which an extract is shown below:

“Reasonable effort should be made to collect the best available evidence to inform the CBA. This will often depend on practicality and judgment. The effort warranted to value particular benefits will depend on the size of the proposed program and the importance of other benefits considered in the appraisal. As a general rule, proposals that are high-cost or high-risk will warrant more extensive analysis than minor proposals. In some cases it may be feasible to adopt standard parameters to estimate costs and benefits of projects of a similar nature e.g. competitive grant programs, but the basis for these parameters should be documented.

Analysts are encouraged to consult Treasury early in the appraisal of large or complex expenditure proposals, so that there is a shared understanding of the scope and valuation of costs and benefits included in the analysis. Experimental evidence is considered the strongest for demonstrating causal relationships, depending on the quality of the study. Quasi-experimental evidence is used when experimental designs are not feasible. Descriptive or observational evidence can be a useful aid to quantitative methods, but are limited by the lack of a control group. For a more detailed explanation of the evidence hierarchy, refer to the NSW Government Program Evaluation Guidelines.”

Proponents should also take care to identify and value all market and non-market costs associated with a project. Examples of non-market costs could include biodiversity offsets or negative externalities such as impacts on social amenity resulting from odour or noise associated with the project.

A negative externality occurs when a decision maker does not have to pay the full cost of the decision. If a good has a negative externality, then the cost to society is greater than the cost the consumer is paying for it. Since consumers make decisions based on where their marginal cost equals their marginal benefit, and since they don’t take into account the cost of the negative externality, negative externalities can result in market inefficiencies unless they are appropriately accounted for.

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