

Appendix 5

Cost Estimating and Risk Assessment In MoTI Business Cases

Prepared By:

Planning and Programming Branch
Infrastructure Department

BC Ministry of Transportation and Infrastructure

Updated April, 2014

Cost Estimating

Cost estimates done in support of project business cases must follow the Ministry's Cost Estimating Guidance. Refer to:

http://www.th.gov.bc.ca/publications/planning/Guidelines/Cost_Estimating_Guidance.pdf

The above Guidance is highly relevant to project business case issues, including:

- Cost estimates through the project life cycle, beginning with pre-project (corridor level) work leading into project planning work and design activities,
- Contingency and risk,
- Continual documentation through the project life cycle,
- Classification of estimates,
- Cost elements,
- Project budget development policy including approved highway cost inflation rates,
- Estimating methods, systems, and tools, and
- Resources

Cost estimates done in the pre-planning and planning stages of a project are typically less accurate than those done later on, since scope and risk information is more limited.

It is particularly important to clearly state all assumptions about:

- The expected scope of work.
- Contingencies in the estimate.
- Potential risks affecting the estimate (e.g. property acquisition, utilities, environmental mitigation, First Nations impacts, geotechnical problems, stakeholder issues which may need to be addressed).

The business case may need to include upper end and lower end cost estimates reflecting uncertainty, and hence a range of potential Net Present Values and Benefit/Cost ratios.

For information on past unit prices see:

Ministry of Transportation Historical Construction Cost Data

http://hce.th.gov.bc.ca/cost_est/index.htm

Recommended reading:

NCHRP Report 574 – Guidance for Cost Estimation and Management for Highway Projects During Planning, Programming and Preconstruction, 2007

http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_574.pdf

Risk Assessment

The “Risk Management Guideline for the BC Public Sector” sets out the principles for assessing project risk. See: http://www.fin.gov.bc.ca/pt/rmb/ref/RMB_ERM_Guideline.pdf

A basic premise is that analysts need to consider both the likelihood and the consequence of each risk.

The Province’s Capital Asset Management Framework (CAMF) provides information on the assessment of project risk in sections 3.2 and 4.5. See: <http://www.fin.gov.bc.ca/tbs/camf.htm>

Section 3.2.1 “Project Risk Categories” has examples of project risk categories:

- general
- policy
- public interest
- management or organizational
- design/construction/commissioning or partnership/supplier,
- site
- financing
- cost/economic/market
- ownership and operations
- other

“To ensure they apply the appropriate levels of due diligence, agencies should develop processes to:

- assess the overall risk and complexity associated with each project, throughout its life cycle;
- assess risk in the earliest stages of planning, when only rudimentary estimates of costs and impacts may be available; and
- continually review and update risk assessments at every stage of a project’s life cycle, adjusting levels of due diligence as needed.”

CAMF Section 4.5.3 sets out business case requirements according to the level of project risk and complexity:

- Large, complex and moderate to high-risk projects: thorough risk assessment, especially when considering alternative service delivery or public-private partnership options.
- Medium-sized projects of moderate risk or complexity: focus primarily on the business case elements with the highest areas of risk, determined through a thorough risk assessment.
- Smaller, less complex projects: focus on selected (relevant) business case elements, with the levels of analysis being commensurate with risk.

“Uncertainty” and “risk” are two terms which frequently arise in project management literature. Since there are widely varying opinions about the definitions of these terms, MoTI has chosen to use only the term “risk”, in the context that every project has some degree of known and/or unknown factors which may affect the project scope, schedule and/or budget. Examples of factors influencing risk are:

- The amount and quality of information available.
- The assumptions made when information is missing or questionable.
- The technical complexity of the proposed option.
- Stakeholders with diverse interests and opinions about the project scope.

The impacts of risk diminish with the improved understanding that comes from each subsequent stage of project development.

Where risk is significant, it should be explicitly identified and assessed in the business case. This requires a careful review of the assumptions employed in the evaluation.

Sensitivity and scenario analysis are ways to deal with risk. Sensitivity analysis is the process of varying an analysis input and determining the effect on the analysis outputs. Scenario analysis involves analyzing the combined effect of a change in a set of assumptions (e.g. “best case”, “most likely” or “worst case” scenarios).

The assessment of risk should serve two basic purposes:

- It should clearly identify the sources and nature of the risk for different options, and the associated impact on the accuracy of the evaluation results.
- It should evaluate the flexibility of the options to respond to events, and comment on how this flexibility can be managed and enhanced through appropriate risk management strategies.

2014-04-16