

13.0 Risk Assessment, Uncertainty and Optimism Bias

- 13.1 All investment schemes are exposed to elements of risk and uncertainty and this project is no exception. Accordingly a risk register has been prepared and is included in Appendix C.
- 13.2 The risk register identifies those areas of delivery, construction and operation where there are uncertainties. The programmed construction date is 2010, which gives several years to assess and overcome some of the potential sources of risk, particularly those relating to road construction.
- 13.3 The risk register indicates the likelihood of occurrence for each of the identified risks, the likely impact each risk has on the implementation of the project and attaches a quantified cost estimate to the likelihood of each risk occurring. The proposed scheme is currently at an early stage in its development and consequently it has not been possible for many of the risks to be calculated empirically at this stage. Instead, risks have been quantified by considering costs experienced from other highway schemes of a similar value, using current rates for work/staff time and by organising 'brain storming' sessions where common-sense approximations have been applied to risks.
- 13.4 The Risk Register identifies six key risks for the project; three construction risks associated with Utilities and three anticipated due to other factors. The potential Utilities risks were revealed to include three elements:
- the risk that uncharted services will be encountered during excavation;
 - the risk that the Utilities will provide inaccurate estimates for diversionary works;
 - the risk that Utilities will require longer lead-in times for diversions.

These high ranking risks have been anticipated due to the town centre location which increases the likelihood of encountering a large number of services.

- 13.5 It is feasible that some of the services may be uncharted and past experience within Nottinghamshire County Council has demonstrated that dealing with these unexpected events can prove time consuming and costly. The risk that Utilities provide inaccurate estimates for diversions could potentially produce cost savings; however, experience from previous contracts has shown that, similarly, costs are more likely to be greater than originally estimated. The issue of the large number of services likely to be encountered on site also increases the risk for potential delays in carrying out utilities work and therefore this could have a cumulative effect of delaying the contract.
- 13.6 Other key risks identified by the risk register included:
- the risk that the value of compensation payments to adjoining land owners will exceed budget allocation;
 - the risk that unauthorised occupation of buildings to be demolished will delay the contract;
 - the risk that there may be difficulties in obtaining Environment Agency approval for the detailed culvert designs.

- 13.7 As the proposed scheme is within a dense urban area there are a significant number of houses in close proximity to the line of the new road. Consequently, the value of compensation payments could be quite high. Similarly, as a number of dwellings are to be demolished unauthorised occupation has the potential to cause severe, and therefore expensive delays to the contract.
- 13.8 The design of the culvert has been indicated as part of the outline design for the proposed scheme. This does not guarantee full approval for the detailed design of the culvert and therefore there is a risk that redesign or additional construction work would be necessary to meet with the Environment Agency's approval.
- 13.9 Following a quantified risk assessment at this early stage of the project an allowance of £787,000 has been added to the scheme cost estimate to allow for measures to mitigate and reduce the risks should they occur. It is proposed to develop the initial risk register through Early Contractor Involvement (ECI) using PRINCE2 methodology to ensure that risks can be further reduced as the project progresses.
- 13.10 The management of risks will be carried out by the Project Manager and Project Board using PRINCE2 methodology to ensure that all risks are identified, recorded and regularly reviewed. Tolerance to risk will be agreed with the Project Board upon commencement of the project after which time the Risk Log will be continually updated to reflect changes to existing risks. Any prevailing issues associated with risk will be escalated to the Project Board via Highlight Reports.
- 13.11 In addition to the inclusion of these contingencies optimism bias has also been applied to the estimates. In discussion with the Department for Transport's economists a capital expenditure optimism bias uplift of 15% would be applicable for this standard civil engineering project and at this stage in the project's development.
- 13.12 A range of other levels of optimism bias has been examined to quantify the impacts of any cost increases on the schemes' BCR and the results are tabulated separately for the preferred scheme and low cost alternative in Table 13a below and Table 13b opposite.

**Table 13a – Impact on scheme returns after applying optimism bias
(Preferred Scheme)**

Level of Optimism Bias	PVC £M	PVB £M	Benefit /Cost ratio (BCR)
0%	7.554	77.940	10.32
15%	8.687	77.940	8.97
32%	9.971	77.940	7.82
40%	10.576	77.940	7.37
44%	10.878	77.940	7.16
66%	12.540	77.940	6.02

**Table 13b – Impact on scheme returns after applying optimism bias
(Low Cost Alternative)**

Level of Optimism Bias	PVC £M	PVB £M	Benefit /Cost ratio (BCR)
0%	7.445	78.595	10.56
15%	8.562	78.595	9.18
32%	9.827	78.595	8.00
40%	10.423	78.595	7.54
44%	10.721	78.595	7.33
66%	12.359	78.595	6.36

