Appendix G – Optimism Bias Analysis

Optimism Bias Assessment and Summary Table

GREEN BOOK GUIDANCE FOR OPTIMISM BIAS

Project Type **Standard Civil Engineering**

Standard Civil Engineering

Upper Bound Optimism Bias(%)		**20**	**44**
Contributory factors to Upper Bound Optimism Bias(%)		**Works Duration**	**Capital Expenditure**
PROJECT PROCUREMENT	Complexity of Contract Structure	N/A	N/A
	Late Contractor Involvement in Design	N/A	3
	Poor Contract Capabilities	16	N/A
	Government Guidelines	N/A	N/A
	Disputes and Claims Occurred	N/A	21
	Information Management	N/A	N/A
	Other (Specify)	N/A	N/A
PROJECT SPECIFIC	Design Complexity	N/A	N/A
	Degree of Innovation	N/A	N/A
	Environmental Impact	46	22
	Other (Specify)	N/A	18
CLIENT SPECIFIC	Inadequacy of the Business Case	8	10
	Large Numbers of Stakeholders	N/A	N/A
	Funding Availability	6	N/A
	Project Management Team	N/A	N/A
	Poor Project intelligence	14	7
	Other (Specify)	N/A	N/A
ENVIRONMENT	Public Relations	N/A	9
	Site Characteristics	N/A	3
	Permits/Consents/Approvals	N/A	0
	Other (Specify)	N/A	N/A
EXTERNAL INFLUENCES	Political	N/A	N/A
	Economic	N/A	N/A
	Legislation/Regulations	N/A	7
	Technology	N/A	N/A
	Other (Specify)	N/A	N/A

CAPITAL EXPENDITURE OPTIMISM BIAS CALCULATION

	in millions
Outturn Cost of Scheme	**£5.48**
Apply 44% Upper Bound Optimism Bias	£2.41
Cost after Upper Bound Optimism Bias	**£7.89**

OPTIMISM BIAS ASSESSMENT TABLE *Factor*	*Risk Reducing Mitigation Factor*	*Risk Remaining Factor*
Complexity of Contract Structure	N/A	0
Late Contractor Involvement in Design	0.25	2.27
Poor Contract Capabilities	N/A	0
Government Guidelines	N/A	0
Disputes and Claims Occurred	0.25	15.75
Information Management	N/A	0
Other (Specify)	N/A	0
Design Complexity	N/A	0
Degree of Innovation	N/A	0
Environmental Impact	0.50	11.00
Other (Orders and Land)	1	0
Inadequacy of the Business Case	0.75	2.50
Large Numbers of Stakeholders	N/A	0
Funding Availability	N/A	0
Project Management Team	N/A	0
Poor Project intelligence	0.25	5.25
Other (Specify)	N/A	0
Public Relations	0.25	6.79
Site Characteristics	0.50	1.49
Permits/Consents/Approvals	0.75	0
Other (Specify)	N/A	0
Political	N/A	0
Economic	N/A	0
Legislation/Regulations	0.10	6.30
Technology	N/A	0
Other (Specify)	N/A	0

Total Reduction Factor %	51.34	
Upper Bound Optimism Bias(%)	44	
Resultant Reduction Optimism Bias(%)	21.4	
Resultant Reduction Optimism Bias(%)	22.59	
Outturn cost less contingencies	£4.95	
Risk Adjustment (Contingencies)	0.5	
Resultant Capital Cost including 33% Optimism Bias	**£7.00**	***millions***
Risk Adjustment including 33% Optimism Bias	**£0.65**	***millions***
Outturn Capital Cost (Adjusted for Risk & OB)	**£7.65**	***millions***

PROJECT PROCUREMENT	Optimum Bias Proportion				Possible Mitigation Measures				Mitigation Factor (0 to 1)
	Capital	Cause of Risk	Effect of Risk	Potential Impacts	Risk Mitigation Strategy	Mitigation Action	Mitigation Action Owner	Mitigation Action costs	Capital Expenditure
COMPLEXITY OF CONTRACT STRUCTURE	N/A								N/A
a) Details of risk transfer had to be clarified b) Payment mechanism had to be defined c) Unforeseen amount of negotiation required in terms of contract									
LATE CONTRACT INVOLVEMENT IN DESIGN	3								0.25
a) Value management was necessary but contractor was not involved early enough		No contractor involved in the scheme at this time	May lead to inappropriate solution	Increase in cost and delay	Mitigate	Adopt Early Contractor Involvement	Promoter	No allowance for QRA	0.25
b) The design could not be built due to construction problems		Unforeseen ground conditions	Additional ground works to mitigate problem	Increase in cost and delay	Mitigate	Undertake trial pits to locate SU apparatus	Promoter	Allowance in QRA	0.25
c) Contractor provided design/construction feedback at a late stage resulting in redesign		No contractor involved in the scheme at this time	Additional physical works thus cost and programme impact	Increase in cost and delay	Mitigate	Adopt Early Contractor Involvement	Promoter	None	0.25
POOR CONTRACTOR CAPABILITIES	N/A								N/A
a) Contractor was inexperienced b) Site health & safety standards were not met c) Construction was not carried out to the necessary standards									N/A
d) The contractor had insufficient resources									
GOVERNMENT GUIDELINES	N/A								N/A
a) No precedent of guideline had been developed to procure a leading edge project						N/A			
DISPUTES & CLAIMS	21								0.25
a) Disputes over interim payments		•Inadequate management •Lack of clarity over payment mechanism	•Delays to project •Litigation		Mitigate	Agreed with 3 Counties Alliance payment procedures	Promoter	External to scheme	0.10
b) Claims for changes in scope (by promoter)		•Inadequate consultation •Failure to extra over requirements •Inadequate output spec •Discover something unforeseen	•Delays to project •Litigation		Mitigate	Continue consultation	Promoter	Included in scheme estimate	0.40
c) Claims for late release of information by other stakeholders		•Failure to identify stakeholder •Failure to consult properly	Additional physical works thus cost and programme impact		Mitigate	Continue consultation	Promoter	Included in scheme estimate	0.25
INFORMATION MANAGEMENT SYSTEMS	N/A								N/A
a) Interfaces between the stakeholders were not managed efficiently									
OTHER (SPECIFY)	N/A								N/A

PROJECT SPECIFIC	Optimum Bias Proportion				Possible Mitigation Measures				Mitigation Factor (0 to 1)
	Capital	Cause of Risk	Effect of Risk	Potential Impacts	Risk Mitigation Strategy	Mitigation Action	Mitigation Action Owner	Mitigation Action costs	Capital Expenditure
DESIGN COMPLEXITY	N/A					N/A			N/A
DEGREE OF INNOVATION	N/A					N/A			N/A
ENVIRONMENTAL IMPACT	22								0.50
a) Contamination due to hazardous substances on route of IRR		•Inappropriate disposal of material •Old workings	•Litigation from EA •Poor PR •Claims for clean up		Mitigate	Undertake soil survey and trial pits	Promoter	Included in QRA	0.50
b) Noise pollution		•Construction plans and methodology	Claims for insulation		Mitigate	•EIA has been undertaken including noise, air quality and ecology impacts and this has been taken into account in the design	Promoter	Included in scheme estimate	0.50
c) Impact on wildlife		•Failure to identify stakeholder •Failure to consult properly	Additional physical works thus cost and programme impact		Mitigate	•Plan to undertake further survey work •Construct alternative sites as necessary •Provide habitat enhancements as necessary		Included in QRA	0.50
ORDERS AND LAND	18								1.00

CLIENT SPECIFIC	Optimum Bias Proportion				Possible Mitigation Measures				Mitigation Factor (0 to 1)
	Capital	Cause of Risk	Effect of Risk	Potential Impacts	Risk Mitigation Strategy	Mitigation Action	Mitigation Action Owner	Mitigation Action costs	Capital Expenditure
INADEQUACY OF BUSINESS CASE	10								0.75
a) Number of services were not anticipated		•Inaccurate records	Design changes		Mitigate		Promoter	Allowance in QRA	0.75
b) Output mechanisms were not defined clearly		Inadequate brief	•Inappropriate design •Design modified		Mitigate	Objectives/outputs of scheme clearly defined and approved following public consultation	Promoter	Allowance in QRA	0.75
c) Oversight in proposed facilities		•Change in the scheme •Success of the scheme •Inadequate consultation	•Poor PR •Scheme could be more or less successful than anticipated		Mitigate	•Monitor suitability of facilities •Trial of one way bus services	Promoter	External to scheme	0.75
d) All stakeholders were not involved and hence all needs were not defined		Unaware that they are involved	Wrong assumption in business case		Mitigate	Continue consultation process	Promoter	Costs included in scheme estimate	0.75
LARGE NUMBER OF STAKEHOLDERS	N/A								N/A
a) Different public sector parties having differing interests in the project									
b) Process of obtaining approval took longer than expected due to number of parties involved									
FUNDING AVAILABILITY	N/A								N/A
a) Difficulties in obtaining financial backing for project									
PROJECT MANAGEMENT TEAM	N/A								N/A
a) Project Management Team was inexperienced in delivering a project of this nature									
b) Inadequate review of drawings by the Project Manager before construction									
POOR PROJECT MANAGEMENT	7								0.25
a) Insufficient ground investigations		Lack of surveys	•Increase in cost and time •Redesign of scheme		Mitigate	•Topographical survey work has been undertaken •Further survey work will be undertaken prior to start of works •Trial pits to be undertaken	Promoter	Included in scheme estimate	0.25
b) Detailed design was based on insufficient site information		Lack of surveys	•Increase in cost and time •Redesign of scheme		Mitigate				0.25
c) Insufficient surveying of existing conditions					Mitigate				0.25
OTHER (SPECIFY)	N/A								N/A

ENVIRONMENT	Optimum Bias Proportion				Possible Mitigation Measures				Mitigation Factor (0 to 1)
	Capital	Cause of Risk	Effect of Risk	Potential Impacts	Risk Mitigation Strategy	Mitigation Action	Mitigation Action Owner	Mitigation Action costs	Capital Expenditure
PUBLIC RELATIONS	9								0.25
a) Opposition from local community (Severance and demolition of special buildings)		•Insufficient consultation •Misleading/incorrect information	•Bad PR •Disruption to the scheme •Possible political intervention •Modification to orders		Mitigate	Continued consultation	Promoter	Included in scheme estimate and QRA	0.25
b) Environmental protests		Loss of habitat			Mitigate		Promoter	Included in QRA	0.25
SITE CHARACTERISTICS	3								0.50
a) Presence of protected species within construction site		•Failure to identify information from site surveys •Failure to comply with EIA	•Additional claims •Change in construction methodologies •Restrictions and delay in timetable		Mitigate	•Further surveys •Construct alternative sites if necessary •Provide habitat enhancements if necessary	Promoter	Included in scheme estimate and QRA	0.25
b) Unexpected ground water		Insufficient soil survey	Additional claims etc.		Mitigate	Undertake soil surveys	Promoter	Included in QRA	0.75
c) Archaeological findings		•Insufficient archaeological survey •Failure to identify in EIA •Failure to conform to planning conditions	•Additional claims •Change in construction methodologies •Restrictions and delay in timetable	Increase in cost and delay	Mitigate	Further surveys programmed ahead of construction •Allowance in programme	Promoter	Included in scheme estimate and QRA	0.50
PERMITS/CONSENTS/APPROVALS	0								0.75
a) Parliamentary Bill required for Project Initiation									1
b) Difficulties in obtaining planning permission, possibly resulting in an appeal to the Secretary of Sate						Outline planning permission obtained. Secure detailed planning permission			0.70
OTHER (SPECIFY)	N/A								N/A

EXTERNAL INFLUENCES	Optimum Bias Proportion				Possible Mitigation Measures				Mitigation Factor (0 to 1)
	Capital	Cause of Risk	Effect of Risk	Potential Impacts	Risk Mitigation Strategy	Mitigation Action	Mitigation Action Owner	Mitigation Action costs	Capital Expenditure
POLITICAL	N/A								N/A
a) Opposition by a major political party b) Impact on sensitive constituencies c) Lacks support from key political stakeholders									
ECONOMIC	N/A								N/A
a) Change in market demand resulting in change in funding priorities b) Crash in stock market									
LEGISLATION/REGULATIONS	7								0.10
a) Change in required standard		Adoption of results of research into guidance	Limited redesign of scheme		Mitigate	•Monitor for impending changes •Liaise with DfT	Promoter	Included in QRA	0.10
TECHNOLOGY	N/A								N/A
a) Computer virus b) Limits in technology						N/A			
OTHER (SPECIFY)	N/A								N/A