

Appendix 5: Proposed Scheme Risk Register and Risk Allowance Derivation

HARM No	Risk	Prob	Cost (£k)			Comments and Risk Management Measures	Owner	Action Plan Required	Time Assessment (Weeks)	
			L	ML	H				CP Time Design + Construction	CP Time Preparation
	EMPLOYER'S RISKS									
01	Planning and Supervision									
101001	Change in key staff: Consultants.	L	0	50	100	Produce succession plan for key personnel	PB MS	Y		
101002	Change in key staff: Employers.	L	0	20	50	Produce succession plan for key personnel. Dissemination of knowledge through Devon CC ongoing.	DCC PE	Y		
101003	Insufficient resources, both Consultant and Employers.	L	20	50	200	Cost caused by need to employ more expensive staff at short notice. Produce resourced programme and monitor	PB MS	Y		
101004	Cost increase due to change in Scheme arising from Inquiry.	L	50	100	200	Good Preparation essential. Continued liaison. Residual risk for some landowners.	PB MS	N		
101005	Cost increase on Network Rail budget for supervision of works, possessions and track monitoring.	M	50	100	150	Budget allowance: £573,550. Value Management arranged with NR. Details still to be confirmed 4/12/07	DCC NB			
101006	Cost increase Network Rail budget for general project management and approvals.	M	20	50	100	Budget allowance: £100,000. Value Management arranged with NR.	DCC (NB)			
101007	Cost increase due to optimistic construction programme. (Too short a programme may increase costs.)	VL	0	10	50	Three years allowed, in addition to period for advance works.	PB MS	N		
101008	Cost increase due to short tender period which increases scope for errors and hence allowance for risk by D&B Contractor.	L	600	1200	3000	Only 4 months in programme allowed as per Barnstaple. Value reflects current contractor feedback on D&B procurement. Procurement options under review for MSB.	DCC PE	Y		
101009	Scheme delayed due to appointment of contractor without railways contractors assurance case	VL	0	0	0	Ensure OJUE requires Contractor's Assurance Case. NR need Contractor's to have PI cover for £155 million.	DCC PE		0	
101010	Actual inflation differs from budget assumption. Moved to 113003	M	0	0	0	Moved to 113003.	PB MS	N		
101011	Scheme delayed due to failure to pass OGC Gateway 3.	L	0	0	0	Understand gateway process	DCC PE	N		4
101012	Scheme delayed due to delay in DfT decision on Major Scheme Bid.	L	0	0	0	Programme allows six months.	DCC PE	N		4
101013	Scheme delayed due to ineffective liaison with external bodies.	M	0	0	0	Produce communications plan	PB MS	Y		8
101014	Scheme delayed due to failure to 1. set up Network Rail agreements and 2. NR to progress CPO prior to Inquiry.	L	0	0	0	Risk realised. NR Value Management arranged for December 2007. DCC will make CPO regardless of NR comments. See 101021				0
101015	Scheme delayed due to change from PPGuidance to PPStatements causing change in status of existing planning application.	VL	0	0	0	Examine PPS to ascertain likelihood of policy shift. Now main river but no change anticipated. Urgent to get outstanding applications issued.	DCC NB			0
101016	Scheme delayed and cost increase due to prolongation of Public Inquiry.	L	50	200	400	Cost based on prolongation of Inquiry. Inquiry time difficult to mitigate. Programme allows 4 week Inquiry and 12 weeks to report.	PB MS	Y		4
101017	Scheme delayed and cost increase due to High Court Challenge	M	10	50	100	Cost of HCC. Delay for High Court Challenge difficult to mitigate. Programme allows 2 months. Raised to 'M' following Weymouth.	PB MS	Y		8
101018	Scheme delayed and cost increase due to change in procurement strategy.	L	5	15	50	Procurement based on D&B. Cost is for eo D&B. Procurement options report sought. Once decision taken, risk mitigated/realised.	PB (MS)	Y		0
101019	Scheme delayed due to delay in award.	L	0	0	0	Delay in award difficult to mitigate. OGC involved.	DCC PE			4
101020	Scheme delayed due to delay in NR approval of method statements submitted by D&B contractor.	M	10	30	80	Cost of additional design minus saving to D&B Contractor. Present the contractor with a full design approved by NR and if time constraints allow then the contractor could change				
101021	Scheme delayed due to NR obstructive approach upon receipt of made Order	M	0	0	0	NR has not engaged in CPO development and could object to Order. Establish rule for amending at Inquiry.	PB MS	Y		
101100	Delay allowance for all activities likely to delay start of scheme. Moved to 113002	M	0	0	0	Moved to 113002	PB MS	Y		

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02	Land and Compensation									
102001	Scheme delayed due to Network Rail's Commercial Property Division not consulted causing delay in CPO	VL	0	0	0	Consult NR. NR may want permanent license as opposed to CPO. See 101021.				0
102002	Cost increase due to increase in Part 1 claims and land at Torbay.	L	1000	1500	2000	Cost based on allowance in DCC and Torbay's Valuer's estimates				
03	Strategic									
103001	Scheme Fails to obtain Regional Funding Allocation.	-	-	-	-	Strategic Risk				
103002	Failure to pass Major Scheme Bid.	-	-	-	-	Strategic Risk				
103003	Change in Scheme Brief arising from MSB	-	-	-	-	Strategic Risk				
103004	Failure to obtain approval through the statutory process, eg landowner objection.	-	-	-	-	Strategic Risk				
103005	Comprehensive Spending Review	-	-	-	-	Strategic Risk				
103006	Statutory changes e.g. aggregate tax, EU legislation changes, UK Government tax changes	-	-	-	-	Strategic Risk				
103007	Change in UK design standards. DMRB, etc, or Network Rail standards	-	-	-	-	Strategic Risk				
103008	Change in UK/EU Legislation	-	-	-	-	Strategic Risk				
103009	Health & Safety - Changes in regulations	-	-	-	-	Strategic Risk				
103010	Political - Change of Government / Sec of State	-	-	-	-	Strategic Risk				
103011	Political - Change in Government strategy, policy and targets	-	-	-	-	Strategic Risk				
103012	Foot and mouth or other disease outbreak leads to restrictions on access to land or to the Contractor's operations.	-	-	-	-	Strategic Risk				
103013	Contractor goes into receivership	-	-	-	-	Strategic Risk				
103014	Change in environmental designations	-	-	-	-	Strategic Risk				
103015	Civil unrest, riots, strikes	-	-	-	-	Strategic Risk				
04	Alignment									
104001	Cost increase due to change in scheme identified by Safety Audit.	M	100	300	1000	Risk exists. Designers to formally respond to the Stage 1 RSA (the response has been prepared but not issued). Difficult to mitigate Stage 2 RSA findings other than perhaps to involve persons with RS Audit experience in design.	PB MS	Y		
05	Engineering: Structures									
105001	Cost increase to structures due to lack of suitable working space.	VL	0	0	0	Review of all structures particularly Retaining walls, Aller Tunnel, Aller Road overline bridge and the east pier foundation at the Torbay Ring Road Rail Bridge underway and incorporated in CPO. Risk mitigated.				
105002	Cost increase to structures due to inadequate review and updating of historical design.	L	60	120	240	Confirm review of historical design now complete and account taken of Eurocodes. Only minor changes anticipated.	DCC NB	Y		
105003	Cost increase due to Network Rail's 'Railway of the Future' policy limiting track 'disruptive' possession opportunities.	M	300	600	1000	Seek early agreement with Network Rail. Programme needs to reflect short periods of night time work and Possessions for cut and cover culverts.	DCC NB	Y		
105004	Scheme delayed and cost increase if Network Rail decides to take design of 'underbridges' in-house	VL	0	10	50	Seek early agreement with Network Rail. Unlikely therefore zeroed. Meeting 4/12/07 Network Rail indicate that underline bridges design 'maybe' in house or a separate D&B contract. Risk put back to 20 Feb 07 values.	DCC NB			0
105005	Culverts - Network Rail may not adopt culverts. (need for Territory Engineer acceptance)	L	10	30	50	Additional land required for access. Seek early agreement with Network Rail	DCC NB	Y		
105006	Cost increase due to maintenance of Network Rail's access points, which may hinder construction programme.	L	20	50	100	Seek early agreement with Network Rail	DCC NB	Y		
105007	Cost increase to Tunnel - Tunnel to span the whole embankment.	L	0	0	0	Budget cost estimate revised to allow span outside clearances to the tracks. Risk mitigated.				

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105008	Cost increase to Tunnel - Late decision to provide clearance for electrification.	VL	300	600	1000	Cost for tunnel, additional roadworks and redesign. Seek early agreement with Network Rail.	DCC NB	Y		
105009	Cost increase to Tunnel - Design span requires signal-resiting to comply with sight lines.	VL	300	500	800	Seek early agreement with Network Rail and examine new topographical survey. Reduced risk because of increased span.	DCC NB	Y		
105010	Cost increase to Tunnel - Realignment/replacement of rail infrastructure required through tunnel including lineside equipment (oil-filled cables).	M	200	400	600	Seek early agreement with Network Rail and examine new topographical survey.	DCC NB	Y		
105011	Cost increase to Tunnel - Late decision on need for lighting and maintenance requirements.	M	100	200	400	Seek early agreement with Network Rail	DCC NB	Y		
105012	Cost increase to Culverts - Redesign required to meet FRA conditions.	VL	0	0	0	FRA already undertaken, therefore risk very low. Resubmission made to EA as at 16.07.07				
105013	Cost increase to Culverts - Thrustboring cannot be undertaken whilst meeting NR's requirements for train operations.	M	200	500	800	Cost reflects slower rate of progress than planned. Network Rail are very sensitive to track disruptions. Alternative form of construction not available.	DCC NB	Y		
105014	Cost increase to Culverts - Thrustboring cannot be undertaken because cover is insufficient.	M	200	400	600	Cost reflects need to redesign and additional roadworks. Need to check designs and consult NR.	DCC NB	Y		
105015	Cost increase to Retaining walls - Erection cannot be undertaken whilst meeting NR's requirements for train operations.	M	200	500	800	Cost reflects slower rate of progress than planned. Network Rail are very sensitive to track disruptions.	DCC NB	Y		
105016	Cost increase to Retaining Walls - Form of construction rejected by NR.	L	300	600	1000	Budget assumes precast units being lifted in. Seek early agreement with Network Rail for crane clearance	DCC NB	Y		
105017	Cost increase to structures across railway - lack of appreciation of constraints in working next to railway.	M	100	200	400	Seek early agreement with Network Rail	DCC NB	Y		
105018	Cost increase due to additional track monitoring works.	M	50	100	200	Budget of £100k allowed. Track monitoring may be required throughout works. Have delapidation survey done prior to works.	DCC NB	Y		
105019	Cost increase to Culverts - Track levelling to be undertaken following installation of culverts	M	100	200	400	Track levelling not allowed in budget.	DCC NB	Y		
105020	Kerswell Gardens Overbridge - Cost increase due to revised bridge design.	L	0	0	0	Assumes rotary piled foundations or pad - no noise issues.				
105021	Cost of provision of insurance against Possession overring	M	100	200	300	Cost of insurances.	DCC NB	Y		
105022	Cost of Bridge Works existing structures Torbay Ring Road	M	100	200	300	Investigate further with Torbay Council engineers	DCC NB	Y		
105023	Cost of protecting Network Rail cables during construction (cable diversions avoided)	M	100	200	300	Network Rail to follow their clearance procedure.	DCC NB	Y		
06	Engineering: Other									
106001	Additional Scheme costs arising for existing A380 through Kingskerswell	M	0	0	0	Agreed that strategy relies on calming of rat runs and works on existing A380 now included in budget.				
106002	Existing Railway Embankments - Cost increase due to flood risk protection measures during structures construction	L	30	60	150	Cost reflects temporary measures to rail embankment for NR. NR to develop special requirements regarding timing during construction.	DCC NB	N		
106003	Cost increase due to additional Accommodation Works	M	20	100	300	Not yet held any detailed discussions with landowners. General allowance over and above that included within current budget.	PB MS	N		
07	Statutory Undertakers									
107001	Cost increase due to C3 estimates too low.	M	400	800	1200	Seek as much detail as possible, depending on level of design available, in C4 requests.	PB MS	N		
107002	Cost increase due to unidentified utilities found requiring diversion	L	10	100	500	Carry out regular liaison with utility companies. Carry out trial pitting for utility locations.	PB MS	Y		
107003	Scheme delayed (during construction) due to insufficient time to place SU orders and poor planning by SUs	M	0	0	0	Mitigate by identifying which diversions are on Critical Path, do as many diversions as possible before work on site commences. Undertake NRSWA process comprehensively. Trail holes to be undertaken before D+B contract. C4s brought forward.			0	

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107004	Offline diversion routes identified too late for all SU plant (eg Yon St)	L	40	100	200	Early liaison on foul sewer, gas main and British Telecom plant	PB MS	Y		
107005	Cost increase of sewer diversions due to uncertainty of sewer locations	M	50	100	300	Organise CCTV Survey, but check cost against risk.	PB MS	Y		
08	Habitat and Species									
108001	Habitat and Species - Insufficient survey and assessment for Proofs of Evidence causes failure at Public Inquiry.	VL	15	20	30	Clear with witness. Re-survey prior to Public Inquiry. Consult Stat Bods, bearing in mind Planning Permissions given.	PB MS	Y		
108002	Habitat and Species - Scheme delayed due to insufficient time post award of D&B contract for surveys, method statements, licences and works to be implemented.	M	0	0	0	Need to ensure timeframes for works are agreed by all parties - otherwise risk there is no window. To minimise risk start work on long term programme for environmental works.*** Potential for delay associated with D&B programme constraints. Produce detailed programme for anticipated mitigation measures and ASSUME Employer advance works.	PB MS	Y		
108003	Amphibians - Scheme delayed due to discovery of species (esp Great Crested Newts) prior to construction.	L	15	20	30	Need supplementary survey. Capture and translocation permitted between March - June 08. See *** above	PB MS	Y	0	
108004	Amphibians - Scheme delayed (site clearance) due to delay in obtaining Defra licence.	M	0	0	0	Licence period is 6 weeks and clearance works can only be carried out during Sept/Oct (potential for 12 month delay)	PB MS	Y	0	
108005	Badgers - Scheme delayed (site clearance) due to insufficient time to carry out resurvey work once D&B contract granted (Spring 09) then can't clear the setts in time.	L	15	20	30	Costs for exclusion. Licence period is 6 weeks and clearance works can only be carried out during Sept/Oct (potential for 12 month delay)	PB MS	Y	0	
108006	Bats - Scheme delayed as unable to identify and secure sufficient mitigation sites (ES compliant). (May end up doing works some distance from the site.)	M	0	0	0	Identify parcels of land where DCC have control and pass to FWAG. Identify landowners who will agree to a management mitigation agreement.	DCC PE	Y	0	
108007	Bats - Scheme delayed and cost increase due to redesign arising from unknown/changed commuting routes.	M	50	100	200	Costs for redesign and surveys. Scope additional Bat Survey and await results. 'M' risk following experience at Barnstaple	PB MS	Y	0	
108008	Bats - Cost increase to culvert due to cross section increase to accommodate bat mitigation best practice.	VL	0	0	0	Significant costs for bat structures - need to keep up to date with latest designs etc to minimise costs (cost savings). More opportunity than risk.	PB MS	Y		
108009	Bats - Scheme delay due to discovery of unknown roosts prior to/during construction.	M	0	0	0	Plan for further species surveys. Single licence required to demolish roosts. See ***	PB MS	Y		
108010	Bats - Additional unknown Bat Roosts discovered during site clearance.	M	5	10	15	Cost of additional mitigation.	PB MS	Y		
108011	Bats - Scheme delayed (site clearance) due to insufficient time to obtain Defra licence.	M	0	0	0	Construct Elmcroft roost prior to start of main works to minimise the risk. See ***	PB MS	Y	0	
108012	Bats - Scheme delayed (site clearance) due to insufficient time to implement the mitigation measures.	M	0	0	0	See ***	PB MS	Y	0	
108013	Birds: Cirl Bunting - Scheme delayed due to delay in implementation of mitigation measures planning condition.	M	0	0	0	Mitigation monitoring scheme to be approved. Financial provision for offsite mitigation in budget.	PB MS	Y		
108014	Dormice - Cost increase due to requirements of NE imposing onerous site clearance conditions.	L	100	200	400	Cost includes inefficient site clearance and attendance by licensees. Also need to carry out further surveys for licence. Assumes no extra for Public Inquiry. See ***	PB MS	Y		
108015	Fish - Scheme delayed (watercourse diversions) due to delay in identifying appropriate translocation sites.	L	0	0	0	No works effecting water courses can be carried out during spawning season (March & August)	PB MS	Y	0	
108016	Reptiles - Increase in cost to provide for 'hotspot areas' and to carry out translocation works.	L	10	30	50	Cost of additional surveys.	PB MS	Y		
108017	Reptiles - Scheme delayed (site clearance) due to failure to identify appropriate translocation sites and in obtaining EN licence.	L	0	0	0	See ***	PB MS	Y		

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			L	ML	H				CP Time Design + Construction	CP Time Preparation
108018	Japanese Knotweed - Scheme delayed (site clearance) due to failure to identify areas. (Could take 12 months to deal with.)	M	5	20	40	Cost associated with surveys. Need to check private gardens, Maddacombe woods, river banks, railway sidings. Consider whether could move to Contractor's risk.	PB MS	Y		
108019	Delay allowance for environmental measures most likely to disrupt the construction programme post start of works	M	0	0	0	The direct cost is zero. Allowance for the increase in inflation due to completing the works later elsewhere. Allowance for prolongation of site work elsewhere.	PB MS	Y		16
09	Water Environment									
109001	Scheme delayed due to Environment Agency approval delayed or withheld.	VL	0	0	0	Constant liaison with EA				
109002	Permanent works consents - Potential change to requirements leads to need for resubmission.	L	0	0	0	Risk realised. EA to issue consents upon re-application by DCC.				
109003	Temporary works consents - EA now require consents for works within floodplains (including site compounds).	VL	0	5	20	Include conditions regarding EA consents in D&B tender documents	DCC PE	Y		
109004	At Maddacombe: Scheme delayed due to insufficient evidence at Public Inquiry to demonstrate effects.	VL	0	5	15	Scheme above water table in limestone area so flooding risk not perceived. Consider further borehole assessment work.	PB MS	Y		
10	Archaeology									
110001	Archaeology - Scheme delayed due to insufficient survey and assessment for Proofs of Evidence.	VL	10	30	50	Further surveys to update. Contact English Heritage with current programme and seek comment regarding need for new surveys to current advice.	PB MS	Y		
110002	Rapid Open Area Excavations - Scheme delayed (earthworks) due to insufficient time to complete work.	VL	20	50	100	Cost of working around site and additional archaeologists. Now plan to undertake in advance of main works following Notice to Enter.	PB MS	Y		
110003	Roman site - Scheme delayed (earthworks) due to insufficient time and resource to complete site assessment.	VL	10	20	50	Cost of working around site and additional archaeologists. Now plan to undertake in advance of main works following Notice to Enter.	PB MS	Y		
11	Ground Conditions									
111001	Increase in costs due to high risk allowance in D&B contract arising from lack of survey data for railway embankments, culverts, etc.	M	50	150	300	Consider need for supplementary survey work pre D&B. (Commission Additional Ground Investigation at the following concrete box culvert sites: Sainsbury's, Keyberry Mill (mainline railway), Manor Drive (branch line railway). Also additional GI at St Marychurch Road junction, the Dacca Bridge Open Flood Channel and attenuation pond sites.) - Risk reduced - mitigation budget identified in Ancillary Works for a supplementary GI	PB MS	Y		
111002	Cost increase due to higher than expected volume of hard rock excavation.	L	0	0	0	Results from GI advise that allowance in FSC for rock is sufficient.				
111003	Cost increase due to discovery of asbestos on site	M	10	20	30	Cost for survey.	PB MS	Y		
12	Construction Phase									
112001	Contractual - Scheme delayed and increase in cost due to Exceptionally Adverse weather (as defined by NEC)	L	0	0	0	Programme works at optimum time of year to reduce risk.	DCC PE	Y		
112002	Water abstraction - Scheme delayed (during construction) due to failure by contractor to obtain licence to abstract water for construction purposes causing EA prohibition order.	VL	0	0	0	EA Special requirements included in D&B Contract	DCC PE	Y		
112003	Ground conditions - Discovery of unidentified diseased carcass.	VL	0	0	0	Not mitigatable.				
112004	Ground conditions - Discovery of contaminated land.	L	0	0	0	Contaminated land survey planned. Assumption is that no additional costs for dealing with contamination on site.	PB MS	Y		
112005	Traffic management during construction is more difficult than expected, or additional restrictions are imposed - specifically Penn Inn Rbt, the on line section Penn Inn to Aller and the Torbay Ring Road	L	200	500	1000	Early discussions with DCC - Area South, Torbay Council, Police and Teignbridge DC required - specifically pre-construction. Pre-plan TM.	PB MS	Y		

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			L	ML	H				CP Time Design + Construction	CP Time Preparation
13	Other Issues									
113001	Pre-construction delays from all risks on this register (Using Critical Path Time calculated below)	M	96	144	192	Detailed Programme to be produced. Manage risks on this and Contractors register	ALL	N		
113002	Delay allowance for all activities likely to delay start of scheme.	M	1500	3000	6000	The direct cost allows for the increase in inflation due to completing the works later (say 6% of £100m at worst)	PB MS	Y		
113003	Actual inflation differs from budget assumption.	M	0	2000	5000	Budget includes extra above Green Book. This is for other construction activities, eg Olympics underway at same time. Monitor DfT publications for revised forecasts.	PB MS	N		
TOTAL Critical Path TIME (WEEKS)						Pre-Construction delay costs are calculated by taking a weekly office management cost (2k, 3k, 4k) multiplied by the Critical Path Time Totals			0	48

CONTRACTORS RISKS (D&B)										
01 Design, Planning and Supervision										
201001	Actual inflation differs from assumed rate at tender.	M	0	0	0	See 113003 above.				
201002	Cost increase due to measurement omissions / design development (estimate or pricing based on inadequate information)	M	200	500	1000	Risk that something is missed .				
201003	Cost increase due to Network Rail costs for technical approval, possessions, supervision, etc,	M	0	50	100	Continue formal discussions with Network Rail				
201004	Railway possessions not available when expected, causing delay to construction and standing resources. Included in 212004	M	0	0	0	Included in 212004.				
201005	Cost increase due to designer having to redesign works for unforeseen difficulties or for failure to manage interfaces.	M	10	50	100	Undertake regular design reviews and reality checks to limit risk of either following incorrect solution or missing design work.				
201006	Scheme delayed due to submission dates missed by designer.	M	0	0	0	Prepare detailed resource programme and monitor using EVA or other tool.			4	
201007	Stage 2 and 3 Safety Audits identify changes to Scheme.	M	50	100	200	Risk exists. Difficult to mitigate.				
02 Land										
202001	Scheme delayed due to land entry not obtained on time	VL	0	0	0	Maintain schedule of Landowners, compile action plan and maintain contact with landowners. (Ecological delays are covered under separate Risk Items)	DCC PE	Y		
03 Strategic										
203001	Not applicable for Contractor									
04 Alignment										
204001	Cost increase due to redesign of alignments required to ensure buildability.	VL	5	10	50	Redesign costs and construction cost allowance. Detail not examined at Tender.				
204002	Cost increase due to redesign of alignments required to accord with published Side Road Orders	VL	5	10	50	Redesign costs and construction cost allowance. Detail not examined at Tender.				

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204003	Cost increase due to redesign of alignments required to accord with published CPO. (Arising from differences in ground level mapping)	VL	5	10	50	Redesign costs and construction cost allowance. Detail not examined at Tender.				
204004	Cost increase due to new retaining walls to keep within CPO due to change in vehicle restraint design standards.	L	50	200	500	Risk realised at detailed design stage.				
05	Engineering: Structures									
205001	Retaining walls - Cost increase due to change in NR policy on clearance to track during construction.	VL	0	0	0	Clearance will already be agreed prior to D&B award.				
205002	Retaining walls - Scheme delayed (during construction) due to buildability problems whilst maintaining traffic flows.	L	50	200	500				4	
205003	Culverts - Cost increase due to difficulty in thrust bore through embankments of unknown material.	M	30	40	50	Risk only realised during construction. Partly mitigated by further GI.	PB MS	Y		
205004	Yon Street Overbridge - Cost increase due to foundation design to account for poor ground conditions.	M	5	10	15	Risk only realised during construction.				
205005	Flyover - Cost increase due to sacrificial retaining walls required for buildability whilst maintaining traffic flows.	L	200	500	1000	Mitigate by further design.	DCC NB	Y		
06	Engineering: Other									
206001	Drainage general - Cost increase to allow for unknown systems and extent of measures required.	M	20	50	150	General allowance over and above allowance within current Scheme Budget, eg Royal Aller Vale Quarry tailings outfall (Ch 2240m) under existing A380				
206002	Accommodation Works general - Cost increase due to unforeseen works. Double count 106003	L	0	0	0	Double count 106003				
07	Statutory Undertakers									
207001	Scheme delayed and cost increase due to unforeseen SU Apparatus exposed during construction.	M	10	30	50	Costs after allowance for C3s. Undertake NRSA process comprehensively.		N	4	
207002	Delay due to late procurement of SU diversions	M	0	0	0	Ensure DCC procure diversions in advance.	DCC PE	Y		
08	Habitat and Species									
208001	Bats - Cost increase to provide temporary measures if tunnels not constructed in time for bats to start using.	M	20	30	40			Y		
208002	Fish - Scheme delayed (during construction) due to insufficient time for fisheries work to be undertaken.	VL	0	0	0			Y	4	
09	Water Environment									
209001	Flood risk - Cost increase (during construction) due to unusual storm event causing flooding of site and 3rd Party damage for long periods.	VL	0	0	0	Contractor to insure against				
209002	Water quality - Scheme delayed (during construction) due to pollution incident which shuts down works.	VL	0	0	0	Contractor to comply with Construction Environmental Management Plan.				
10	Archaeology									
210001	Archaeology - Scheme delayed (earthworks) due to discovery of unknown sites.	VL	20	50	100	Cost of working around site and additional archaeologists.			4	
210002	Archaeology - Scheme delayed (temporary works) due to identification of potential sites.	VL	10	20	50	Cost of working around site and additional archaeologists.				
11	Ground Conditions									
211001	Increase in costs due to misinterpretation of historic ground investigation data by D&B team.	L	0	0	0	Mitigation actioned. GI information reviewed against topo survey.				

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211002	Cost increase due to unexpectedly poor or inadequate road formation /existing pavement construction at Newton Abbot Bypass, Riviera Way & Torbay Ring Road tie-ins	L	10	15	20	Obtain pavement survey data/details from Devon CC and Torbay C and assess risk accordingly		N		
211003	Water table higher and more active than anticipated resulting in additional batter drain and filter drain requirements, especially in colluvial soils.	M	20	30	40	Batter drains not separately identified in cost estimate		N		
211004	Increase in cost due to treatment of contaminated water intercepted from contaminated land at Yannon Lane landfill site.	L	0	0	0	Mitigation actioned. Monitoring scheme put into effect in accordance with the ES.				
211005	Unforeseen contaminated land - general	L	10	50	100	There is risk of discovering oil, tar or other contaminated ground.		N		
211006	Unforeseen (soil filled) cavities exposed requiring ground treatment	L	10	15	20	Cutting at Maddacombe / Churchway Lane - there could be cavities (none found in works so far) Risk only realised during construction.				
211007	Effect of Aller Valley trunk sewer. Weakened the ground due to construction of sewer. (Site investigation was prior to sewer construction.)	L	20	30	40	Risk only realised during construction.				
211008	Ground treatment (grouting) contaminates groundwater resources.	L	0	0	0	Include in specification. Seek alternative solution to ground treatment				
211009	Cost increase to rectify railway track levels caused by settlement of ground beneath Aller Junction embankment and/or beneath Aller Tunnel.	L	0	0	0	Monitoring of track levels required during and after embankment construction. Track re levelling costs may be incurred. Allowed in Employer's Risks.		N		
211010	Cost increase due to provision for enhanced foundation at Yon Street Overbridge and adjacent retaining walls due to steep strata dip.	L	10	15	20	Risk only realised during construction.				
211011	Cost increase due to enhanced foundation provision for Maddacombe Road Overbridge due to uncertain limestone conditions.	L	10	15	20	Risk only realised during construction.				
211012	Cost increase due to insufficient suitable structural fill for embankments etc, especially from Yannon Lane/ Maddacombe cutting. (The material has high moisture content therefore risk of being unsuitable.)	L	300	500	1000	Carry out measurement and programme exercises throughout Design Phase to determine true extent of risk. Risk as material is weather susceptible may not be as much suitable as originally thought. Risk high as capping is not just assumed everywhere		Y		
12	Construction Phase									
212001	Cost increase should major subcontractor go into receivership	VL	0	25	50	Unlikely given supplier procedures		N		
212002	Protestor action.	VL	500	1000	3000	Additional security costs over and above those in budget. Re-examine after Inquiry.				
212003	Overheating of local economy - availability of local resources	VL	200	500	1000	Depends upon when other major projects occur. Allow for e/o costs of labour.				
212004	Railway possessions not available when expected, causing delay to construction and standing resources.	M	20	30	40	Book culvert possessions two years in advance by anticipating contractor's programme. Seek external contractor advice if necessary.	DCC NB	Y	4	
212005	Cost increase due to possession overruns which cause train delay costs	M	100	200	300	Cost of insurances.	DCC NB			
212006	Scheme delayed and cost increase due to unplanned Network Rail works during construction period.	L	0	0	0	Continue formal discussions with Network Rail.	DCC NB			
212007	Scheme delayed and cost increase due to discovery of Japanese Knotweed					See above.				
212008	Scheme delayed and cost increase due to adverse weather conditions.	M	75	150	300	Monitor programme start date as the further out it moves - the greater the possible impact.		N		

HARM No	Risk	Prob	Cost (£k)			Comments and Risk Management Measures	Owner	Action Plan Required	Time Assessment (Weeks)	
			L	ML	H				CP Time Design + Construction	CP Time Preparation
212009	Scheme delayed due to unexpected archaeological finds. (During watching brief)	M	20	50	100	No allowance made in budget or in programme for dealing with major find. There is a risk of something interesting arising from the site work or during the watching brief and this is included here.		N		
212010	Scheme delayed due to watching brief slow progress due to unfamiliar archaeologists.	M	0	0	0	Consider briefing by Employer's archaeologists to Contractor's.				
212011	Scheme delayed and cost increase due to restrictions on construction methods due to noise levels.	M	20	40	60	Cost of noise mitigation. Main risk area is Aller.			4	
13	Other Works									
213001	Construction delay from all risks on this register (Using Critical Path Time calculated below)	H	700	840	1120	Manage risks on this register				
TOTAL Critical Path TIME (WEEKS)						Construction delay costs are calculated by taking a weekly site establishment rate multiplied by the Critical Path Time Totals			28	0

Notes

ITEMS IN RED ARE TO BE REMOVED FROM THE NEXT REGISTER
 ITEMS IN BLUE HAVE BEEN ADJUSTED SINCE THE LAST REGISTER
 ITEMS IN GREEN ARE NEW RISK ITEMS

Scheme : A380 Kingskerswell Bypass
 Reference : 43444

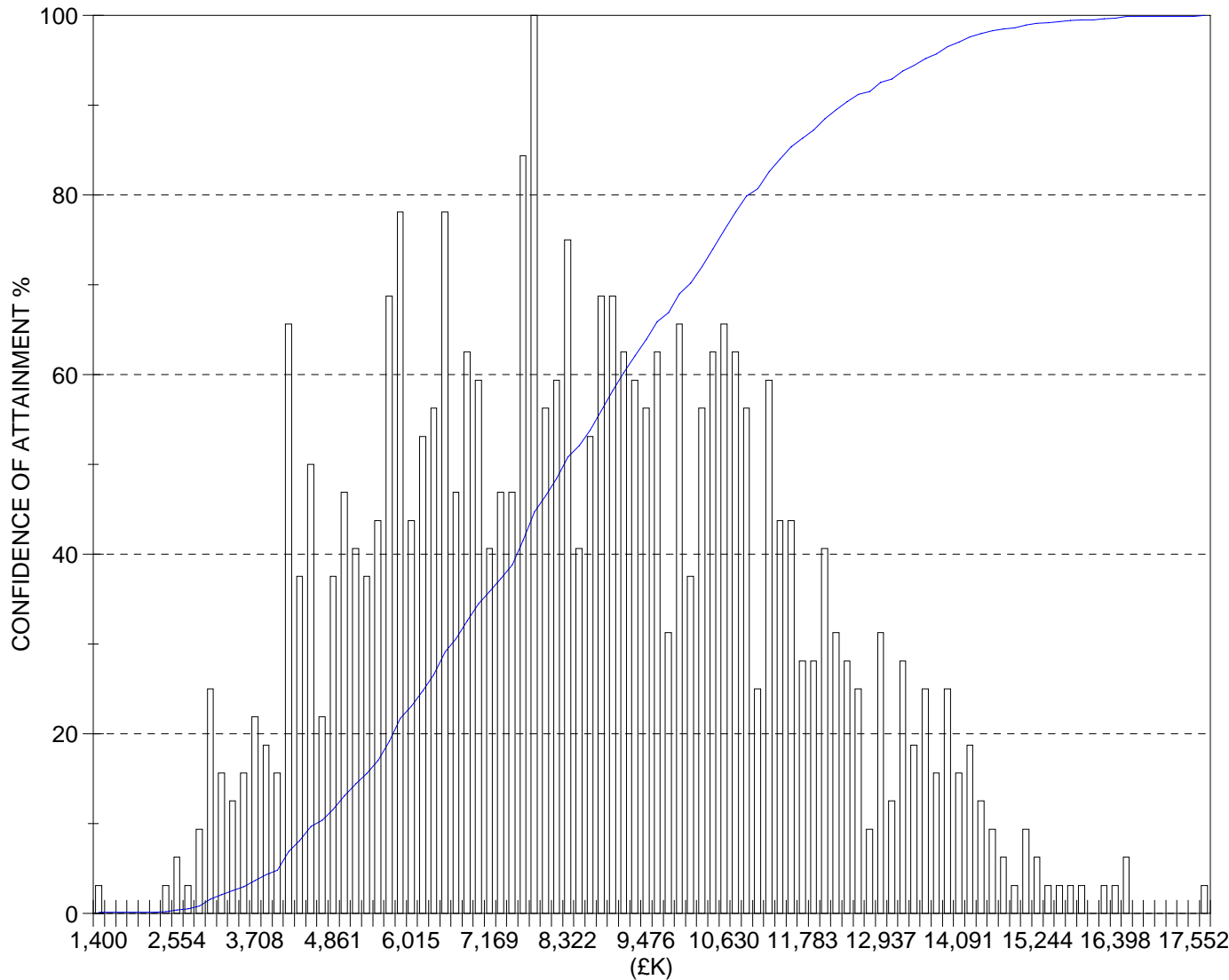
43444 All Risks Run

RCTPI Date : 00/00/0000
 RCTPI Index :



05 December 2007

Risk Management - Cost Risk Analysis



Scheme Base Estimate : £0 Risk Allowance : £8,444,084 STDV of Risk Allowance : £2,919,779
 (All values exclusive of VAT)

Statistical Analysis

MEAN	£8,444,084
MEDIAN	£8,263,719
MODE	£7,827,884
Std. Dev.	£2,919,779
MINIMUM	£1,400,332
MAXIMUM	£17,716,426

Maximum Scheme Cost	Confidence of Attainment
£4,052,972	5 %
£4,602,336	10 %
£5,273,345	15 %
£5,738,106	20 %
£6,198,106	25 %
£6,608,297	30 %
£7,067,227	35 %
£7,571,514	40 %
£7,855,352	45 %
£8,267,375	50 %
£8,741,825	55 %
£9,129,875	60 %
£9,566,619	65 %
£10,107,743	70 %
£10,543,309	75 %
£10,979,857	80 %
£11,571,404	85 %
£12,369,289	90 %
£13,554,998	95 %
£17,716,426	100 %

Legend

Confidence of Attainment %

Individual Probability %

Highways Agency Risk Assessment

Scheme Description : A380 Kingskerswell Bypass

Reference : 43444

Region : South

Works :	£0	Risk Allowance :	£8,444,084
P&S :	£0	Standard Deviation :	£2,919,779
Land :	£0	SBE + Risk Allowance :	£8,444,084
Scheme Base Estimate :	£0	SBE + Risk Allowance + 1SD :	£11,363,863

RCTPI Date : 00/00/0000

RCTPI Index :

Stage :

Risk Number	Description	Curve Type	Occurrence Probability	Minimum Estimate	Risk Estimate	Maximum Estimate	Average of Calculated Estimate
01	P & S						
01001	Change in key staff: Consultants	1 Normal	Low 20 %	£0	£50,000	£100,000	£10,406
01002	Change in key staff: Employers	1 Normal	Low 20 %	£0	£20,000	£50,000	£4,473
01003	Insufficient resources both C & E	1 Normal	Low 20 %	£20,000	£50,000	£200,000	£23,797
01004	Cost inc - Scheme change - arising from Inquiry	1 Normal	Low 20 %	£50,000	£100,000	£200,000	£19,958
01005	Cost inc - Network Rail(NR) Supervision	1 Normal	Medium 40 %	£50,000	£100,000	£150,000	£45,171
01006	Cost Inc - NR Project Management	1 Normal	Medium 40 %	£20,000	£50,000	£100,000	£24,633
01007	Cost inc - Optimistic Construction Programme	1 Normal	Very Low 10 %	£0	£10,000	£50,000	£2,700
01008	Cost inc - Short tender period	1 Normal	Low 20 %	£600,000	£1,200,000	£3,000,000	£353,339
01009	Scheme delay - Railways assurance case	1 Normal	Very Low 10 %	£0	£0	£0	
01010	Actual inflation differs from budget	1 Normal	Medium 40 %	£0	£0	£0	
01011	Scheme delay - OGC Gateway 3	1 Normal	Low 20 %	£0	£0	£0	
01012	Scheme delay - Dft decision	1 Normal	Low 20 %	£0	£0	£0	
01013	Scheme delay - ineffective liaison with External bodies	1 Normal	Medium 40 %	£0	£0	£0	
01014	Scheme delay - NR Agreements	1 Normal	Low 20 %	£0	£0	£0	
01015	Scheme delay - Planning application	1 Normal	Very Low 10 %	£0	£0	£0	
01016	Scheme delay - PI prolongation	1 Normal	Low 20 %	£50,000	£200,000	£400,000	£45,967
01017	Scheme delay - High Court Challenge	1 Normal	Medium 40 %	£10,000	£50,000	£100,000	£21,289
01018	Scheme delay - change in Procurement strategy	1 Normal	Low 20 %	£5,000	£15,000	£50,000	£5,820
01019	Scheme delay - Delay in award	1 Normal	Low 20 %	£0	£0	£0	
01020	Scheme delay - NR approval method statements	1 Normal	Medium 40 %	£10,000	£30,000	£80,000	£17,622
01021	Scheme start delay allowance - all activities	1 Normal	Medium 40 %	£0	£0	£0	
01022	Scheme delay - NR obstructive approach	1 Normal	Medium 40 %	£0	£0	£0	
02	Land						
02001	Scheme delay - NR CPO	1 Normal	Very Low 10 %	£0	£0	£0	
02002	Cost inc - Pt 1 Claims & Land at Torbay	1 Normal	Low 20 %	£1,000,000	£1,500,000	£2,000,000	£284,811
03	Strategic						
03001	Failure to obtain Regional Funding Allocation	1 Normal	Medium 40 %	£0	£0	£0	

Highways Agency Risk Assessment

Scheme Description : A380 Kingskerswell Bypass

Reference : 43444

Region : South

RCTPI Date : 00/00/0000

RCTPI Index :

Stage :

Risk Number	Description	Curve Type	Occurrence Probability	Minimum Estimate	Risk Estimate	Maximum Estimate	Average of Calculated Estimate
03002	Failure to pass Major Scheme Bid	1 Normal	Medium 40 %	£0	£0	£0	
03003	Change in Scheme Brief	1 Normal	Medium 40 %	£0	£0	£0	
03004	Approval through statutory process	1 Normal	Medium 40 %	£0	£0	£0	
03005	Comprehensive Spending Review	1 Normal	Medium 40 %	£0	£0	£0	
03006	Statutory Changes	1 Normal	Medium 40 %	£0	£0	£0	
03007	Change to UK design standards	1 Normal	Medium 40 %	£0	£0	£0	
03008	Change in UK/EU Legislation	1 Normal	Medium 40 %	£0	£0	£0	
03009	H & S - Changes in regulations	1 Normal	Medium 40 %	£0	£0	£0	
03010	Political - Change of Govt / Sec of State	1 Normal	Medium 40 %	£0	£0	£0	
03011	Political - Govt strategy, policy & targets	1 Normal	Medium 40 %	£0	£0	£0	
03012	Disease outbreak - access restrictions	1 Normal	Medium 40 %	£0	£0	£0	
03013	Contractor goes into receivership	1 Normal	Medium 40 %	£0	£0	£0	
03014	Change in environmental designations	1 Normal	Medium 40 %	£0	£0	£0	
03015	Civil unrest, riots, strikes	1 Normal	Medium 40 %	£0	£0	£0	
04	Alignment						
04001	Cost inc - RSA	1 Normal	Medium 40 %	£100,000	£300,000	£1,000,000	£213,946
05	Engineering: structures						
05001	Cost inc - lack of suitable working space	1 Normal	Very Low 10 %	£0	£0	£0	
05002	Cost inc - historical design information	1 Normal	Low 20 %	£60,000	£120,000	£240,000	£28,328
05003	Cost inc - NR future policies limit 'disruptive' track possessions	1 Normal	Medium 40 %	£300,000	£600,000	£1,000,000	£274,632
05004	Scheme delay - NR takes underbridges design in-house	1 Normal	Very Low 10 %	£0	£10,000	£50,000	£2,705
05005	NR may not adopt culverts	1 Normal	Low 20 %	£10,000	£30,000	£50,000	£5,854
05006	Cost inc - NR maintenance hinders Const programme	1 Normal	Low 20 %	£20,000	£50,000	£100,000	£12,458
05007	Cost inc - Tunnel length change	1 Normal	Low 20 %	£0	£0	£0	
05008	Cost inc - Tunnel electrification	1 Normal	Very Low 10 %	£300,000	£600,000	£1,000,000	£74,533
05009	Cost inc - Tunnel signals re-siting	1 Normal	Very Low 10 %	£300,000	£500,000	£800,000	£66,489
05010	Cost inc - Tunnel rail infrastructure	1 Normal	Medium 40 %	£200,000	£400,000	£600,000	£162,822
05011	Cost inc - Tunnel lighting and maintenance	1 Normal	Medium 40 %	£100,000	£200,000	£400,000	£101,411
05012	Cost inc - Culverts FRA conditions	1 Normal	Very Low 10 %	£0	£0	£0	
05013	Cost inc - Culverts thrustboring NR requirements	1 Normal	Medium 40 %	£200,000	£500,000	£800,000	£205,971

Highways Agency Risk Assessment

Scheme Description : A380 Kingskerswell Bypass

Reference : 43444

Region : South

RCTPI Date : 00/00/0000

RCTPI Index :

Stage :

Risk Number	Description	Curve Type	Occurrence Probability	Minimum Estimate	Risk Estimate	Maximum Estimate	Average of Calculated Estimate
05014	Cost Inc - Culverts thrustboring insufficient cover	1 Normal	Medium 40 %	£200,000	£400,000	£600,000	£162,136
05015	Cost inc - Retaining walls NR requirements	1 Normal	Medium 40 %	£200,000	£500,000	£800,000	£198,008
05016	Cost inc - Retaining walls form of construction	1 Normal	Low 20 %	£300,000	£600,000	£1,000,000	£133,038
05017	Cost inc - Lack of Appreciation for Railway working constraints	1 Normal	Medium 40 %	£100,000	£200,000	£400,000	£103,884
05018	Cost inc - Additional track monitoring works	1 Normal	Medium 40 %	£50,000	£100,000	£200,000	£50,594
05019	Cost inc - Culverts affect track leveling	1 Normal	Medium 40 %	£100,000	£200,000	£400,000	£101,028
05020	Cost inc - Kerswell Gardens OB redesign	1 Normal	Low 20 %	£0	£0	£0	
05021	Cost of provision of insurance against Possesion overing	1 Normal	Medium 40 %	£100,000	£200,000	£300,000	£79,717
05022	Cost of Bridge Works existing structures Torbay Ring Road	1 Normal	Medium 40 %	£100,000	£200,000	£300,000	£78,713
05023	Cost of Protecting Network Rail Cables During Construction (Cable Diversions Avoided)	4 Pessimistic	Medium 40 %	£100,000	£200,000	£300,000	£95,058
06	Engineering: other						
06001	Add costs - Works to Existing A380 at Kingskerswell	1 Normal	Medium 40 %	£0	£0	£0	
06002	Cost inc - Flood risk protection during const	1 Normal	Low 20 %	£30,000	£60,000	£150,000	£19,054
06003	Cost inc - additional accommodation works	1 Normal	Medium 40 %	£20,000	£100,000	£300,000	£63,624
07	Statutory Undertakers						
07001	Cost inc - C3 estimates too low	1 Normal	Medium 40 %	£400,000	£800,000	£1,200,000	£315,254
07002	Cost inc - additional diversions	1 Normal	Low 20 %	£10,000	£100,000	£500,000	£47,354
07003	Scheme delay - SU orders and planning	1 Normal	Medium 40 %	£0	£0	£0	
07004	late identification of offline diversion routes	1 Normal	Low 20 %	£40,000	£100,000	£200,000	£25,750
07005	Cost inc - uncertainty of sewer locations	1 Normal	Medium 40 %	£50,000	£100,000	£300,000	£67,497
08	Habitat and Species						
08001	Failure at PI - Insufficient Survey and Assessment	1 Normal	Very Low 10 %	£15,000	£20,000	£30,000	£2,469
08002	Scheme delay - surveys, method statements, licences	1 Normal	Medium 40 %	£0	£0	£0	
08003	Scheme delay - Amphibian - discovery	1 Normal	Low 20 %	£15,000	£20,000	£30,000	£4,592
08004	Scheme delay - Amphibians - Defra Licence	1 Normal	Medium 40 %	£0	£0	£0	
08005	Scheme delay - Badgers - survey delays	1 Normal	Low 20 %	£15,000	£20,000	£30,000	£4,228
08006	Scheme delay - Bats - ID mitigation sites	1 Normal	Medium 40 %	£0	£0	£0	
08007	Scheme delay - Bats - commuting routes	1 Normal	Medium 40 %	£50,000	£100,000	£200,000	£50,822
08008	Cost inc - Bats - Culvert design	1 Normal	Very Low 10 %	£0	£0	£0	

Highways Agency Risk Assessment

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Region : South

RCTPI Date : 00/00/0000

RCTPI Index :

Stage :

Risk Number	Description	Curve Type	Occurrence Probability	Minimum Estimate	Risk Estimate	Maximum Estimate	Average of Calculated Estimate
08009	Scheme delay - Bats - discovery of new roosts	1 Normal	Medium 40 %	£0	£0	£0	
08010	Additionnal unknown Bat roosts discovered during site clear	1 Normal	Medium 40 %	£5,000	£10,000	£15,000	£4,042
08011	Scheme delay - Bats - Defra licence	1 Normal	Medium 40 %	£0	£0	£0	
08012	Scheme delay - Bats - Mitigation measures	1 Normal	Medium 40 %	£0	£0	£0	
08013	Scheme delay - Birds - mitigation measures	1 Normal	Medium 40 %	£0	£0	£0	
08014	Cost inc - Dormice - NE site clearance conditions	1 Normal	Low 20 %	£100,000	£200,000	£400,000	£49,933
08015	Scheme delay - Fish - ID translocation sites	1 Normal	Low 20 %	£0	£0	£0	
08016	Cost inc - Reptiles - Translocation works	1 Normal	Low 20 %	£10,000	£30,000	£50,000	£5,900
08017	Scheme delay - Reptiles - EN licence	1 Normal	Low 20 %	£0	£0	£0	
08018	Scheme delay - Japanese Knotweed found	1 Normal	Medium 40 %	£5,000	£20,000	£40,000	£9,666
08019	Construction Delay allowance - Environmental measures	1 Normal	Medium 40 %	£0	£0	£0	
09	Water Environment						
09001	Scheme delay - EA approval	1 Normal	Very Low 10 %	£0	£0	£0	
09002	Permanent Works Consents - re-submission	1 Normal	Low 20 %	£0	£0	£0	
09003	temp works consents - EA requirements	1 Normal	Very Low 10 %	£0	£5,000	£20,000	£976
09004	Scheme delay - Flood risk evidence at PI	1 Normal	Very Low 10 %	£0	£5,000	£15,000	£925
10	Archaeology						
10001	Failure at PI - Insufficient Survey and Assessment	1 Normal	Very Low 10 %	£10,000	£30,000	£50,000	£3,170
10002	Scheme delay - Rapid open area excavations	1 Normal	Very Low 10 %	£20,000	£50,000	£100,000	£6,656
10003	Scheme delay - Roman site - Site assessment	1 Normal	Very Low 10 %	£10,000	£20,000	£50,000	£3,337
101022		1 Normal	Very Low 10 %	£0		£0	
11	Ground Conditions						
11001	Cost inc - lack of survey data	1 Normal	Medium 40 %	£50,000	£150,000	£300,000	£71,442
11002	Cost inc - Excavation in hard rock	1 Normal	Low 20 %	£0	£0	£0	
11003	Cost inc - discovery of asbestos	1 Normal	Medium 40 %	£10,000	£20,000	£30,000	£8,356
12	Construction Phase						
12001	Scheme delay - Adverse weather	1 Normal	Low 20 %	£0	£0	£0	
12002	Scheme delay - Water abstraction licence	1 Normal	Very Low 10 %	£0	£0	£0	
12003	Ground Conditions - discover diseased carcass	1 Normal	Very Low 10 %	£0	£0	£0	
12004	Ground Conditions - Contaminated land	1 Normal	Low 20 %	£0	£0	£0	

Highways Agency Risk Assessment

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Region : South

RCTPI Date : 00/00/0000

RCTPI Index :

Stage :

Risk Number	Description	Curve Type	Occurrence Probability	Minimum Estimate	Risk Estimate	Maximum Estimate	Average of Calculated Estimate
12005	TM problems	1 Normal	Low 20 %	£200,000	£500,000	£1,000,000	£123,739
13	Other Issues						
13001	Scheme delay - all risks	1 Normal	Medium 40 %	£96,000	£144,000	£192,000	£58,614
13002	Delay allowance for all activities likely to delay start of scheme.	1 Normal	Medium 40 %	£1,500,000	£3,000,000	£6,000,000	£1,522,427
13003	Actual Inflation differs from budget assumption	1 Normal	Medium 40 %	£0	£2,000,000	£5,000,000	£1,027,713
14	Contractors Risks(CR) - Design, Planning and Supervision						
14001	Actual inflation differs from assumed rate at tender	1 Normal	Medium 40 %	£0	£0	£0	
14002	Cost increase due to measurement omissions / design development (estimate or pricing based on inadequate information)	1 Normal	Medium 40 %	£200,000	£500,000	£1,000,000	£245,437
14003	Cost increase due to Network Rail costs for technical approval, possessions, supervision, etc,	1 Normal	Medium 40 %	£0	£50,000	£100,000	£20,009
14004	Railway possessions not available when expected, causing delay to construction and standing resources	1 Normal	Medium 40 %	£0	£0	£0	
14005	Cost increase due to designer having to redesign works for unforeseen difficulties or for failure to manage interfaces	1 Normal	Medium 40 %	£10,000	£50,000	£100,000	£21,289
14006	Scheme delayed due to submission dates missed by designer	1 Normal	Medium 40 %	£0	£0	£0	
14007	Stage 2 and 3 Safety Audits identifies changes to Scheme	1 Normal	Medium 40 %	£50,000	£100,000	£200,000	£47,531
15	CR - Land						
15001	Scheme delayed due to land entry not obtained on time	1 Normal	Very Low 10 %	£0	£0	£0	
16	CR Strategic						
16001	Not applicable for Contactor	1 Normal	Medium 40 %	£0	£0	£0	
17	CR Alignment						
17001	Cost increase due to redesign of alignments required to ensure buildability	1 Normal	Very Low 10 %	£5,000	£10,000	£50,000	£2,551
17002	Cost increase due to redesign of alignments required to accord with published Side Road Orders	1 Normal	Very Low 10 %	£5,000	£10,000	£50,000	£2,914
17003	Cost increase due to redesign of alignments required to accord with published CPO (Arising from differences in ground level mapping)	1 Normal	Very Low 10 %	£5,000	£10,000	£50,000	£2,586
17004	Cost increase due to new retaining walls to keep within CPO due to change in vehicle restraint design standards	1 Normal	Low 20 %	£50,000	£200,000	£500,000	£58,823

Highways Agency Risk Assessment

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RCTPI Index :

Stage :

Risk Number	Description	Curve Type	Occurrence Probability	Minimum Estimate	Risk Estimate	Maximum Estimate	Average of Calculated Estimate
18	CR Engineering: Structures						
18001	Retaining walls - Cost increase due to change in NR policy on clearance to track during construction	1 Normal	Very Low 10 %	£0	£0	£0	
18002	Retaining walls - Scheme delayed (during construction) due to buildability problems whilst maintaining traffic flows	1 Normal	Low 20 %	£50,000	£200,000	£500,000	£56,203
18003	Culverts - Cost increase due to difficulty in thrust bore through embankments of unknown material	1 Normal	Medium 40 %	£30,000	£40,000	£50,000	£14,693
18004	Yon Street Overbridge - Cost increase due to foundation design to account for poor ground conditions	1 Normal	Medium 40 %	£5,000	£10,000	£15,000	£4,154
18005	Flyover - Cost increase due to sacrificial retaining walls required for buildability whilst maintaining traffic flows	1 Normal	Low 20 %	£200,000	£500,000	£1,000,000	£119,725
19	CR Engineering: Other						
19001	Drainage general - Cost increase to allow for unknown systems and extent of measures required	1 Normal	Medium 40 %	£20,000	£50,000	£150,000	£34,218
19002	Accommodation Works general - Cost increase due to unforeseen works	1 Normal	Low 20 %	£0	£0	£0	
20	CR Statutory Undertakers						
20001	Scheme delayed and cost increase due to unforeseen SU Apparatus exposed during construction	1 Normal	Medium 40 %	£10,000	£30,000	£50,000	£12,241
20002	Delay due to late procurement of SU diversions	1 Normal	Medium 40 %	£0	£0	£0	
21	CR Habitat and Species						
21001	Bats - Cost increase to provide temporary measures if tunnels not constructed in time for bats to start using	1 Normal	Medium 40 %	£20,000	£30,000	£40,000	£12,316
21002	Fish - Scheme delayed (during construction) due to insufficient time for fisheries work to be undertaken	1 Normal	Very Low 10 %	£0	£0	£0	
22	CR Water Environment						
22001	Flood risk - Cost increase (during construction) due to unusual storm event causing flooding of site and 3rd Party damage for long periods	1 Normal	Very Low 10 %	£0	£0	£0	
22002	Water quality - Scheme delayed (during construction) due to pollution incident which shuts down works	1 Normal	Very Low 10 %	£0	£0	£0	
23	CR Archeaology						

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RCTPI Index :

Stage :

Risk Number	Description	Curve Type	Occurrence Probability	Minimum Estimate	Risk Estimate	Maximum Estimate	Average of Calculated Estimate
23001	Archaeology - Scheme delayed (earthworks due to discovery of unknown sites)	1 Normal	Very Low 10 %	£20,000	£50,000	£100,000	£7,216
23002	Archaeology - Scheme delayed (temporary works) due to identification of potential sites	1 Normal	Very Low 10 %	£10,000	£20,000	£50,000	£3,243
24	CR Ground Conditions						
24001	Increase in costs due to misinterpretation of historic ground investigation data by D&B team	1 Normal	Low 20 %	£0	£0	£0	
24002	Cost increase due to poor or inadequate existing pavement construction at Newton Abbot Bypass, Riviera Way & Torbay Ring Road tie-ins	1 Normal	Low 20 %	£10,000	£15,000	£20,000	£2,948
24003	Water table higher and more active than anticipated resulting in additional batter drain and filter drain requirements esp in colluvial soils	1 Normal	Medium 40 %	£20,000	£30,000	£40,000	£12,292
24004	Increase in cost due to treatment of contaminated water intercepted from contaminated land at Yannon Lane landfill site	1 Normal	Low 20 %	£0	£0	£0	
24005	Unforeseen contaminated land - general	1 Normal	Low 20 %	£10,000	£50,000	£100,000	£10,847
24006	Unforeseen (soil filled) cavities exposed requiring ground treatment	1 Normal	Low 20 %	£10,000	£15,000	£20,000	£2,923
24007	Effect of Aller Valley trunk sewer. Weakened the ground due to construction of sewer (SI was prior to sewer construction)	1 Normal	Low 20 %	£20,000	£30,000	£40,000	£6,394
24008	Ground treatment (grouting) contaminates groundwater resources	1 Normal	Low 20 %	£0	£0	£0	
24009	Cost increase to rectify railway track levels caused by settlement of ground beneath Aller Junction embankment and/or beneath Aller Tunnel	1 Normal	Low 20 %	£0	£0	£0	
24010	Cost increase due to provision for enhanced foundation at Yon Street Overbridge and adjacent retaining walls due to steep strata dip	1 Normal	Low 20 %	£10,000	£15,000	£20,000	£3,097
24011	Cost increase due to enhanced foundation provision for Maddacombe Road OB due to uncertain limestone conditions	1 Normal	Low 20 %	£10,000	£15,000	£20,000	£3,373
24012	Cost increase due to insufficient suitable structural fill for embankments etc, esp Yannon Lane/Maddacombe cutting	1 Normal	Low 20 %	£300,000	£500,000	£1,000,000	£138,228
25	CR Construction Phase						

Highways Agency Risk Assessment

Scheme Description : A380 Kingskerswell Bypass

Reference : 43444

Region : South

RCTPI Date : 00/00/0000

RCTPI Index :

Stage :

Risk Number	Description	Curve Type	Occurrence Probability	Minimum Estimate	Risk Estimate	Maximum Estimate	Average of Calculated Estimate
25001	Cost increase should major subcontractor go into receivership	1 Normal	Very Low 10 %	£0	£25,000	£50,000	£2,492
25002	Protestor action	1 Normal	Very Low 10 %	£500,000	£1,000,000	£3,000,000	£172,689
25003	Overheating of local economy - availability of local resources	1 Normal	Very Low 10 %	£200,000	£500,000	£1,000,000	£61,382
25004	Railway possessions not available when expected, causing delay to construction and standing resources	1 Normal	Medium 40 %	£20,000	£30,000	£40,000	£11,958
25005	Cost increase due to possession overruns which cause train delay costs	1 Normal	Medium 40 %	£100,000	£200,000	£300,000	£78,631
25006	Scheme delayed and cost increase due to unplanned Natwork Rail works during construction period	1 Normal	Low 20 %	£0	£0	£0	
25007	Scheme delayed and Cost increase due to discovery of Japanese Knotweed	1 Normal	Medium 40 %	£0	£0	£0	
25008	Scheme delayed and cost increase due to adverse weather conditions	1 Normal	Medium 40 %	£75,000	£150,000	£300,000	£75,825
25009	Scheme delayed due to unexpected archaeological finds (during watching brief)	1 Normal	Medium 40 %	£20,000	£50,000	£100,000	£23,093
25010	Scheme delayed due to watching brief slow progress due to unfamiliar archaeologists	1 Normal	Medium 40 %	£0	£0	£0	
25011	Scheme delayed and cost increase due to restrictions on construction methods due to noise levels	1 Normal	Medium 40 %	£20,000	£40,000	£60,000	£16,125
26	CR Other works						
26001	Design and Construction delay from all risks on this register (Using Critical Path Time calculated below)	1 Normal	High 70 %	£700,000	£840,000	£1,120,000	£647,781