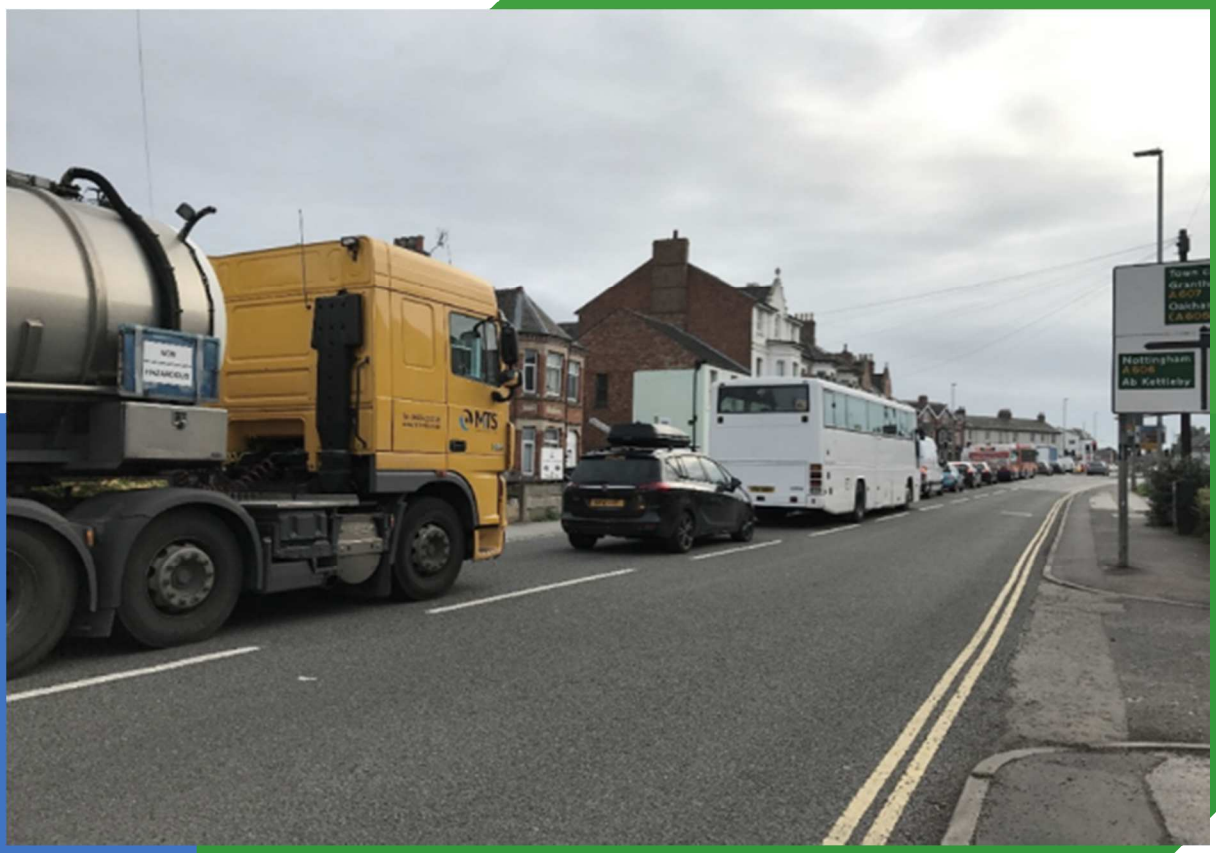
Melton Mowbray Distributor Road

APPENDIX D

Full Risk Register and QRA



Leicestershire County Council

Melton Borough Council

llep Leicester & Leicestershire Enterprise Partnership

Melton Mowbray Distributor Road

ECI RISK MANAGEMENT SCHEDULE

Version V1

Updated: 01/11/17

Risk Rating Guidance			
Probability	Consequence	Cost	Time
4 = Very High or extremely likely	4 = Very High	>£200K	>1 month lost time
3 = High or likely	3 = High	£50K - £200K	2 - 4 weeks lost time
2 = Medium or unlikely	2 = Medium	£10K - £50K	>1 week lost time
1 = Low or very unlikely	1 = Low	< £10K	< 1 week lost time

Risk Rating Matrix

High

8	16	24	32
6	12	18	24
4	8	12	16
2	4	6	8

Low

No.	CATEGORY	RISK	IMPACT	Min (£)	Max (£)	Most likely cost of impact (£)	Probability	Cost Impact	Time Impact	Rating	Status	MITIGATION	Manager of risk	Liability (assumed)	Estimated mitigation cost (£)	Residual Probability	Residual Cost Impact	Residual Time Impact	Residual Rating	Cost of residual risk (£)	Total of residual and mitigation cost (£)
1	Statutory Undertakers	Discovery of uncharted statutory undertakers plant	Significant delays to planned completion and disruption to works activities	50000	500000	155000	3	4	3	21	LIVE	Close liaison with Stats bodies. Trial holes to be undertaken in advance of works, where new carriageway crosses existing highway network and undertake ground radar survey. Aecom provide composite drawing of stats and review with contractor to identify areas of highest risk for further investigation.	Contractor / Aecom	LCC	30000	2	3	3	12	75000	105000
2	Statutory Undertakers	Statutory Undertakers diversions not commenced/completed as programmed	Delay to the programme	25000	200000	61000	2	3	2	10	LIVE	Regular progress meetings with the statutory parties to mitigate any delays on the programme.	Contractor	LCC	1000	1	1	1	2	20000	21000
3	Statutory Undertakers	Increase in project work scope due to Statutory Undertakers' work	Significant delays to planned completion and disruption to works activities	20000	200000	37000	2	3	3	12	LIVE	Trial holes to be undertaken in advance of works, where new carriageway crosses existing highway network and undertake ground radar survey. Locations to inform design.	Aecom	LCC	10000	1	2	2	4	20000	30000
4	Statutory Undertakers	National Grid - Lead in periods for 132kv overhead cable diversion may exceed programme and/or works take longer	Significant delay to programme	100000	1000000	250000	3	4	4	24	LIVE	Programme reviewed for criticality. Mitigation on programme where possible. Early meetings with NG. Ensure senior management buy-in to criticality	LCC / Aecom	LCC	2000	2	3	3	12	100000	102000
5	Statutory Undertakers	S.U. costs higher than expected	Clients budget affected	0	300000	93000	1	3	1	4	LIVE	Non disruptive access to all work areas by Stats cntractor. Contractors programme could be adjusted to facilitate the increased costs of installtion of services.	LCC	LCC	2000	1	2	1	3	20000	22000
6	Archaeology	Unplanned archaeological investigation works	Significant delays to planned completion.	10000	400000	150000	1	4	3	7	LIVE	Undertake desk top study to identify ground radar survey areas. Pre-start invetsigations through topsoil strip any areas of identified potential archaeological presence under Watching Brief. Over and above the advance archaeological investigations.	Contractor / Aecom	LCC	20000	1	1	1	2	10000	30000
7	Network rail	Cancellation of programmed Network Rail possessions at the Railway Bridge	Cost of cancelled possession and remobilisation of works in future possession. Delay to programme	75000	300000	90000	3	3	4	21	LIVE	Advanced discussions with network rail outside parties team and support from contractor with significant rail experience. Try and take the required possesions off the critical path. Book contingency possessions	Contractor / LCC	LCC	10000	2	2	2	8	30000	40000
8	Network rail	Restricted availability of Network Rail possessions at Railway Bridge	Increased resources required to complete works in the available possessions	15000	150000	50000	2	2	3	10	LIVE	Advanced discussions with network rail outside parties team and support from contractor with significant rail experience. Try and take the required possesions off the critical path.	Contractor / LCC	LCC	5000	2	2	1	6	15000	20000
9	Weather	Flooding in the vicinity of the River Eye, Thorpe and Scalford Brooks, other watercourses	Delay to the programme. Clean-up and damage due to flooding.	50000	500000	125000	3	3	3	18	LIVE	Design temporary works for the risk of flooding. Cofferdam and bunding key items of work. Prepare water/pollution strategy. Review flood prediction models against programme	Contractor	Contractor	50000	2	2	2	8	30000	80000
10	Weather	Above 1 in 10 weather events disrupts earthworks or other Site Wide operations	Delay to the programme. Affects weather susceptible activities particularly earthworks	75000	500000	150000	2	4	4	16	LIVE	Well maintained/constructed haul routes. Proactive monitoring of weather reports. Short standdown periods where required. Prepare water/pollution strategy	Contractor	LCC	25000	2	2	2	8	50000	75000
11	Weather	Severe weather up to 1 in 10 event affects the project e.g.High winds during beam lifts means cranes cannot work, unseasonably wet weather, snow etc.	Additional costs to complete works. Additional NR possessions required. Standing costs. Programme delay	20000	150000	50000	4	3	2	20	LIVE	Check weather reports, weather contingency plan, plan to protect the works. Adjust programme durations to allow for seasonal weather	Contractor	Contractor	5000	4	2	2	16	50000	55000
12	Design	Design changes the Works Information.	Delays and increased costs to the project	100000	600000	155000	3	4	3	21	LIVE	Proactive mitigation of the effects of the change, through detailed planning and supply chain discussions. VE solutions to off-set the increases in project scope and impacts on LCC budget. Refer to VE/Opportunity schedule. Close collaboration Contractor/Aecom/LCC to mitigate any impact early	Aecom	LCC	5000	2	3	1	8	75000	80000
13	Design	LCC require a significant increase to the work/design scope	Delays and increased costs to the project	20000	250000	60000	2	3	2	10	LIVE	Proactive mitigation of the effects of the change, through detailed planning and supply chain discussions. VE solutions to off-set the increases in project scope and impacts on LCC budget. Refer to VE/Opportunity schedule. Close collaboration Contractor/Aecom/LCC to mitigate any impact early	LCC	LCC	5000	2	2	1	6	50000	55000
14	Earthworks	Ground conditions not as expected requiring redesign, material processing, or change in work methodology	Delay to programme and cost increase to associated construction activity.	25000	400000	90000	2	3	3	12	LIVE	Consider adequacy of site investigation. Increase borehole coverage prior to construction start in suspect areas	Contractor / Aecom	LCC	15000	1	2	1	3	50000	65000
15	Earthworks	Availability of suitable imported fills in sufficient quantity at budgeted cost	Cost increase to budget	100000	1000000	310000	3	4	1	15	LIVE	Early engagement with local supply chain. Collaboration Contractor/Aecom/LCC to review design proposals against locally available fill materials	Contractor	LCC	5000	1	3	1	4	75000	80000
16	Earthworks	A proportion of earthworks materials may be unacceptable and cannot be reused on the project requiring disposal off-site to landfill	Increase to costs disposing to landfill and increased import	75000	500000	90000	2	3	2	10	LIVE	Additional ground investigation prior to construction start in areas of suspect materials. Identify areas on site for landscaping and bunding. Assess processing or stabilisation options early.	Contractor / Aecom	LCC	15000	1	2	1	3	50000	65000
17	Earthworks	Settlement of embankments	Additional fill material will be required. Settlement periods required. Geotechnical monitoring equiment installed. Delays to programme & costs	50000	250000	65000	2	3	3	12	LIVE	Review geotechnical design and associated risk. Additional ground investigation. Review criticality in construction programme. Consider ground improvement techniques	Aecom	LCC	15000	1	2	2	4	25000	40000
18	Ecology	Ecology - unidentifed issues	Ecology mitigation stratergy and effects - Project programme and target	10000	100000	25000	1	2	4	6	LIVE	Sufficient surveys to quantify risks. Work with ecologist to understand mitigation possible	Aecom	LCC	10000	1	1	2	3	10000	20000
19	Third parties	Road network management co-ordination -Availability of the network due to other parties activities	Effects tie-in planned methodology	10000	50000	12000	1	2	2	4	LIVE	Establish good working relationship with LCC Highways and local stakeholders, early discussion on programme with Network Coordinator to align programme to the available space.	Contractor	Contractor	2000	1	2	1	3	15000	17000
20	Third parties	Local community and stakeholders impacted are difficult to negotiate with	Impacts methodology and programme	5000	50000	7000	2	1	1	4	LIVE	Early engagement with community and stakeholder prior to construction. Understand issues and concerns. Appoint a dedicated Public Liaison Manager early	Contractor	Contractor	2000	1	2	1	3	15000	17000
21	Third parties	Approvals and licences	Delays and additional fees from third parties (Example EA licences)	5000	20000	3000	2	1	1	4	LIVE	Early discussions to mitigate delays to programme.	Contractor / Aecom	LCC	2000	1	1	1	2	5000	7000
22	Operational	Additional fees for access through third party land	Increased cost above Contractor allowances and scheme budget	10000	50000	16000	2	2	1	6	LIVE	Early review of access areas and discussions with relevant third parties.	Contractor	Contractor	2000	1	1	1	2	5000	7000
23	Economy	Fluctuating Supply Chain prices due to inflation as the industry enters post brexit uncertainty	Increases above allowances within target cost	0	600000	185000	3	4	1	15	LIVE	Leverage contractor supply chain relationships. Attempt to get fixed price agreements for the duration of the contract. Consider alternative materials in the design	Contractor	LCC	1000	2	3	1	8	100000	101000
24	Funding	Funding may be delayed	Potential delay to scheme increases costs and abortive work	0	1000000	62000	2	2	4	12	LIVE	Use ECI as a 'soft start' approach to the scheme to allow for issues with funding. Opportunity within this period to discuss further VE if there are constraints on the funding value. Provides additional construction programme and cost certainty	LCC	LCC	10000	1	2	3	5	20000	30000
25	Measurement	The ground survey may be incorrect (high or low)	Change in quantification	-100000	200000	31000	2	3	1	8	LIVE	Contractor to review OGL survey with Aecom prior to works. Instigate further surveys if required	Contractor	LCC	10000	1	1	1	2	15000	25000
26	Pavements	Designed roundabout alignment requires more than envisaged full depth construction or on-line construction activities	Significant impact on tie-in construction methodology resulting in delays to programme and cost increases	10000	150000	30000	2	2	2	8	Live	Advanced review of the design and production of early traffic management phasing in detail. Test options against programme	Contractor	Contractor	3000	1	1	1	2	20000	23000
27	Statutory Undertakers	Opportunity - Natural England/EA agree to river diversion so structure is no longer constructed under power lines	National Grid - overhead cable diversion will not be required. Note link to C4 above (note that cost impact has been fixed at £2m due to inclusion of £2m within costings for this item)	-2000000	-2000000	-2000000	1	4	1	5	LIVE	We are in ongoing discussion with NE/EA and the impact/ benefits that a potential river diversion could provide. Mitigation cost equates to cost of river diversion.	Designer	LCC	20000	1	1	1	2	-200000	-180000
		Risk TOTALS		-£1,240,000	£7,420,000	£352,000									£282,000					£750,000	£1,032,000

MMDR
Project Risk Register (Design)

Leicestershire County Council
Consultant - AECOM Infrastructure Limited
ECI Contractor - Carillion
REVISION A (DRAFT FOR REVIEW)

CELLS COLOURED IN THIS WAY CALCULATE BY FORMULA

Key to Risk Ratings				
Ranking	Likelihood		Impact	
Likelihood x Impact = Ranking	%age	Rating	value	Rating
Ranking < 5 = L	0% to 5%	1	£0 to £9,999	1
Ranking 6 to 12 = M	6% to 15%	2	£10,000 to £29,999	2
Ranking >12 = H	16% to 30%	3	£29,999 to £84,999	3
	31% to 50%	4	£84,999 to £199,999	4
	51% to 100%	5	£199,999 +	5

ID	Risk	Risk Rating			Cost of Risk	% Likelihood	Cost Impact	Risk Owner (best placed to mitigate)	Risk Mitigation
		NB - These cells populate automatically							What
		Likelihood	Impact	Ranking					
1	Staff Resources								
1.1	Key individuals leave employment of LCC and / or AECOM, and this affects progress.	2	3	M	£50,000	10%	£5,000	Joint	Allow sufficient lead in time to mobilise the works. Succesion planning. Collate calendars to assess leave issues.
1.2	Staff sickness affects progress of works.	1	3	L	£50,000	5%	£2,500	Joint	Prepare delegation/succesion plan and identify potential to share some responsibilities.
2	Highways								
2.1	Proposed earthworks balance impacted by developer proposals to north.	3	4	M	£100,000	20%	£20,000	AECOM	Careful consideration of vertical alignment to achieve earthworks balance. Identify potential borrow pits.
2.2	Significant buildability constraints in the vicinity of the River Eye crossing. Two sets of powerlines, SSSI and river, combined with proposed bridge construction and new roundabout. Potential increase in River Eye bridge span due to EA / NE requirements for voles.	4	5	H	£500,000	50%	£250,000	Joint	Close collaboration with EA and NE. Potential solutions include a possible diversion of the river. Scheme progressing on assumption that river will not be realigned. Risk remains due to objections from landowners and ongoing discussions with EA. Potential increase in River Eye bridge span due to EA requirements (10m to abutment face to allow for voles). Prepare report for EA/NE to consider alternatives.
2.3	Design of northern section of alignment in the vicinity of Roundabout 3 is still to be confirmed due to the uncertainty of developer requirements.	3	5	H	£200,000	20%	£40,000	Joint	Continue to develop proposals in collaboration with developers to reach suitable agreement.
3	Structures								
3.1	Potential for increased structure sizes to meet EA/NE requirements (including potential increase due to voles)	4	5	H	£500,000	50%	£250,000	AECOM	Work with EA/ NE to confirm structure sizes.
3.2	Potential for River Eye Bridge to require an additional span to cross the disused canal between the river and Saxby Road.	2	5	M	£400,000	10%	£40,000	AECOM	Discuss alternatives with canal support group. Original canal route already has significant blockers along its route.
3.3	Network Rail's property team may impose a charge for over-sailing the railway (air rights). This is considered case-by-case, taking account of the purpose of the crossing. It can be a significant sum. Significant additional project cost.	1	5	M	£2,000,000	5%	£100,000	AECOM	Negotiate with NR to minimize any charge, stressing the benefits to the public of the MMDR (as opposed to commercial benefits).
4	Drainage								
4.1	Delays to drainage design resulting from late receipt of pollution control / attenuation requirements information from EA.	2	3	M	£40,000	10%	£4,000	AECOM	Hold regular meetings with EA. Progress prelim design on basis of conservative pollution control / attenuation assumptions.
4.2	Proposed drainage outfall locations not feasible due to lack of discharge consent or unworkable levels. Delay to programme as highway alignment redesign required to facilitate required drainage changes.	3	4	M	£85,000	20%	£17,000	AECOM	Early consultation with EA and checks on required outfall levels in relation to proposed vertical alignment to establish viability of outfall points.
5	Geotechnics								
5.1	Little ground Investigation information currently available. Embankments constructed of won cut material may require faces to be flatter than gradients of 1:2.5 currently assumed.	4	4	H	£190,000	50%	£95,000	AECOM	Early analysis of GI data to identify suitability of material.
5.2	Potential for Unexploded Ordnance has been identified to the east of Nottingham Road.	1	3	L	£50,000	2%	£1,000	AECOM	Appoint specialist subcontractor to complete UXO survey over respective area. Provide detailed specification for UXO investigations.

MMDR
Project Risk Register (Design)

Leicestershire County Council
Consultant - AECOM Infrastructure Limited
ECI Contractor - Carillion
REVISION A (DRAFT FOR REVIEW)

CELLS COLOURED IN THIS WAY CALCULATE BY FORMULA

Key to Risk Ratings				
Ranking	Likelihood		Impact	
Likelihood x Impact = Ranking	%age	Rating	value	Rating
Ranking < 5 = L	0% to 5%	1	£0 to £9,999	1
Ranking 6 to 12 = M	6% to 15%	2	£10,000 to £29,999	2
Ranking >12 = H	16% to 30%	3	£29,999 to £84,999	3
	31% to 50%	4	£84,999 to £199,999	4
	51% to 100%	5	£199,999 +	5

ID	Risk	Risk Rating			Cost of Risk	% Likelihood	Cost Impact	Risk Owner (best placed to mitigate)	Risk Mitigation
		NB - These cells populate automatically							What
		Likelihood	Impact	Ranking					
5.3	Little ground Investigation information currently available. Potential to encounter contaminated material.	2	5	M	£200,000	10%	£20,000	AECOM	Confirm nature of material during GI.
5.4	A map of the Melton Mowbray Navigation and Oakham Canal indicates the presence of a canal lock immediately to the east of Lag Lane. This falls directly beneath our proposed alignment. The current status of the lock within the abandoned canal is unknown. The lock could have been drained and removed but is more likely to have been filled in with unknown material.	3	3	M	£50,000	25%	£12,500	AECOM	Further investigation will be required during the GI. The lock location may fall in the vicinity of the River Eye bridge abutment. The nature of any fill material will require identification.
5.5	Potential for basal reinforcement on approach to River Eye Bridge. Allow for potential 250m length of heavy grade geogrid with 450mm thick class 6 material.	4	5	H	£700,000	50%	£350,000	AECOM	Decision made as to ground treatment requirements on receipt of GI details.
6	Environmental								
6.1	Encountering tar bound materials on site.	4	2	M	£25,000	50%	£12,500	LCC	Complete pavement investigations. Design pavement construction overlay rather than inlay where possible.
6.2	Results of environmental survey work and assessments require potential route realignment.	2	3	M	£50,000	10%	£5,000	Joint	Early analysis of environmental survey information to identify potential issues.
6.3	Availability of suitable hydraulic models from the EA. Could impact programme by delaying confirmation of the proposed design of new structures, earthworks and highway alignment.	3	4	M	£90,000	25%	£22,500	AECOM	Early consultation with EA to establish what hydraulic models they have and what changes are required in order to make them fit for purpose.
6.4	Potential delays due to land access agreements. This prevented the completion of initial GCN surveys within the spring 2017 survey window. The survey will take place March to June 2018. This leaves it tight for the submission of the ES as the GCN are seasonally restricted.	3	2	M	£25,000	25%	£6,250	LCC	Continue to develop relationships with landowners. Maintain close communication with Property owners.
6.5	Environment Agency flood models excluded the tributaries of the River Eye. New baseline modelling is required to inform structure and highways designs, and to assess flood and environmental impact and mitigation.	3	4	M	£100,000	20%	£20,000	AECOM	Modelling is progressing as a priority activity. Further topo is being specified for the River Eye, although model results won't be available to inform Preliminary Design. Agreed with LCC that modelling won't be undertaken of Scalford Brook / Thorpe Brook at this stage.
7	Operations								
7.1	Increase in carrriageway construction due to low CBR values could cause increase service diversions / protection measures.	3	4	M	£100,000	25%	£25,000	LCC	GI data and pavement investigation will inform pavement design and expected CBR values. Complete CBR tests and provide alternative detail of construction in relation to CBR values.
7.2	Poor existing carriageway construction leading to more extensive reconstruction.	4	4	H	£100,000	40%	£40,000	LCC	Pavement investigation to confirm condition at tie-ins with existing pavement construction.
7.3	Traffic impact of incident on A1. Levels of congestion in MM are particularly bad during incidents on the A1. Could also cause disruption to deliveries and access issues to site.	2	2	L	£10,000	10%	£1,000	LCC/AECOM	Prepare emergency traffic management plan in discussion with MMBC/ECI. Include discussions with HE regarding A1 incidents.
7.4	Timely approval of traffic management layouts for construction of roundabouts.	2	2	L	£15,000	10%	£1,500	LCC/AECOM	Details to be agreed in ECI process to ensure traffic orders can be placed in advance to avoid delays to works.
7.5	Interface of Roundabout 5 with existing culvert on Saxby Road requires diverting due to level issues.	3	4	M	£100,000	25%	£25,000	AECOM	Works requirement to be determined during detailed design.

MMDR
Project Risk Register (Design)

Leicestershire County Council
Consultant - AECOM Infrastructure Limited
ECI Contractor - Carillion
REVISION A (DRAFT FOR REVIEW)

CELLS COLOURED IN THIS WAY CALCULATE BY FORMULA

Key to Risk Ratings				
Ranking	Likelihood		Impact	
Likelihood x Impact = Ranking	%age	Rating	value	Rating
Ranking < 5 = L	0% to 5%	1	£0 to £9,999	1
Ranking 6 to 12 = M	6% to 15%	2	£10,000 to £29,999	2
Ranking >12 = H	16% to 30%	3	£29,999 to £84,999	3
	31% to 50%	4	£84,999 to £199,999	4
	51% to 100%	5	£199,999 +	5

ID	Risk	Risk Rating			Cost of Risk	% Likelihood	Cost Impact	Risk Owner (best placed to mitigate)	Risk Mitigation
		NB - These cells populate automatically							What
		Likelihood	Impact	Ranking					
8	Statutory Undertakers								
8.1	The clearance to overhead high voltage power lines may be insufficient adjacent to the River Eye overbridge.	5	5	H	£1,000,000	90%	£900,000	AECOM	Continue discussions with Western Power to confirm clearance requirements and consider potential diversion of powerlines.
8.2	Services found to be in location different to that expected requiring diversion / protection.	3	4	M	£150,000	20%	£30,000	LCC	Complete GPRS / trial holes to confirm locations prior to construction.
8.3	Services required for the adjacent development areas impact programme.	3	4	M	£120,000	30%	£36,000	LCC	Liaison with developers to ascertian their requirements.
9	Planning								
9.1	Planning Application rejected/delayed.	1	3	L	£50,000	5%	£2,500	LCC	Consider nature of delays/ rejection and agree actions.
9.2	Legal process delays. Potential for Public Inquiry.	5	3	H	£50,000	60%	£30,000	LCC	Ensure contingency plans prepared to programme in public enquiry
9.3	Lack of clarity between developer and LCC/Melton BC over road alignment within proposed development to the north.	3	4	M	£85,000	20%	£17,000	LCC	Continue collaboration with developers throughout design process to confirm satisfactory proposals.
9.4	Risk of proposed developments adjacent to the route with unknown requirements impacting on junction capacity/ design / safety for the MMDR.	3	4	M	£100,000	30%	£30,000	LCC	LCC to ensure that all relevant information regarding existing / proposed planning applications and developments is made available to AECOM to aid understanding of the potential impact on the design. This should include regular updates from the Melton Mowbray / LCC Planning Departments. Possibility of allowing additional left in/ left out junctions.
	Total value of Risk Register					**Total Cost Impact**	**£2,411,250.00**		