

Appendix E Side Road Strategy Options Appraisal



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PROJECT	A47/A11 THICKTHORN JUNCTION - PCF STAG	E 3									
PROJECT No.	119556	RATIONALE No	HE551492-MMSJ	V-GEN-000-SH-	-ZZ-00003						
			Sheet 1 of 3								
SUBJECT	A47/A11 THICKTHORN CANTLEY LANE SIDEROAD STRATEGY OPTIONS APPRAISAL	APPROVAL DATE									
MAIN DESIGN TEAM	HIGHWAYS	SUPPORT TEAM 1	ENVIRONMENT	SUPPORT TEAM 2	STRUCTURES						
LOCATION	A47/A11 Thickthorn Interchange, Norwich, N	orfolk	è	MAIN DISCIPLINE Route Alignment and Junctions							
DESIGN RATIONALE	economic, operational, safety and other mat Safety is a legal requirement under the CDM also been undertaken as per Design Risk Asse This Side Road Strategy Options Appraisal is a	Regulations and is a crucia sssment HE551492-MMSJ\	/-GEN-000-SH-CX-0001	1.	-						
APPLICATION	This side Road Strategy Options Appraisar is t	ised to evaluate unitering (options using a simple	ina stanuara sc	Loring matrix.						
OMPLETING AND	Each option is assessed in terms of engineering, environmental, economic, operational, safety and other matters. A qualitative assessment is given alongside a quantitative scoring system based on: Score of 0 = Unacceptable and is a "showstopper" with the option ruled out for the reasons given. Score of 1 to 5 = Option has adverse impact and quantified for the reasons given. Score of 6 to 10 = Option offers distinct advantages ranging from minor (7) to very significant (10)										
DESIGN RATIONALE FORMS	DESIGN: Score of 0 is an unacceptable design with Departure from Standards resulting in operational safety concerns which cannot be mitigated. Score of 5 is an acceptable design with/without Departure from Standards. Score of 10 is a design above and beyond DMRB requirements with exemplary standards.										
	PROPOSED CONSTRUCTION METHODOLOGY: Score of 0 is unacceptable that requires extraordinary construction techniques. Score of 5 requires construction adjacent/above/below major constraints such as power lines, railway etc. Score of 10 has no major construction constraints and no significant residual risks.										
	OPERATIONAL SAFETY: Score of 0 is unacceptable that introduces significant safety risks to users. Score of 5 is an acceptable design with/without mitigation measures to maintain user safety. Score of 10 is a layout incorporating best practise/exemplary standards with no residual safety risks.										
		OPERATIONAL TRAFFIC: Score of 0 is unacceptable that introduces significant delays/diversions to users. Score of 5 is an acceptable level of delay no worse than currently exists									
	OPERATIONAL WALKING, CYCLING & HORSE RIDING (WCHR): Score of 0 is unacceptable design that provides an undesired route for walking, cycling & horse riding. Score of 5 is acceptable and provides a design to DMRB standard. Score of 10 is a design above and beyond DMRB standard that provides enhanced facilities for WCHR.										



	Score of 5 has addition	cant maintenance requireme onal maintenance requireme mal additional maintenance r	nts but in line with Net		: Manual and routine/win	ter service codes.					
	ENVIRONMENTAL: Score of 0 has significant environmental impacts which cannot be mitigated. Score of 5 impacts environmental for which mitigation can be provided to allow residual impacts to be acceptable. Score of 10 has no significant environmental impacts.										
COMPLETING AND	validity of the consul Score of 5 addresses	actively contradict the majo tation process. the majority of known custo s the majority of known cust	mer concerns.			public perception re. the					
SCORING THE DESIGN RATIONALE FORMS	LEGAL: Score of 0 has a high risk of Legal Challenge during the DCO Process. Score of 5 has low risk of Legal Challenge during the DCO Process. Score of 10 reduces the risk of Legal Challenge during the DCO Process.										
	RISK: Score of 0 has major impacts on the scheme risk overall which is likely to lead to opposition and objection. Score of 5 has impacts on the scheme risk overall but opposition and objection can be mitigated. Score of 10 has no impacts on the scheme risk overall.										
COMPLETING THE DESIGNERS RISK ASSESSMENT	Each risk identified is Red/Amber/Green ra The risk matrix belov	ssessment for each option is put into the relevant group uting (post mitigation). v is be used to assist in the as for each option is then giver	where the risk, the haz	ard and mitigation		and given a					
			10	Severity							
	Probability	5 - Catastrophic	4 - Critical	3 - Major	2 - Moderate	1 - minor					
	5 - Frequent	2	5 20	15	10	5					
RISK MATRIX for	4 - Probable 3 - Occasional		0 16	9	8						
Design Risk	2 - Remote		0 8	6	4	(2)					
Assessment	1 - Improbable		5 4	3	2	1					
	LOW		MEDIUM		нідн						



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PROJECT No.	A47/A11 THICKTHORN JUNCTION - PCF STAG 119556	RATIONALE No	HE551492-MMSI	V-GEN-000-SH-ZZ-0	10003			
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SUBJECT	A47/A11 THICKTHORN CANTLEY LANE SIDEROAD STRATEGY OPTIONS APPRAISAL	APPROVAL DATE REQUIRED	onest 2 or o					
MAIN DESIGN TEAM	HIGHWAYS	SUPPORT TEAM 1	ENVIRONMENT	SUPPORT TEAM 1	STRUCTURES			
LOCATION	A47/A11 Thickthorn Interchange, Norwich, N	Vorfolk		MAIN DISCIPLINE				
				Route Alig	nment and Junctions			
	This Design Rationale and Design Risk Assess		N SUMMARY					
	Highways England (HE) undertook Non-Statu Preferred Route Announcement in August 20 assessed. Following this, Highways England Feedback from the Public Consultation raise Increased traffic along Cantley Lane, partic Increased traffic and congestion in Cringlef Cantley Lane becoming the main access ro Rat-running to the A11 via. Station Lane; Underpass being unsafe for non-motorised Environmental impact on wildlife and trees Increased noise/air pollution; Impacts upon landscape protection zone as Regular use of the footbridge; Land severance; PCF Stage 3 Preliminary Design assessed the MMSJV-General-000-General-CH-00001 fully	217 where Cantley Lane announced the potentia d the following commen cularly associated with the ford; ute from South Norwich d users; 5; djacent to the new deve various options for the y details the Cantley Lan	Side Road Strategy wa is solutions for Cantley ts in relation to re-cor- e recycling centre at S to Ketteringham; lopment; re-connection of Cantle e options assessed tha	as held in abeyance r Lane (Options 3 ar nnection of Cantley Station Lane; ley Lane and report at are considered w	as options were still being ad 4). Lane: reference HETTNJCT- ithin this design rationale.			
Option 3	The alignment of this option was developed Lane South, the A47, and the Breckland Rails proposed local road link road shown at PIE), This option is routed through the Cringleford to Round House Roundabout.	way Line (Plot 52A on th that the proposed link c	e originally proposed aused severe severan	Single Option land ce to his land.	plans with the originally			
Option 4	This option restores access to the main high scheme, by connecting Cantley Lane South to	경찰 대한 보통에 되었는 것이 되었는데 보고 있다면 없다.		Lane South; which	would be severed by the			
Option 5	The A11 Station Lane Junction was originally out junction, presumably on the grounds of Station Lane, North and South of the A11, from This option proposes improvements at the A and South of the A11) and requires 2 new st	safety to stop motorists om turning right onto th .11/Station Lane junction	turning right across of e A11. In to the west of Thickt	pposing traffic. Thi thorn Interchange t	s has prevented traffic from			



Option 6	The A11 Station Lane Junction was originally built as an at-grade, all movements junction, but has since been converted to a left-in, left out junction, presumably on the grounds of safety to stop motorists turning right across opposing traffic. This has prevented traffic from Station Lane, North and South of the A11, from turning right onto the A11. This option proposes improvements at the A11/Station Lane junction to the west of Thickthorn Interchange to provide a roundabout on the mainline carriageway to allow all movements between Station Lane and the A11.									
Option 7	The A11 Station Lane Junction was originally built as an at-grade, all mo out junction, presumably on the grounds of safety to stop motorists turn Station Lane, North and South of the A11, from turning right onto the A This option was tabled by the public at a Parish Council meeting on 6th junction to the West of Thickthorn Interchange and requires a new roun which requires a skewed underpass beneath the existing A11 dual carrier	ning right across opposing traffic. This has prevented traffic from 11. april 2017 which proposes improvements at the A11/Station Lane idabout and slip roads to connect Station Lane South to the A11								
	REFERENCES:									
General	Cantley Lane Options Report: HE551492-MMSJV-General-000-General-0504/12 Safety Risk Assessment: Cantley Lane Options: HE551492-MM Cringleford Developer Layout Drawing: 350/PL/003									
Option 3	General Arrangement Drawing: HE551492-MMSJV-HGN-000-DR-CH-000 Departure Summary Drawing: HE551492-MMSJV-HAC-000-DR-CH-000									
Option 4	General Arrangement Drawing: HE551492-MMSJV-HGN-000-DR-CH-000 Departure Summary Drawing: HE551492-MMSJV-HAC-000-DR-CH-000									
Option 5	General Arrangement Drawing: HE551492-MMSJV-HGN-000-DR-CH-000 Departure Summary Drawing: HE551492-MMSJV-HAC-000-DR-CH-000									
Option 6	General Arrangement Drawing: HE551492-MMSJV-HGN-000-DR-CH-000 Departure Summary Drawing: HE551492-MMSJV-HAC-000-DR-CH-000									
Option 7	General Arrangement Drawing: HE551492-MMSJV-HGN-000-DR-CH-000 Departure Summary Drawing: HE551492-MMSJV-HAC-000-DR-CH-000									
OPTION SELECTED	Option 4: This option restores access to the main highway network for the properties along Cantley Lane South, who otherwise would have their access restricted by this low bridge when the Cantley Lane (South) links to Thickthorn Roundabout are removed to implement the scheme.	APPROVERS COMMENTS:								
SUMMARY OF REASONS	Option 4 scores 50 which has the best score of all options when compared to option 3 (38), Option 5 (29) Option 6 (30) and Option 7 (41). 1. Reduces the risk of objection or any potential compensation as a consequence of the proposed route through the Cringleford Residential Extension Development. 2. Reduces the risk of objection by local Cringleford residents, particularly those along Cantley Lane who were concerned at the route being used as a 'rat run'. 3. Avoids lengthy diversions for residents along Cantley lane. 4. Provides a continuous route for non-motorised users between Cantley lane and Cantley lane South via the new non motorised user bridge across the A47. 5. Provides a DMRB compliant design. 6. Generates less excavated materials and reduces the schemes export of surplus excavated material. 7. Norfolk County Council preferred option as set out during consultation meeting 05/12/17.									



STAKEHOLDERS CONSULTED	The following Stakeholders have been consulted on the options indicated in brackets: - Cringleford and Hethersett Parish Council (Options 3, 4 & 5) - Richard Bacon MP and various residents visiting his surgery (Options 3, 4 & 5) - Simon Mason, Fleet Maintenance Operator - Norfolk Fire Service - Emergency Service Co-ordinator (Norfolk Police Force and Fire Services NB. Ambulance Svc unable to attend meeting but rescheduled) Overall scheme discussed including communications during construction phase. - Norfolk County Council Highway Department (Options 3, 4, 5, 6 & 7). - Norfolk County Council LLFA (Option 3). - East Carlton and Ketteringham Parish Council (Options 3 & 4). - Historic England (Option 3). - Historic England (Option 3). - County Archaeologist (Option 3). - Environment Agency (Option 3). - Environment Agency (Option 3).
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	ATEGY OPTIONS APPRAISAL								S	weco
PROJECT	A47/A11 THICKTHORN JUNCTION - PCF STAGE 3									
PROJECT No.	119556	RATIONALE	No:	HE551492	MMSJV-GEN-000-SH-ZZ-00003					
	A47/A11 THICKTHORN	APPROVAL	DATE						MAIN DISCIPLINE	
SUBJECT	CANTLEY LANE SIDEROAD STRATEGY OPTIONS APPRAISAL	REQUIRED:	DATE			Sheet 3 of	3		Route Alignment and Junctions	
MAIN DESIGN TEAM	ніснимуч	SUPPORT TEAM 1	FNVIRONMENT			SUPPORT TEAM 1	STRUCTURES			
LOCATION	A47/A11 THICKTHORN INTERCHANGE, NORWICH, N	IORFOLK					'			
OPTION	Option 3	SCORE	Option 4	SCORE	Option 5	SCORE	Option 6	SCORE	Option 7	sco
DESIGN	L Design in accordance with Masual for Streets sclegin requirements and mot MBMs accordance, would require agreement from Local Authority. 2. This option requires several geometric releasations which are compounded and combined. There are 8 Departure from Standards. 3. The composition of the second requires agreement with Local Authority. 4. All the departures are a combination of departures and releasations in horizontal curvature (8 steps below), vertical curvature (12 steps below), vertical curvature (2 steps below), vertical curvature (3 steps below), vertical curvature (4 steps below) in close proximity to an 8.05 gradient. These departures should be mitigated by way of signage / road markings etc. 5. The steps \$\frac{1}{2}\$ gradient on the east cide of the existing AT is also on the agenciach to a consideration of the considera	5	1. Luyout design primarily in accordance with ordelia. 2. This option requires several geometric relaxations which are compounded and combined, relaxations which are compounded and combined there are 2 Desparing from Standards and 3. Relaxations which form part of combination departures. 5. measured than carrangeness with requires agreement with Local Authority. 4. A key departure is a combination of relaxations in Vertical Curvature (2 tesps below) and Stoppine in Vertical Curvature (2 tesps below) and stopping sight obtainer (1 tesps below) and marking etc. 5. A key departure is a combination of relaxations in varieties curvature (2 tesps below) and stopping sight obtainer (1 tesps below) along the new combination of the arm of tesps below and the specific combination of the arm of the specific production of the arm of the credit only compromised the purpose of the specific production of the arm of the specific production of the arm of the specific production of the arm of the specific production of the specific production of the arm of the specific production of the specific product	6	L Dougn in accordance with Manual for Streets's design requirements and not DMRS standard sedges requirements and not provided the sedges of t	3	1. Roundabout design not fully in accordance with children. 2. This option requires 2 Departure from Standards. 3. One key Departure from Standard is the Roundabout proximity to Station Land Junction. 3. One key Departure from Standard is the Roundabout proximity to Station Land Junction and Land Land Land Land Land Land Land	4	2. Layout design and fully in accordance with collision. 2. This option requires several geometric relaxations which are compounded and combined. There are 100 persons from Standards and 4. Relaxations which form part of combination departures. 3. A key departure is substandard weaven [segification with compartures. 4. A key departure is substandard weaven [segification provided - less than the Libra required] between proposed A11 Eastbound taper merge and station lane (North) diverge. This rain diagnosus layout as there will be merging traffic adjustment of the service of the station of the station of the service of the ser	:
	Drainage of this option will require approx. 8m deep drainage from the underpass low point towards Crineleford rail bridge to allow a discharge.		Generates less excavated materials and reduces the schemes surplus of excavated material. Requires existing Cartley Stream and access.		material if site won material is suitable for reuse in the embankment.				Underpass required below the live A11 carriageway required in a tight corridor between the A11 carriageway and the existing railway line.	



DESIGN	to the existing Cantley Stream. 10. Additional drainage facilities in terms of attenuation storage and poliution control will be required prior to discharge.		truck to the south west of the alignment to be realigned "diverted." Li his proposed inforcements two derestricted rural roads with autonal speed limits. The design yeared and signature have been severed and separate have been severed and severed and organized for the main link results to the scheme. 12. Overland flow of surface waster declarage to the intercopted at the toe of earthworks.		imported III may be required. 9. Additional drainage facilities in terms of antennation strong and gold internation strong and gold internation strong and gold internation strong and gold internation strong and gold internations strong and link roads. 10. Additional drainage survey will be required outside of the current Red Line Boundary.				10. Construction within tight corridor between the A11 carriageway and the existing live railway line. 11. Additional rainage scattles is nermen of a pumping station, attenuation storage and positions construct with the required for the roundabout, associated slip roads and underpass. 12. Additional drainage zurvey will be required outside of the current Red Line Boundary.	
PROPOSED CONSTRUCTION METHODOLOGY	T. Taffic Management required to create contra/flows to enable the structure to be constructed in two halves. 2. Working under and adjacent to high voltage overhead electricity line (40014 and 1328V). 3. Working over low pressure gas pipes, BT cables, water pipes and other statutory infrastructure at Cantlety Lane South to in to the west of the link. 4. Existing gravel pit land may require ground stabilisation.	3	1. Trolfic Management required to segregate adultment/pier construction from the live carriageway. 2. Lidery that temporary road closures will be required on the ALI for beam lifts although anticipated this will be during off peak periods. 3. Existing contaminated land may require ground stabilisation.	5	L Extensive Traffic Management required to suggregate ablumming/per construction from the progregate pull-mortify construction from the live carriagewy. Lifety that temperary road clauses will be required on the A11 for beam lifts although anticipated this will be during off peak periods. 2. Working over and adjacent to live railway line. 3. Temporary rail dissures will be required for beam lifts. 4. Additional Ground investigation required.	4	L Extensive Traffic Management required to suggregate roundable construction from the live carriageous. Likely that temporary rand classures will be required on the A11 for tie in works. 2. Additional Ground Investigation required. 3. No structures required for this option.	6	L Schesive Traffic Management required. Likey that temporary and discurse will be required on the A11 for the underpass although anticipated this will be during off peak periods. 2. Working adjacent to live railway line. 3. Additional Ground Investigation required. 4. Earthwork cutting slope may require stabilisations on as not to adversely impact the railway/earthwork. 5. Groundwater issues due to depth of cutting and underpass.	3



and overhebots. Cashs on the link may be linked as grained and thereby the character of a rural land in keying with the existing callenge with the existing		The proposed link road for vehicles travelling	The design introduces a new link between the		1. The detour to the main group of properties on		1. The detour to the main group of properties on		1. This option contains a proposed departure for	
creat the rail of large or production. 1. The promises of the consequence and different production of the Lindship Cately Larks South the service and consequence and different productions of the Lindship Cately Larks South the service and consequence and the large of the large										
description of an additional arm on the second part of the company processes to an additional arm on the second part of company processes that the second part of the company processes that the second part o			new junctions where none currently exist will		includes rural two-way single lane carriageway		includes rural 2-way single lane carriageway roads		length of 1km within the DMRB. This would result	
2. The prevalence and additional stream on the Resolution will be activate read a round laste in the standard of the district stream of the standard production will be activated the production of the standard p	L.	access the wider highway network.	create the risk of injury collisions such as re-starts		roads with limited passing places, would		with limited passing places, would adversely		in a higher risk of injury accidents on the A11 Dual	
showmbows Way recomband will be do more wearing and corning incomposes and records a control of the control of			and overshoots. Crashes on the link may be		adversely affect emergency services response		affect emergency services response times. It		Carriageway, particularly side-swipes.	
wearing and crossing movements and transfer increass the sixting registery collision including gladering of the street of the st							could also lead to head-on collisions during			
In concase the risk of legary collisions including deliveness and re-duction. 3. The increased traffic as a result of them [1], showing the secretaries and expert to the proposed Congeledor Residential Extension and Congeledor Resid		Roundhouse Way roundabout will lead to more	in keeping with the existing Cantley Lane South.		during emergencies.		emergencies.		2. The detour to the main group of properties on	
in words and re-starts. 3. The increases the residence as a resident file (1), show, well imported training to a resident of their groups of Confederate and Section (1), and the section of the section		weaving and crossing movements and thereby							Cantley Lane South (approx 6.3km), which	
and the following of the maintenance personance length of the control of the maintenance personance length of the control of t		increase the risk of injury collisions including side-	2. Overbridges will be required to carry the new		2. The alignment of the link is influenced by		2. The roundabout's proximity to the Station Lane		includes rural 2-way single lane carriageway roads	
minimance personal bring study and special plant ground with a present of them (15). This will increase the risk of whiches beauting and an advertage of the antibodies of this from highly large designation the proposal control of the proposal con		swipes and re-starts.	link over the A11. This will increase the		Manual for Streets (MfS) rather than the Design		Junction is sub-standard, reducing both the Sight		with limited passing places, would adversely	l
minimance personnel being struct by passing which would be an observed filter and the proposal Cringletone flower residents of the through the structure of the filter of			maintenance burden and thereby the risk to		Manual for Roads and Bridges (DMRB), resulting		Stopping Distance (SSD) and weaving length and		affect emergency services response times. It	
whichies or fails from height. 3. Norfolk fire Service in Millions of the analysis and another in its complete in the control of the service in the control of the control of the service in the control of the control of the service in the service in the control of the service in the control of the service in the control of the service in the service in the control of the service in the service		3. The increased traffic as a result of item (1).	maintenance personnel being struck by passing		in significantly tighter geometry, including low					l
purposed cingleted Residential Estension Development, in particular leading to possible conflicts between podestrates and cyclist and morter vehicles. 4. The alignment of the link is inferenced by Manual for Storker (Mily) sather than the Despit Manual for forstee and adult (Mily) are than the possible of the entire of the link is inferenced by Manual for forstee and adult (Mily) are than the possible of the entire of the link is inferenced by Manual for forstee and adult (Mily) are than the possible of the entire of the link is inferenced by Manual for forstee and adult (Mily) are than the possible of the entire of the link is inferenced by Manual for forstee and adult (Mily) are than the possible of the entire of the link is inferenced by Manual for forstee and adult (Mily) are than the possible of the entire of the link is inferenced by Manual for forstee and adult (Mily) are than the possible of the entire of the link is inferenced by Manual for forstee and adult (Mily) are than the possible of the entire of the link is inferenced by Manual for forstee and adult of the link is inferenced by Manual for forstee and adult of the the intervention of the mortal is sunfor our and adult of the the entire of the entire of the mortal is sunfor our and adult of the the entire of the mortal is sunfor our and adult of the entire of the entire of the mortal is sunfor our and adult of the entire of the entire of the mortal is sunfor our and adult of the entire of the mortal is sunfor our and adult of the entire of the mortal is sunfor our and adult of the entire of the mortal is sunfor our and adult of the entire of the mortal is sunfor our and adult of the entire of the mortal is sunfor our and adult of the entire of the mortal is sunfor our and adult of the entire of the mortal is sunfor our and adult of the entire of the mortal is sunfor our and adult of the entire of the mortal is sunfor our and adult of the entire our and adult of the entire of the mortal is sunfor our and adult of the entire our and adult of the e										
Development, in particular leading to possible conflicts between partestiman and register (Many and product of the initial increases to a form of the way was a control or which it is influenced by Manual for Streets (MS) rather than the Design Manual for Streets (MS) rather than the Design Manual for Streets (MS) reading low and adjust to the national way of the carriageway. 5. The wertical alignment is unique to the state of the existing allow principle. The state of the existing fallow principle. The increase of which is bearing the carriageway. 5. The vertical alignment is existed to find the existing allow principle. The existing allow principle. The existing allow principles of the existing principles of the existing principles of the existing allow principles. The existing allow principles of the existing allow principles of the existing allow principles. The existing allow principles of the existing allow principles of the existing allow principles. The existing allow principles of the existing allows and the existin										
treatment in the application and registers and experience and reconstructions are reconstructed and reconstruction and reconstruction and reconstructions are reconstructed and reconstruction an			3. Norfolk Fire Service indicated their preference				3. The siting of a normal roundabout on a high		3. The proposed route alignment is subject to a	
motor vehicles. 4. The alignment of the link is influenced by Manual for Streets (HIS), rather than the Design Manual for Exercise (DMRIS), resulting and the found and for found and found for found and for found and found for found found for found for found for found for found for found for found found to indicate the found for found for found fou										
currently exist will introduce the risk of injury collisions such as re-tasts and everthoods. 4. The alignment of the link is influenced by Manual of Streets (MS) pather than the Design Manual of Streets (3. The addition of two new junctions where none					
A. The alignment of the link is influenced by Manual for Rosets (MRS) after that the Design Manual for Rosets (MRS) after that the Design Manual for Rosets (MRS) after that the Design Manual for Rosets and Bridge (DMRI), resulting in significantly lighter generately, including low rails benish on a round subject to the relational state of the existing rules of the proposed round alignment is subject to a Height (12 / fm) and well regiment is subject to the resulting rules of the results of the resulting rules of the results of the result										
Manual for Streets (MRS) where then the Design Manual for Storets (MRS) where the three the proposed route alignment is subject to a Height (2.7) restriction at the existing (1.7 ma). Weight (7.7) restriction at the existing excess, would result in increase (1.7 ma). Weight (7.7) restriction at the infrastructure. So Norfoll Fire service raised concerns that this route was single access, would result in increase (1.7 ma). Weight (7.7) restriction at the infrastructure. So Norfoll Fire service raised concerns that this route was single access, would result in increase (1.7 ma). Weight (7.7) restriction at the existing extraction of the control expense was required. So Norfoll Fire service raised concerns that this route was single access, would result in increase (1.7 ma) which is result with the existing extraction of the route was single access, would result in increase (1.7 ma) which is response was required. So Norfoll Fire service raised concerns that this route was single access, would result in increase (1.7 ma) which is response was required. So Norfoll Fire service raised concerns that this route was single access, would result in increase (1.7 ma) which is result in increase (1.7 ma) which is response was required. So Norfoll Fire service raised		4 The alignment of the link is influenced by	Total Company							
Manual for Roads and bridges (DMRB), resulting in significantly lighter generately, including low radii bends on a road subject to the national speed limit (ESI). This will increase the risk of wholes leaving the carriageway. 5. The vertical adjustment to the first first of the national speed limit (ESI). This will increase the risk of wholes leaving the carriageway. 5. The vertical adjustment to the first first of the national speed limit (ESI). This will increase the risk of wholes colliding with the satisfig railway bridge. 6. Similarly the disk gradient will affect to control crashes by wholes to receive the product of SIN to bis in outside of the Cinglifetor Devolupement. This could lead to origin-whole (loss of control crashes by wholes to receive the was single access, would result in increased response terms, and presented legistical issues if a multi whole response was required. 6. Similarly the disk gradient will affect whoter maintenance operations and westbound will be a trist of single-whice loss of control crashes to the maintenance operations and westbound will be a trist of single-whice loss of control collisions in ky contribution. 6. Similarly the disk gradient will affect whoter maintenance operations and westbound will be a trist of single-whice loss of control collisions in ky contribution. 7. The underpass breacht the existing fallows principle of the control of the							conflicts. There is the notential to introduce			l
In significantly tighter geometry, including low radii bends on a road subject to the national speed limit (1951). This will increase the risk of wholes leaving a save grapation of 195 to the national speed limit (1951). This will increase the risk of wholes leaving a save grapation of 195 to the national speed limit (1951). This will increase the risk of the national speed limit (1951). This will increase the risk of the national speed limit (1951). This will increase the risk of the national speed limit (1951). This will increase the risk of the national speed limit (1951). This will increase the risk of the national speed limit (1951). This will increase the risk of wholes travelling towards cantley Lane South. 6. Similarly the 80 gradient will affect whole the safety of the speed of the safety of the speed of the safety of th					4. The proposed route alignment is subject to a					l
and ibends on a road subject to the national speed milit (RSL). This will increase is the risk of wholicle leaving the carriageway. 5. The vertical alignment on the East tide of the existing ATP requires a steep gradient of fist to the existing ATP requires a steep gradient of fist to the existing ATP requires a steep gradient of fist to the vertical exponent to the published that while a functionance was acceptable, it was on the limit of acceptability. There is a risk of wholices colliding with the interessed response times, and presented logistical issues if a multi wholice response was required. 5. Norfolk Fire service naised concerns that this route was single access, would result in increased response times, and presented logistical issues if a multi wholice response was required. 6. Similarly the 8% gradient will affect whete maintenance operations and whethere heading consultation due to personal and eventoomal will be a trial of single-whice loss of control collision in ity conditions. 6. Norfolk Fire service raised concerns that this route was single access, would result in increased response times, and presented logistical issues if a multi wholice response was required. 6. In overcome the height restriction at the railway bridge, potential miligation could be to railway bridge, potential miligation could be to railway bridge, potential miligation could be to railway shrough this would be at significant count to read the properties of the propertie					Height (13"/4m) & Weight (7.5T) restriction at the		due to the roundabout.		infrastructure.	l
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E. Northis Fire Service Indicated their performance to the mainline A11 since using the underpass would introduce a 0.6 find indirection to / from Control y tame Goath, which would reduce separate the underpass would introduce a 0.6 find indirection of the control of the performance and the underpass would introduce a 0.6 find indirection to / This option would replace the existing uncontrolled geleatrian resulting east of Statism (including two controlled gets to cross she railway in the personal injury collision in the top networking, and horse in the which crosses the mailine A11, due to the provision of the accordance which would be no injury collision in the top networking, cyclist and horse in the provision of the accordance which would be no injury collision in the top the statism of the provision of the accordance with the control of the provision of the accordance which would be no injury collision in the provision of the provision of the accordance which would be no injury collision in the provision of the provision o		consultation due to personal safety concerns.			7. This option would have to retain the existing		highway although this would be at significant		personal injury collision risk to pedestrians,	
the underpass would introduce a O. Shm discription 7. This option would replace the existing to from Control under Sunday under Sunday to the University under Sunday to the University under Sunday under engineer times. However'll also required managency which would be no control under the sunday under engineer times. However'll also required managency which causes the mainties A11, due to the managency which causes the mainties A11, due to the managency which causes the mainties A11, due to the managency which causes the mainties A11. 1. This option would replace the existing to use and A11. There is a high personal injury called to the high speeds of vehicles using the A11. 1. This option would replace the existing to use which crosses the mainties A11, due to the managency which the existing. However, the managency which the existing they require traffic signal control to ensure arise crossing arous a high speech, high Traffic flow carriageness. There is high personal plury callition risk to prederion, cyclists and hore: risters due to the high speeds of		The contract of the second of			uncontrolled pedestrian crossing east of Station		cost.		cyclists and horse riders due to the high speeds of	
including two sourchridges to cross the railway interesting two contributings to the contribution of the c		8. Norfolk Fire Service Indicated their preference			Lane which across the mainline A11 since using				vehicles using the A11.	
reduce response times. However if also required managency whites to be resuded through a collision with to predestines, cyclists and he have produced through a proposed housing development. All. Lane which crosses the mainline A11, due to the managency which would have produced through a more produced through a mor					the underpass would introduce a 0.6km diversion		7. This option would replace the existing			
sum groups within to be recorded through a projection of the recorded strongth as a project of housing development. project of housing development. ### AT1. #### AT1. ###################################		to / from Cantley Lanc South, which would					uncontrolled pedestrian crossing east of Station			
riders due to the high speeds of vehicles using the A11. In the high speeds of vehicles using the search the control likely require to raffic signal control to ensure arise receiving arone a high speed, high raffic flow carriage ways. There is a high second player callition risk to prefet or the high speeds of vehicles using the control likely require to ensure arise receiving arone a high speed, high raffic flow carriage ways. There is a high personnal player callition risk to prefet or flow to the high speeds of					line and A11. There is a high personal injury					
A11. countedhout recoving would likely requise traffic signal control to ensure safe crossing across a high speech, high traffic flow carriageous; There is a high speech, high traffic flow carriageous; There is a high paroman jointy radiican risk to predestrians, cyclists and hone risks due to the high speeds of										
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1. Although this option does provide an alternative 1. The option provides benefits to the properties 1. This option prevents any through traffic on 1. This option pr	
through route to the Thickthorn junction, the along the eastern section of Cantley Lane South due to existing access on A11 Cantley Lane South due to existing access on A11 Cantley Lane South due to existing access on A11	1 1
transport model predicts that it is unlikely to as there will no longer be any through traffic / A47 to be closed. Therefore, the predicted A11/A47 to be closed.	1 1
attract any additional rerouted traffic from a wider passing the properties. traffic on Cantley Lane South is zero except for traffic on Cantley Lane South is zero except for	1 1
area. The reason for this could be that the local traffic associated with residents on Cantley local traffic associated with residents on Cantley	
Paccapacition link Board Caption Lang South subject is not captured in the strategies Lang South subject is not captured in the strategies Lang South subject is not captured in the strategies Lang South subject is not captured in the strategies Lang South subject is not captured in the strategies Lang South subject is not captured in the strategies	
Station loss from a relative losses route for	
Season rate own a recurre onger owner to transport model. Westbourd traffic to access All as compared to	
westcound starting to access ALL as compared to the Thickthorn route and the Thickthorn scheme 2. This scheme does not form a through route 2. This scheme does not form a through route	1 1
From approximately 1 minute (A47 Westboung	1 1
also reduces the delay at the interchange. off slip road approach) in the base to 2 minutes between Hethersett and Ketteringham recycling between Hethersett and Ketteringham recycling	
However, in the event of an incident on the A11 / (05127 approach) in 2037. centre via Station Lane North because the north because the	
A47, there could be a significant increase of traffic an inorthern part of Station Lane North is closed to an inorthern part of Station Lane North is closed to traffic as	
utilising this parallel route. traffic as per the base year. In addition, traffic on increase in journey times and congestion. the base year. In addition, the design of single la	
Station Lane North has to give way to A11 merge reduces the difficulty for Eastbound traffi	
2. This option could also see a small rise in traffic and also see a small rise in traffic as a compared to Option 6 and	1 1
from a wider area utilising Cantley Lane South to from Ketteringham. A merge option was estimated to cause 177 seconds delay per vehicle therefore attracted more rerouted traffic from	1 1
travel to / from Ketteringham Recycling Centre. considered for the A11 Eastbound Traffic, which on A11 Eastbound traffic and 117 seconds delay Ketteringham.	1 1
Although this is not captured in the transport would attract more vehicles to use this link; per vehicle for the opposite direction in 2037 AM	
model, our professional Judgement on this however the sub-standard weaving length to the Peak. In addition, the appearance of agricultural 3. Under this option, there would be a significant	t l
increase would be around 100 AADT based on proposed A11 Eastbound diverge ruled this out vehicles would adversely effect the performance increase on average journey time for residents	n
actual count data for the recycling centre. On safety grounds. Of the roundabout. Cantley Lane South to access Thickthorn Junction	
from approximately I minute (A47 Westbound	
3. Under this option, there would be a significant off slip road approach) in the base to 6 minute	1 1
TRACTIC Canting use South to access Thickhorn Junction 5 (All Leastbound off slip road approach) in 203 (Canting use South to access Thickhorn Junction)	4
from approximately 1 minute (A47 Westbound Thickthorn function from approximately 1 minute (A47 Westbound) Thickthorn function from approximately 1 minute (A47 Westbound)	1 1
from approximately A minute (new vectorium incoming proximately A minute (new vectorium incoming proximately A minute (new vectorium and proximately A minute) (new vectorium and proximately A minute (new ve	1 1
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approach) in 2057.	
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OPERATIONAL WCHR (Walking cycling Horse Riding)	1. NMU Count data: during school term time an average of 12 pedestrians and 27 cyclats used the serving bridge on a weeklay and 13 pedestrians and 16 cyclets used the sessing bridge on a weeklay and 13 pedestrians and 16 cyclets used the average of 12 pedestrians and 16 cyclets used it on a weeklay and 18 pedestrians and 16 cyclets used to 18 pedestrians and 16 cyclets used to 18 pedestrians and 18 pedestria	3	1. NMU Count data: during whoel term time an average of 12 pedestrians and 27 cyclests used the sourcing bridge on a weekly and 13 pedestrian and 18 registers used in a sewelay and 13 pedestrian and 18 registers used in an awarena. 2. The footbridge will be registered as part of the stormer as this is a desired rotust for access to local amenibus such as the Destroys suggest and the season in Children's an average of the season in Children's and	5	1. NMU Courn data: during school term time an average of 12 pedestrians and 27 cyclists used the schizility bridge on a weekeld and 13 pedestrians and 16 cyclists used the outside bridge on sevelday and 13 pedestrians and 16 cyclists used the one weekeld and 13 pedestrians and 16 cyclists used the separate of the school as the school a	5	1. NMU Court data: during school term time an average of 21 pedestrians and 27 cyclists used the secting brigg on a weekly and 31 pedestrian and 18 cyclists used in control programs and 18 cyclists used in on a wavelend. 2. The footbridge will be replaced as part of the scheme as this is a decined most for access to local amounties such as the Doctors supery and shows in clinicative. 3. This option would replace the existing all space models the control of the con	5	1. NMU Count data: during school term time an average of 12 pedestrians and 27 cyclats used the sociating furige on aveekagy and 13 pedestrians and 16 cyclates used the section of the sociation furige on a weekagy and 15 pedestrians and 16 cyclates used it on a weekagy and 16 pedestrians and 16 cyclates used it on a weekagy and store the section of	5
MAINTENANCE	and link / sly roads. 2. Additional periodic maintenace required within drainage to prevent the proposed underpass becoming unpassable during extreme storm events. 3. Frequent maintenance during periods of adverse cold weather to ensure route remains open due to 8% Gradient.	5	mention of structures required to cross the existing. All and link roads.	6	additional multiple virtualisms required to reco- ting the existing fall have been greatly line and the additional junctions. 2. Option may require access to live railway lines for structures assessment / maintenance.	3	Additional maintenance effects due to additional pavements although no structures.	8	additional jumping valetos, undergous, retaining wall adjacent for alianza and life, reads beneath the A47 and the associated slip roads. 2. Additional periodic maintenace required within drainage to prevent the proposed undergoas becoming unpassable during extreme storm events.	2



		Summary Based on a qualitative assessment only. Potential for direct and indirect impacts on noise, greenhouse gases, historic environment, biodiversity (NERC Act habitats) and water environment.		Summary Based on a qualitative assessment only. Potential for significant adverse impacts on historic omirionment, blockhereity (NEBC Act habitats) and water environment.		Summary Based on a qualitative assessment only. Area impacted by side road option has not been subject of baseline surveys and therefore is a desi- based assessment only. Potential for direct and indirect impacts on greenhouse gases, landscape, historic environment, biodiversity and water environment.		Summary Based on a qualitative assessment only. Area impacted by side road option has not been tubject of baseline surveys and therefore it a desk- based assessment only. Potential for disert and indirect impacts on greenhouse gases, biodiversity and water environment.		Summary Based on a qualitative assessment only. Area impacted by side road option has not been subject of baseline surveys and therefore is a desi- based assessment only. Protential for clieter and indirect impacts on greenhouse gases, landscape, historic environment, biodiversity and water environment.	
		Noise This option will see increased traffic flow down Cardiny Lane and Cartley Lane South and Introduce new source of noise.		Noise -New access road linking Cantley Lane to B1172 introduces new source of noise but is not close to residential receptors. Noise from A47 & A11 already dominates in this area.		Noise -Noise from Cantley Lane South would reduce as no through traffic but new A47 slip roads would offset this. New A11 access unlikely to effect existing non-residential receptors due to proximity of high noise A11.		Noise Noise From Cantley Lane South would reduce as no through traffic but new A47 slip roads would offset this. New A11 access unlikely to effect existing non-residential receptors due to proximity of high noise A11.		Noise -Noise from Cantley Lane South would reduce as no through traffic but new A47 slip roads would offset this. New A11 access unlikely to effect existing non-reddental receptors due to proximity of high noise A11.	
		Air Quality - Negative impact expected on air quality due to increase in traffic however increase not expected to be significant.		Air Quality - The design is not expected to increase traffic flows along Cantley Lane South where there are sensitive receptors.		Air Quality -5.6km detour from Cantley Lane South via Station Lane would increase regional emissions but increases would not be significant.		Air Quality - 4.9km detour from Cantley Lane South via Station Lane would increase regional emissions but increases would not be significant.		Air Quality -6.3km detour from Cantley Lane South via Station Lane would increase regional emissions but increases would not be significant.	
(D	ONMENTAL	Greenhouse gases -Negative impact on regional greenhouse anticipated however impact not expected to be significant. Full assessment not undertaken.		Greenhouse gases -No increase in regional greenhouse gases anticipated as no expected increase in traffic on Cantley Lane South. Full assessment not yet undertaken.		Greenhouse gases -Hegative impact on regional greenhouse anticipated however impact not expected to be significant. Full assessment not undertaken.		Greenhouse gases -Negative impact on regional greenhouse anticipated however impact not expected to be significant. Full assessment not undertaken.		Greenhouse gases -Negative impact on regional greenhouse anticipated however impact not expected to be significant. Full assessment not undertaken.	
Sumn		Landscape Affacts out of the AFA Alignment causes, which was the AFA Alignment causes, which was the AFA Alignment causes were limited field everance to outsit of AFA? Alignment through new urban development arbor than though peen countryside. - Visual effects on Cantley Iane South properties however can be mitigated.		Landscape - Inno et agentium parts of Earstey Wand, - Inno et agentium parts of Earstey Wand, - Inno et agentium parts of Earstey Wand, - Visual effect on property where Castley Lane bouth meets new extension.		Landscape Linux of unablesed areas and numbers is bindy-pressed. Linux of unablesed areas and numbers is bindy-pressed. Linux of unablesed areas and the second areas and second and an and the second areas and a second and a second and a linux of unablesed and a second and a linux of unablesed and a linux of unablesed and a linux of unablesed and unablesed and linux of unablesed and unab		Landscape - Leaved iducational areas of landgermes and omit - Leaved iducational areas of landgermes and omit - Leaved landscapes should be a landgerment of		Landscape - Link of beneficial sees of conditions, shortly, - Link of beneficial sees of conditions, shortly, - Link of beneficials, regulg proclams and since and severance of analysis form land sewant language - Link of the service of the servi	
			3		2		3		4		3



	Niktoric Cruvionmen - Indicatatins in the total awas of surviving historic landscape of The flound House (Brade II) sendle different his lagishing satisfies a singless consent increased noise would adversary effect the statisfies of the world of the statisfies of the statisfies of the world adversary effect the statisfies of The Round House (Grade II) during operation.	Historic Environment 1. -Scheduled Momment (2 No. Tumuli) approxSom from toe of proposed embankment - toursaand ankies insperts no extering furing construction and operation. -Area between embankment and Tumuli previously mined for gravel/sand. Subsequently used for landful! enduced liethlood ob buried archaeology in this area. -North of the ALI, proposed road runs through greunds of Thickthorn Park Inon-designated, early CISH middiscope part). Setting of the historic park almost by construction and operation of a new road through grounds.	Historic Environment - Area not subject to archaeological surveys Isolated instances of finds in area of scheme on Morfolic Epichoe Internal Surveys Potential for moderate adverse effect on buried archaeological enrolls register and several effect on surveys archaeological enrolls registed by construction-applion would introduce new critings on fand not currently built on.	Historic Environment - Area on tu Suget to archaeological surveys Industed instances of finish in area of scheme on Norful's Explores kirlengs Charbase Leow adverse effect on buried archaeological remains potentially impacted by construction - option constructed on existing A11 mainline.	Historic Environment - Area not subject to archaeological surveys Inolated instances of finds in area of scheme on Morful Explorer Meraging Instance. - Potential moderate adverse effect on barried archaeological emakin impacted by construction- option would introduce new cuttings on land not corrently built on.
ENVIRONMENTAL (Detail on Environmental Summary Table)	Boolevesty - Inscreed direct and indirect impact upon Natural Environment and furd Communities (IREST) Assistant and indirect impact upon (IREST) Assistant and indirect habitats of high- hadinessing state (Insert than Applies 1) - Additional mitigation measures to avoid, reduce, mitigate or commensate are needed in order to manage potential ecological effects.	Biodiversity - Potential disert and indirect impact upon Natural Environment and Rural Communities (VRIER) shakingts and high number of habitates of high hindimersity value. - 18 occurrent resea would be lost as a result of - 18 occurrent resea would be lost as a result of - 18 occurrent resea would be lost as a result of - 18 occurrent resea would be lost as a result of - 18 occurrent resea would be lost as a result of - 18 occurrent resea would be lost as a result of - 19 occurrent research of the lost of an under - 19 occurrent research of the lost of a result of - 19 occurrent and order to order to - 10 occ of all roots requires lience.	Biodiversity Ame and prevalently stillages to be addition enoughcal surveys. - Postantial direct and indirect impacts upon their and a stillage of the stillage of the stillage - Minigation measures not possible for loss of mature trees. - Additional mitigation measures to avoid, reduce, mitigate or compensate are needed in order to manage potential ecological effects. - Loss of last root requires increase.	Biodiversity Area and previously entities to be addition configurate survey. Instruction distance and institute longuate supus MSEC data habitate and institute and religit to the survey. And to a survey and the su	Biodiversity Area not presimably uniques to baseline escalegical surveys. Firstendial direct and indirect impacts upon statural it entermonates and their Communities (FIRCK) labelists and other helitact of high -Miligation measures not possible for loss of mature trees. -Additional mitigation measures to avoid, reduce, mitigate or compensate are needed in order to manage potential ecological effects.
	Water Environment Dues not intersect any source protection zone. - Proguest dusting pass may interesting ground harder flow if it extension business easier table.	Water Environment Brown Obversion of appress. 600m required with associated ecological (water volto, otter) and -literate land language language and -literate language language and potential for groundwater pollution. - Crosses a source protection zone 2.	Water Environment Common description and it. Controlly tame via Station Land discription located in Station Land Controlly Land Controlly Southerings at Sever risk of deep surfaces wester Floodings. Southerings at Sever risk of deep surfaces wester Floodings. Southerings are descripted to the several surfaces and several surfaces. Southerings are surfaced as guidence and several surfaces are surfaced as guidence.	Water Environment Consider Search protections and 2. Consider Language Control of the Consider Language Control of the Control	Water Environment County Law via Station Road diversion located in Hardware via Station Road diversion located in Hardware via the Management of Management protected applies



	1. This link would provide the opportunity of an	1. This option would remove the opportunity of	1. This option would avoid the risk of 'rat running		1. This option would avoid the risk of 'rat running'	1. This option would avoid the risk of 'rat runs	ing'
	alternative route for vehicles travelling between	'rat running' along Cantley Lane between Station	along Cantley Lane between Station Lane and		along Cantley Lane between Station Lane and	along Cantley Lane between Station Lane and	
	Cantley Lane South and Round House Roundabout,	Lane and Roundhouse Roundabout / Thickthorn	Roundhouse Roundabout / Thickthorn Interchange	d	Roundhouse Roundabout / Thickthorn Interchange.	Roundhouse Roundabout / Thickthorn Intercha	
	particularly if incidents occur on the mainline A11	Interchange					
	or A47 and Thickthorn Interchange.	marchange.	2. The detour to the main group of properties on	1	2. The detour to the main group of properties on	2. The detour to the main group of properties	3n
	or Ary and illication interchange.	2. The detour to the main group of properties on	Cantley Lane South (approx 5.6km), which include	.I	Cantley Lane South (approx 4.9km), which includes	Cantley Lane South (approx 6.3km), which incl	
	2. The detour to the main group of properties on	Cantley Lane South (approx 1.5km) avoids the	rural 2-way single lane carriageway roads with	`	rural 2-way single lane carriageway roads with	rural 2-way single lane carriageway roads with	
	Cantley Lane South (approx 1.2km) avoids the	restricted height / width along Cantley Lane	limited passing places, would adversely affect		limited passing places, would adversely affect	limited passing places, would adversely affect	
	restricted height / width along Cantley Lane	which is rural 2-way single lane carriageway road	emergency services response times.		emergency services response times.	emergency services response times.	
	which is rural 2-way single lane carriageway road	with limited passing places and would minimise			THE REAL PROPERTY OF THE PARTY		
	with limited passing places and would minimise	emergency services response times.	3. This option includes provision of a non-		3. The roundabout introduces a junction along the	3. This option includes provision of a non-	
	emergency services response times.		motorised user bridge over the existing A47 -		mainline which will impede A11 mainline through	motorised user bridge over the existing A47 -	
		3. This option includes provision of a non-	preferred option from consultation with local		traffic.	preferred option from consultation with local	
	3. Underpass beneath the existing A47 was not	motorised user bridge over the existing A47 -	residentsand Local Authority and provides a safer			residents and Local Authority and provides a sa	fer
	favoured by the local residents during	preferred option from consultation with local	route across the A47.		4. Delays during peak periods will occur as a	route across the A47.	
	consultation due to personal safety concerns	residents and Local Authority and provides a safer		1	result of the roundabout impeding free-flowing		
		route across the A47.	4. The proposed route alignment is subject to a	1	traffic.	4. The proposed route alignment is subject to a	î l
	4. The 8% gradient is difficult to negotiate by non-		Height (13" / 4m) & Weight (7.5T) restriction at th			Height (13" / 4m) & Weight (7.5T) restriction a	
	motorised users, particularly for wheelchair /	4. This option minimises disruption to road users	existing railway bridge.	1	5. This option includes provision of a non-	existing railway bridge.	
	pushchair users, the elderly and disabled.	as the majority of this option is offline which	During consultation with Norfolk Fire Service,	1	motorised user bridge over the existing A47 -	During consultation with Norfolk Fire Service,	
	Mitigation could be provided by re-aligning the	reduces the traffic management required to	they highlighted that while a 4m clearance was	1	preferred option from consultation with local	they highlighted that while a 4m clearance wa	
	footway away from the highway which would be	existing highways.	acceptable, it was on the limit of acceptability.	1	residentsand Local Authority and provides a safer	acceptable, it was on the limit of acceptability	
		evisitif tillimats.		1			
	within the extent of greenspace allocated to the		There is a risk of vehicles colliding with the	1	route across the A47.	There is a risk of vehicles colliding with the	
	Cringleford Residential Extension.		infrastructure.	1		infrastructure.	
				1	6. The proposed route alignment is subject to a		_
	5. Increased traffic will impact on Future		5. Norfolk Fire service raised concerns that this		Height (13" / 4m) & Weight (7.5T) restriction at the	5. Norfolk Fire service raised concerns that the	
	Residents of the proposed Cringleford Residential		route was single access, would result in increased	4	existing railway bridge.	route was single access, would result in increa	
	Extension Development.		response times, and presented logistical issues if		During consultation with Norfolk Fire Service,	response times, and presented logistical issue	s if
STOMER		3	6 a multi vehicle response was required.	2	they highlighted that while a 4m clearance was	2 a multi vehicle response was required.	
	6. This option minimises disruption to road users				acceptable, it was on the limit of acceptability.		
	as the majority of this option is offline which		6. This option has significant impacts on A11 road	rl .	There is a risk of vehicles colliding with the	6. This option has significant impacts on A11 r	oad
	reduces the traffic management required to		users and the railway due to disruption during	1	infrastructure.	users due to the disruption to road users duri	
	existing highways.		construction of the bridges across the A11 and	1		construction of the underpass and slip roads.	
	0.0.0012		railway.	1	7. Norfolk Fire service raised concerns that this	- onstruction of the underpass and sup roads.	
				1	route was single access, would result in increased		
				1	response times, and presented logistical issues if		
				1			
				1	a multi vehicle response was required.		
				1	Control of the Contro		- 1
				1	8. This option has significant impacts on A11 road		
				1	users due to disruption during construction of		
				1	the roundabout and complex traffic management		- 1
				1	phasing that is required.		- 1
				1	and the same of th		
				1	1		- 1
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cost	estimate. 2. Approv quantities for this option: Land = 60,000m2 Site Clearance = 60,000m2 Site Clearance = 60,000m2 Oranage popes = 1000m Oranage popes = 1000m Oranage popes = 1700. Oranage dulies = 27 NO. Drainage dulies = 27 NO. Brathworks Cut = 65,000m3 Pavement = 5,000m3 Pavement = 5,000m3 Structures = 1 underpass Oranage popes = 1000m3 Structures = 1 underpass Oranage popes = 10000m3 Structures = 10000m3 Structures = 10000m3 Structures = 100000m3 Struc	5	estimate. 2. Sevuctural design & construction works more complex and extensive than Option 5. Scheduled Monuments—geological survey required to confirm seatest and whether the proposed init road adversely impacts upon bursed archaeology. 4. Realignment of Cantley stream, associated culvurs and sociat track. 5. Approx quantities for this option: 1. Approx quantities for this option: 1. Approx quantities for this option: 1. Approx quantities and company of the c	Š	2. This option requires two additional structures to cross the existing A11 and railway as well as new highway / junctions. 3. Increased scope resulting in increased design programme duration. 4. Increased control or additional results of the control of the co	2	additional structures as well as new highway / junctions. 2. Option fits within current HE scheme budget estimate. 3. Approx additional quantities for this option: tand = 1,000m2. Size Clearance = 10,000m2. Fending = 4000m and Restraint = 2000m Corainage about = 20 No Derivange manbole = 7 No. Derivange Guillies = 20 No Derivange Guillies = 20 No Derivange Guillies = 20 No Structures = No additional structures. 4. Approximate cost of this Option is approximately £0.564.	7	beneath the existing A11 and significant slip road construction. 2. Approx additional quantities for this option: Land = 95,000m2 Site Clearance = 95,000m2 Site Clearance = 95,000m2 Site Clearance = 25,000m Site Clearance = 25,000m Orainage pelipse = 2500m Orainage pelipse = 2500m Orainage pelipse = 27 No. Earthworks cut = 130,000m2 Farefring = 600m Structure = 11 Underpass and 1 retaining wall S. Approximate cost of this Option is approximately £10,00M.	i
RISK	hurther traffic is routed through the development which could affect he sale or value of properties in the area. 2. The developer could further object if the front print of the silignment significantly effects the developable area. 5. Construction of underpass hemself the existing AZF will require more complex the arrangements which may result in additional risk to pregramme and cont. 4. The provision of an SN gradient along the route may not be accepted by Norfolk County Council and potential severance to emergency whiches in winter conditions.	3	may be rejected. 2. Pipposed diversion of Cardley Steam may receive objections from Environment Agency. 3. Early engagement with EA over Cardley Stream diversion has been inergisted to mitigate risk.	5	ampact, ag. cost, programme, flootgrint, works being consider the originally proposed tend the decondary. 2. Construction of structure across existing railway line will require railway possession, interdince with research mail may result in adoptificant rails to programme. 3. Network Sail approvals for the structure crossing the railway, may result in additional programme risks.	3	impact, e.g. cost, programme, footprint, works being nutristed free originally proposed fixed the fooundary. 2. Extensive traffic management arrangements will be required for this option which may result in agentines duly as in the section of during commencion—legislational risk to be managed. 3. This option does not deliver on the scheme objectives and results in additional delays to journey time. This may result in the scheme performance no being value for money and result in objections.	3	impact, ag. cost, programme, hotoprist, works being costale the originally proposed field the foundary. 2. Construction of underpass benath the existing at little the require more complex TM arrangements which may result in additional risk to programme and cost. 3. Temporary works will be required directly adjacent to the range value of the underpass, would result in delay during the exavation of the underpass, would result in delays during constitution to obtain approvals from Network faal.	3





Appendix F Side Road Strategy Options Designers Risk Assessment



SSESSMENT				HILLIAN SAME	MacDonald Swec
PROJECT	A47/A11 THICKTHORN JUNCTION IMPROVE	MENT - PCF STAGE 3	2		
PROJECT No.	119556	Ref.	HE551492-MMSIV	-GEN-000-SH-CX-00011	
SUBJECT	A47/A11 THICKTHORN CANTLEY LANE SIDEROAD STRATEGY OPTIONS APPRAISAL	APPROVAL DATE REQUIRED			
MAIN DESIGN	HIGHWAYS	SUPPORT	ENVIRONMENT	SUPPORT	STRUCTURES
TEAM	1000 (100) (1000 (1000 (100) (1000 (1000 (100) (1000 (1000 (100) (100) (1000 (100) (100) (1000 (100) (1000 (100) (1000 (100) (100) (100) (1000 (100) (100) (100) (100) (100) (100) (1000 (100) (TEAM 1	EINVINONNENT	TEAM 1	19/11/20/27/2010/19/20
LOCATION	A47/A11 Thickthorn Interchange, Norwich, N	NOTTOIK		Route Alignmen	
	DESIGNERS RISK ASSESSMENT		OPTION	Optio	on 3
HAZARD GROUP	HAZARD	RISK		REDUCE, ISOLATE, L MITIGATIONS	POST-MITIGATIO
	Non-compliant with DMRB - Multiple Departures Required.	Single vehicle loss of control collisions at low radius bends as a result of inappropriately high speeds.	urban environment 20/30mph speed limits. Requires Local Authority approval for change of speed limit and design standard.		HIGH
GENERAL (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)		Motor vehicle collision with pedestrians, cyclists.	1. Option provides from a wider area Interchange and tr Road / A11 Junction 2. Option is not an the 13'6"/4.1m heirestriction at Cantl bridge and the 7.5' Cantley Lane South 3. Consider street junctions.	ey Lane South railway t weight restriction at n/Station Lane junction. lighting on approach to	HIGH
	Drivers use local roads to access wider highway network.	Driver overshoots stop/give way markings at junctions.	Provide clear and concise road markings and signs. Consider street lighting on approach to junctions.		Medium
	Construction of underpass beneath existing A47 Dual Carriageway.	Disruption to A47 during construction.	during construction 2. Anticipated top- will require numer	management required n. down construction which ous traffic management nstruction to install the	нібн



GENERAL (INCLUDE GD04 RISK ASSESSMENT	Flexibility of Design Layout	Change to design layout.	Ties into the current road layout proposed by the cringleford development contractor. May introduce additional traffic that requires enhanced road geometry and road pavement. Impacts and severes the developments open space identified between the existing A47 and Cringleford.	HIGH
	The provision of an additional arm on the Roundhouse Way roundabout will lead to more weaving and crossing movements and thereby increase the risk of injury collisions.	Side-swipe and re-start collisions.	Provide clear and concise road markings/spiralization to increase lane discipline.	HIGH
RESULTS WHERE PREPARED)	The vertical alignment on the east side of the existing A47 requires a gradient of 8% to tie in outside of the Cringleford Development.	Single vehicle loss of control collisions as a result of steep gradient, particularly in wintry conditions.		HIGH
	Personal safety of walkers, cyclists and horse riders using the underpass beneath existing A47 Dual Carriageway.	Personal safety.	 Street lighting and CCTV may be required within the underpass to provide an element of security for walkers, cyclists and horse riders. 	HIGH
UTILITIES (INCLUDE GD04 RISK	Buried utilities	Injury, Burns, damage to apparatus, electrocution, explosion etc	Option will require additional length of utility diversions already considered under the scheme. Overhead power cables directly adjacent to Option.	Medium
ASSESSMENT RESULTS WHERE PREPARED)	High Voltage Overhead power lines (132kv and 400kv)	Injury, Burns	Option requires construction work directly adjacent and below the overhead power cables. However, works are required directly adjacent and below in any case although Option reduces the amount of works in close proximity.	HIGH
WORKING AT HEIGHT OR ON SLOPES (INCLUDED GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	Falling from height	Personal exposure, long term injury, paralysis and fracture	Option will require works at height during construction of underpass structure and cutting earthworks. If working at height cannot be avoided, suitable fall prevention systems/guard-rails are to be employed.	Low



	Falling into earthworks, trenches, chambers, ducts.	Injury, whole body injury, paralysis and fracture	Option will require deep excavations within cutting slopes, trenches, chambers, ducting and the like. Any earthworks, open trenches, chambers or ducts to be suitably fenced off by the contractor to minimise the probability of occurence.	Low
EXCAVATIONS (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE	Unstable ground due to poor ground conditions / high groundwater table.	Injury	Option will require deep excavations within cutting slopes. Ground investigation to be carried out. GI report and drawings to be provided.	Medium
PREPARED)	Historical Gravel Pit south of A47 Footbridge and east of Cantley Lane South.	Unstable ground, poor ground conditions and possible contaminated ground.	1. Option cut coincides with area identified as historical gravel pit. Properties of gravel pit backfill material requires investigation. 2. Ground investigation to be carried out. 3. GI report and drawings to be provided.	High
	Deep cutting to accommodate the underpass (1:3 side slopes up to 11m in height).	Surplus excavated material	Option generates significant additional excavated material which adds to the surplus of excavated material already generated by the scheme.	HIGH
	Noise	Effect on hearing	Option is within a cutting slope albeit closer to a number of residential properties within Cringleford. It is anticipated that traffic noise will increase as a result of highway traffic. Noise Fences are likely required to screen noise impacts near properties although the precise extents are to be confirmed.	Medium
OCCUPATIONAL HEALTH (INCLUDE HEMP WHERE REQUIRED)	Vibration	Effect on local features/property	Option is within cutting slope albeit closer to a number of residential properties within Cringleford. It is anticipated that vibration will increase as a result of highway traffic.	Medium
	Visual	Risk of objection by local residents and requirement of Planning.	1. Option is within cutting slope which provides an element of visual screening from the surroundings. 2. Underpass lighting is likely to be required for personal safety although the precise lighting/extents are to be confirmed.	Low



	Works at height	Injury	Option will require works on structures, deep excavations within cutting slopes, trenches, chambers, ducting and the like. Any earthworks, open trenches, chambers or ducts to be suitably fenced off by the contractor to minimise the probability of occurence.	Low
TEMPORARY WORKS (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	Historical Gravel Pit south of A47 Footbridge and east of Cantley Lane South.	Unstable ground, poor ground conditions and injury	1. Option cut coincides with area identified as historical gravel pit. Properties of gravel pit backfill material requires investigation. 2. Ground investigation to be carried out. 3. GI report and drawings to be provided.	Medium
	High Voltage Overhead power lines (132kv and 400kv)	Injury, Burns	Option requires additional construction work directly adjacent and below the overhead power cables. However, main scheme works are required directly adjacent and below in any case.	High
CONFINED SPACES (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	N/A	N/A	N/A	
WATER (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE	Falling in stream, water, pool or pond	Injury, drowning	Option avoids works directly adjacent and within the Cantley Stream watercourse. Operatives visiting water pools, balancing tanks, sewege works, canals and rivers should only do so with the permission of the landowner or responsible person in control of the land	Low
PREPARED)	Contracting Weil's or Lyme Disease	Injury, Infection	Operatives should wear gloves and foot / leg protection where contact with stagnant water such as from sewege works, road side drainage rivers, canals and drainage trenches.	Medium



	Contaminated land possible within historical landfill	Infection	1. Option avoids works directly adjacent and within the area of landfill that may contain contaminated land. 2. Ground investigation required to confirm extent of cantaminated land. 3. GI report and drawings, to be provided.	Low
MATERIALS	Historical Gravel Pit south of A47 Footbridge and east of Cantley Lane South.	Injury	1. Option cut coincides with area identified as historical gravel pit. Properties of gravel pit backfill material requires investigation. 2. Ground investigation to confirm presence of and extent of contaminated land. 3. GI report and drawings to be provided.	Medium
(INCLUDE GD04 RISK ASSESSMENT WHERE PREPARED)	Asbestos	Personal exposure, long term injury, abestos related diseases	1. Option avoids works directly adjacent and within the area of landfill that may contain contaminated land. 2. Geophys required to confirm extent of cantaminated land. 3. GI report and drawings, to be provided. 4. No demolition/dismantling of any structure/furniture unless it has been positively identified by a competent person not to contain asbestos.	Low
	Removal of tar bound pavement	Personal exposure, long term injury	1. Option may require works within existing pavement that may contain tar. 2. Operatives should not work on an existing pavement unless it has been positively identified as not containing tar materials.	Medium
			OVERALL RATING	High



SIDEROAD ST ASSESSMENT	RATEGY OPTIONS APPRAIS	SAL - DESIGN R	ISK	Mott	MacDonald Sweco
PROJECT	A47/A11 THICKTHORN JUNCTION IMPROVE	MENT - PCF STAGE 3		JI-	
PROJECT No.	119556	Ref.	HE551492-MMSJV	-GEN-000-SH-CX-00011	
SUBJECT	A47/A11 THICKTHORN CANTLEY LANE SIDEROAD STRATEGY OPTIONS APPRAISAL	APPROVAL DATE REQUIRED			
MAIN DESIGN TEAM	HIGHWAYS	SUPPORT TEAM 1	ENVIRONMENT	SUPPORT TEAM 1	STRUCTURES
LOCATION	A47/A11 Thickthorn Interchange, Norwich, N	lorfolk	i.	MAIN DI	ALTERNATION OF THE PROPERTY OF
T. Control of Control	No.			Route Alignmer	t and Junctions
	DESIGNERS RISK ASSESSMENT		OPTION	Opti	on 4
HAZARD GROUP	HAZARD	RISK		REDUCE, ISOLATE, OL MITIGATIONS	POST-MITIGATION
	Drivers use local roads to access wider highway network.	Driver overshoots stop/give way markings at junctions.	Provide clear an and signs. Consider street junctions.	Medium	
	Turning movements at B1172 Norwich Road	Driver fails to appreciate the path or speed of an approaching vehicle, resulting in a side-on	and warning signs.	d concise road markings ighting on approach to	Medium
GENERAL (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	Construction of structure over existing A11 Dual Carriageway.	Disruption to A11 Journey Times during construction works.	Extensive traffic during construction Anticipated bott will require several phasings during co Advanced mitigal	om-up construction which I traffic management nstruction of the structure stion works to forewarn ned activities, use of mobile	HIGH
	Cantley Stream	Works adjacent or within watercourse.	1. Option will require works within and directly adjacent to the existing Cantley Stream. 2. Operatives visiting water pools, balancing tanks, sewege works, canals and rivers should only do so with the permission of the landowner or responsible person in control of the land.		0.5



	Thickthorn Park & Ride Extension development.	Risk of objection by local Developer of Thickthorn Park & Ride Extension development.	Option is outwith the area identified for the future Thickthorn Park & Ride Extension development.	Low
GENERAL (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	resulting from historical landfil	Poor ground conditions, infection and disturbance.	1. Option will require works directly adjacent and possibly within the area of landfill that may contain contaminated land. 2. Ground investigation required to confirm extent of cantaminated land. 3. GI report and drawings, to be provided. 4. No demolition/dismantling of any structure/furniture unless it has been positively identified by a competent person not to contain asbestos.	HIGH
	Archealogical remains: Ancient Scheduled Monuments	Impact on Ancient Scheduled Monuments	Option will require works directly adjacent to the Ancient Scheduled Monuments. Geophys required to confirm extent of ancient scheduled monument.	Medium
JTILITIES (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	Buried utilities	Injury, Burns, damage to apparatus, electrocution, explosion etc	Option minimises impacts on utilities. No overhead power cables in the vicinity of Option.	Low



WORKING AT HEIGHT OR ON SLOPES (INCLUDED GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	Falling from height	Personal exposure, long term injury, paralysis and fracture	1. Option will require works at height during construction of structure and embankment earthworks. 2. If working at height cannot be avoided, suitable fall prevention systems/guard-rails are to be employed.	Low
EXCAVATIONS (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	Falling into earthworks, trenches, chambers, ducts.	Injury	Option will require deep excavations within trenches, chambers, ducting and the like. Any earthworks, open trenches, chambers or ducts to be suitably fenced off by the contractor to minimise the probability of occurence.	Low
	Historical Gravel Pit south of A47 Footbridge and east of Cantley Lane South.	Unstable ground, poor ground conditions and possible contaminated ground.	1. Option avoids area identified as historical gravel pit. 2. Ground investigation to be carried out. 3. GI report and drawings to be provided.	Low
	Unstable ground due to poor ground conditions / high groundwater table.	Injury	Ground investigation to be carried out. GI report and drawings to be provided.	Low
OCCUPATIONAL HEALTH (INCLUDE HEMP WHERE REQUIRED)	Noise	Effect on hearing	Option is on embankment slope albeit further away from the residential properties within Cringleford. It is anticipated that noise will increase as a result but affect far fewer properties.	Low
	Vibration	Effect on local features/property	Option is on embankment slope albeit further away from the residential properties within Cringleford. It is anticipated that vibration will increase as a result of highway traffic but affect far fewer properties.	Low
	Visual	Risk of objection by local residents and requirement of Planning.	Option is on embankment slope albeit further away from the residential properties within Cringleford which will be more prominent in its surroundings.	Medium



	Works at height	Injury	1. Option is on embankment and will require deep excavations within trenches, chambers, ducting and the like. 2. Any earthworks, open trenches, chambers or ducts to be suitably fenced off by the contractor to minimise the probability of occurence.	Low
TEMPORARY WORKS (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	Contaminated land. Possible Contamination resulting from historical landfil	Poor ground conditions, infection and disturbance.	1. Option will require works directly adjacent and possibly within the area of landfill that may contain contaminated land. 2. Ground investigation required to confirm extent of cantaminated land. 3. GI report and drawings, to be provided. 4. No demolition/dismantling of any structure/furniture unless it has been positively identified by a competent person not to contain asbestos.	HIGH
	Archealogical remains: Ancient Scheduled Monuments	Impact on Ancient Scheduled Monuments	Option will require works directly adjacent to the Ancient Scheduled Monuments. Geophys required to confirm extent of ancient scheduled monument.	Medium
CONFINED SPACES (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	N/A	N/A	N/A	
WATER (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE	Falling in stream, water, pool or pond	Injury, drowning	1. Option will require works within and directly adjacent to the existing Cantley Stream. 2. Operatives visiting water pools, balancing tanks, sewege works, canals and rivers should only do so with the permission of the landowner or responsible person in control of the land	HIGH
PREPARED)	Contracting Weil's or Lyme Disease	Injury, Infection	Operatives should wear gloves and foot / leg protection where contact with stagnant water such as from sewege works, road side drainage rivers, canals and drainage trenches.	Medium



	Contaminated land. Possible Contamination resulting from historical landfill	Infection	1. Option requires works directly adjacent and potentially within the area of contaminated land. 2. Geophys required to confirm extent of cantaminated land. 3. GI report and drawings, to be provided.	Medium
	Historical Gravel Pit south of A47 Footbridge and east of Cantley Lane South.	Injury, infection	Option avoids area identified as historical gravel pit. Ground investigation to be carried out. GI report and drawings to be provided.	Low
MATERIALS (INCLUDE GD04 RISK ASSESSMENT WHERE PREPARED)	Asbestos	Personal exposure, long term injury,abestos related diseases and programme/ construction delay	1. Option works are in close proximity to a disused landfill site where contaminated land could be present. 2. Ground investigation required to confirm extent of cantaminated land. 3. GI report and drawings, to be provided. 4. No demolition/dismantling of any structure/furniture unless it has been positively identified by a competent person not to contain asbestos.	Medium
	Removal of tar bound pavement	Personal exposure, long term injury	1. Option may require works within existing pavement that may contain tar. 2. Pavement survey to be undertaken. 3. Operatives should not work on an existing pavement unless it has been positively identified as not containing tar materials.	Medium
			OVERALL RATING	Medium



SSESSMENT					Sweco
PROJECT	A47/A11 THICKTHORN JUNCTION IMPROVE	MENT - PCF STAGE 3			
PROJECT No.	119556	Ref.	HE551492-MMSJV-0	GEN-000-SH-CX-00011	
SUBJECT	A47/A11 THICKTHORN CANTLEY LANE SIDEROAD STRATEGY OPTIONS APPRAISAL	APPROVAL DATE REQUIRED			
MAIN DESIGN	HIGHWAYS	SUPPORT	ENVIRONMENT	SUPPORT	STRUCTURES
TEAM		TEAM 1	ENVINORMENT	TEAM 1	e. Company of the control of
LOCATION	A47/A11 Thickthorn Interchange, Norwich, I	Nortolk		Route Alignment	
	DESIGNERS RISK ASSESSMENT		OPTION	Optio	n 5
HAZARD GROUP	HAZARD	RISK	1000000	UCE, ISOLATE, CONTROL TIGATIONS	POST-MITIGATION
Construction of additional structures over existing A11 Dual Carriageway and existing railway. GENERAL (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE PREPARED) Drivers use local roads to access wider highway network.	Departures Required.	Single vehicle loss of control collisions at low radius bends as a result of inappropriately high speeds.	for Streets which is a environment 20/30r Local Authority appr limit and design star 2. Provide clear and signs.	mph speed limits. Requires roval for change of speed	HIGH
	existing A11 Dual Carriageway and existing	Disruption to A11 and railway during construction.	construction. 2. Railway possessio structures. 3. Anticipated botto require numerous tr during construction	ons required to construct ons required to construct on-up construction which will raffic management phasings to install the structure. ghting on approach to	HIGH
	Inadequate width/height of existing highway network	13'6"/4.1m height & Cantley Lane South weight restriction at Lane junction. 2. Access to/from Cantickthorn Interchal of the scheme.	ttractive route due to the to 5m width restriction at railway bridge and the 7.5t to cantley Lane South/Station antley Lane South from nge will be removed as part	HIGH	



GENERAL (INCLUDE	Emergency services response times delayed/response prevented.	Inadequate width/height of existing highway network	1. Option may prevent access to the properties east of the railway bridge due to the 13'6"/4.1m height & 5m width restriction at the bridge and the 7.5t weight restriction at Cantley Lane South/Station Lane junction. 2. Lower the carriageway beneath the bridge or raise the bridge structure. 3. Provide additional road warning signs.	HIGH
GENERAL (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	Despite the new infrastructure crossing the A11, the existing uncontrolled at-grade pedestrian crossing will likely need to be retained due to its convenience.	Motor vehicle collision with pedestrians, cyclists.	Provide grade separated crossing of A11 on Station Lane south/Station Lane north desire line.	HIGH
	Drivers use local roads to access wider highway network.	Driver overshoots stop/give way markings at junctions.	Provide clear and concise road markings and signs and consider gantry signage. Consider street lighting on approach to junctions.	Medium
UTILITIES (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	Buried utilities	Injury. Burns. damage to apparatus, electrocution, explosion, etc.	Option will require additional utility diversions over and above those already considered as part of the scheme.	HIGH
WORKING AT HEIGHT OR ON SLOPES (INCLUDED GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	Falling from height	Personal exposure, long term injury, paralysis and fracture	1. Option will require works at height during construction of structures and cutting earthworks. 2. If working at height cannot be avoided, suitable fall prevention systems/guard-rails are to be employed.	Low



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	Falling into earthworks, trenches, chambers, ducts.	Injury	Option will require works at height during construction of structure, deep excavations within trenches, chambers, ducting and the like.	
EXCAVATIONS (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE			Any open trenches, chambers or ducts to be suitably fenced off by the contractor to minimise the probability of occurence.	Low
PREPARED)	Unstable ground due to poor ground conditions / high groundwater table.	Injury	Ground investigation to be carried out. GI report and drawings to be provided.	Medium
OCCUPATIONAL HEALTH (INCLUDE HEMP WHERE REQUIRED)	Noise	Effect on hearing	Option is on embankment slope albeit further away from the residential properties within Cringleford. It is anticipated that noise will increase as a result but affect far fewer properties.	Low
	Vibration.	Effect on local features/property	Option is on embankment slope albeit further away from the residential properties within Cringleford. It is anticipated that vibration will increase as a result but affect far fewer properties.	Low
	Visual	Risk of objection by local residents and requirement of Planning.	Option is on embankment slope albeit further away from the residential properties within Cringleford which will be more prominent in its surroundings.	Medium
TEMPORARY WORKS (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	Works at height	Injury	1. Option will require works at height during construction of structure, deep excavations within trenches, chambers, ducting and the like. 2. Any earthworks, open trenches, chambers or ducts to be suitably fenced off by the contractor to minimise the probability of occurence.	Low
ONFINED SPACES (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	N/A	N/A	N/A	
WATER (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	N/A	N/A	N/A	



	Contaminated land. Possible Contamination resulting from historical landfill	Infection	Ground Investigation required to confirm. GI report and drawings, to be provided.	Low
MATERIALS (INCLUDE GD04 RISK ASSESSMENT WHERE PREPARED)		Personal exposure, long term injury,abestos related diseases	1. Ground Investigation required to confirm. 2. GI report and drawings, to be provided. 3. No demolition/dismantling of any structure/furniture unless it has been positively identified by a competent person not to contain asbestos.	Medium
	Removal of tar bound pavement	Personal exposure, long term injury	1. Option may require works within existing pavement that may contain tar. 2. Operatives should not work on an existing pavement unless it has been positively identified as not containing tar materials.	Medium
			OVERALL RATING	HIGH



SIDEROAD ST ASSESSMENT	RATEGY OPTIONS APPRAIS	SAL - DESIGN RI	SK	Mott I	MacDonald Sweco
PROJECT	A47/A11 THICKTHORN JUNCTION IMPROVE	MENT - PCF STAGE 3			
PROJECT No.	119556	Ref.	HE551492-MMSJ	V-GEN-000-SH-CX-00011	
SUBJECT	A47/A11 THICKTHORN CANTLEY LANE SIDEROAD STRATEGY OPTIONS APPRAISAL	APPROVAL DATE REQUIRED			
MAIN DESIGN TEAM	HIGHWAYS	SUPPORT TEAM 1	ENVIRONMENT	SUPPORT TEAM 1	STRUCTURES
LOCATION	A47/A11 Thickthorn Interchange, Norwich,	Norfolk		Route Alignmen	
	DESIGNERS RISK ASSESSMENT		OPTION	Optio	
HAZARD GROUP	HAZARD	RISK		, REDUCE, ISOLATE, DL MITIGATIONS	POST-MITIGATION RISK RATING
GENERAL (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	Inadequate weaving length between proposed roundabout and existing A11/Station Lane diverge junctions.	Side swipe collisions	Option has sub-standard design which requires a departure from standard. Provide clear and concise road markings and signs and consider gantry signage. Consider street lighting.		HIGH
	A11 mainline traffic impeded by the roundabout.	Stop-start traffic during peak times increases risk of shunt collisions	1. Option roundabout provision along the mainline is over provision and requires a departure from standard. 2. Significant risk of accidents as a result of stop-start traffic. 3. Provide clear and concise road markings and signs. 4. Consider street lighting.		HIGH
	High speeds on the A11 approach to the roundabout.	Driver overshoots stop/give way markings at junctions.	mainline is over p departure from s	nd concise road markings	



	Drivers use local roads to access wider highway network.	Inadequate width/height of existing highway network	1. Option is not an attractive route due to the 13'6"/4.1m height & 5m width restriction at Cantley Lane South railway bridge and the 7.5t weight restriction at Cantley Lane South/Station Lane junction. 2. Access to/from Cantley Lane South from Thickthorn Interchange will be removed as part of the scheme. 3. Provide additional road warning signs.	HIGH
GENERAL (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	Emergency services response times delayed/response prevented.	Inadequate width/height of existing highway network	1. Option may prevent access to the properties east of the railway bridge due to the 13'6"/4.1m height & 5m width restriction at the bridge and the 7.5t weight restriction at Cantley Lane South/Station Lane junction. 2. Lower the carriageway beneath the bridge or raise the bridge structure. 3. Provide additional road warning signs.	нібн
	New crossing at roundabout replaces existing uncontrolled at-grade pedestrian crossing.	Motor vehicle collision with pedestrians, cyclists.	Provide traffic signalised crossing of A11.	HIGH
	Drivers use local roads to access wider highway network.	Driver overshoots stop/give way markings at junctions.	Provide clear and concise road markings and signs and consider gantry signage. Consider street lighting.	Medium
UTILITIES (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	Buried utilities	Injury, Burns, damage to apparatus, electrocution, explosion etc	Option will require additional utility diversions over and above those already considered as part of the scheme.	HIGH



WORKING AT		T T	1	
HEIGHT OR ON SLOPES (INCLUDED GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	N/A	N/A	N/A	
EXCAVATIONS (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	Falling into earthworks, trenches, chambers, ducts.	Injury	1. Option will require works at height during construction of structure, deep excavations within trenches, chambers, ducting and the like. 2. Any open trenches, chambers or ducts to be suitably fenced off by the contractor to minimise the probability of occurence.	Low
	Noise	Effect on hearing	Option is at grade and further from a number of residential properties within Cringleford. It is anticipated that traffic noise would decrease as a result.	Low
	Vibration	Effect on local features/property	Option is at grade and further from a number of residential properties within Cringleford. It is anticipated that vibration would decrease as a result.	Low
	Visual	Risk of objection by local residents and requirement of Planning.	Option is at grade and would require additional screening proposals from the surroundings.	нідн
TEMPORARY WORKS (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	N/A	N/A	N/A	
CONFINED SPACES (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	N/A	N/A	N/A	



WATER (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	N/A Contaminated land. Possible Contamination resulting from historical landfill	N/A Infection	N/A 1. Ground Investigation required to confirm.	Low
MATERIALS (INCLUDE GD04 RISK ASSESSMENT WHERE PREPARED)	Asbestos	Personal exposure, long term injury, abestos related diseases	2. GI report and drawings, to be provided. 3. I. Ground Investigation required to confirm. 2. GI report and drawings, to be provided. 3. No demolition/dismantling of any structure/furniture unless it has been positively identified by a competent person not to contain asbestos.	Medium
	Removal of tar bound pavement	Personal exposure, long term injury	1. Option may require works within existing pavement that may contain tar. 2. Operatives should not work on an existing pavement unless it has been positively identified as not containing tar materials.	Medium
			OVERALL RATING	HIGH



SIDEROAD ST ASSESSMENT	RATEGY OPTIONS APPRAIS	AL - DESIGN RI	SK	N	/lott /\	NacDonald Sweco
PROJECT	A47/A11 THICKTHORN JUNCTION IMPROVE	MENT - PCF STAGE 3				
PROJECT No.	119556	Ref.	HE551492-MMSJ	V-GEN-000-SH-C	CX-00011	
SUBJECT	A47/A11 THICKTHORN CANTLEY LANE SIDEROAD STRATEGY OPTIONS APPRAISAL	APPROVAL DATE REQUIRED				
MAIN DESIGN TEAM	HIGHWAYS	SUPPORT TEAM 1	ENVIRONMENT	SUPPORT TEAM 1	- 1	STRUCTURES
LOCATION	A47/A11 Thickthorn Interchange, Norwich, I	Norfolk		1	MAIN DIS	CIPLINE
1 - 1 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 -				Route	Alignment	and Junctions
	DESIGNERS RISK ASSESSMENT		OPTION		Optio	n 7
HAZARD GROUP	HAZARD	RISK	500 1 TO 100 100 TO 1	, REDUCE, ISOI DL MITIGATION	90 TH OTH	POST-MITIGATION RISK RATING
	Construction of additional structure beneath existing A11 Dual Carriageway.	Disruption to A11 during construction.	Extensive traffi during constructi Anticipated to which will require management phato to install the stru	on. o-down construc e numerous traff ssings during cor	ction fic	HIGH
GENERAL (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	Inadequate weaving length between proposed merge and existing A11/Station Lane diverge junctions.	Side-swipe collisions.	Option has sub requires a depart Provide clear a and signs and cor Consider street	ure from standa nd concise road nsider gantry sign	ard. I markings	HIGH
	Drivers make last minute lane change decisions along the A11 due to its complexity and proximity to existing A11/Station Lane junction.	Side-swipe collisions.	Option has sub- excacerbates this Provide clear a and signs. Consider stree	risk. nd concise road		HIGH
	Low traffic usage potentially results in high speeds on the A11 diverge approach to the roundabout.	Driver overshoots stop/give way markings at junctions.	1. Provide clear a	nd concise road nsider gantry sig		Medium



GD04 RISK ASSESSMENT RESULTS WHERE PREPARED) WORKING AT HEIGHT OR ON SLOPES (INCLUDED GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	Falling from height	to apparatus, electrocution, explosion etc Personal exposure, long term injury, paralysis and fracture	diversions over and above those already considered as part of the scheme. 1. Option will require works at height during construction of underpass structure and cutting earthworks. 2. If working at height cannot be avoided, suitable fall prevention systems/guardrails are to be employed.	HIGH Low
UTILITIES (INCLUDE	Personal safety of walkers, cyclists and horse riders using the underpass beneath existing A47 Dual Carriageway. Buried utilities	Personal safety. Injury, burns, damage	Street lighting and CCTV may be required within the underpass to provide an element of security for walkers, cyclists and horse riders. Option will require additional utility	HIGH
	Despite the new infrastructure crossing the A11, the existing uncontrolled at-grade pedestrian crossing will likely need to be retained due to its convenience.	Motor vehicle collision with pedestrians, cyclists.	Provide grade separated crossing of A11 on Station Lane south/Station Lane north desire line.	HIGH
GENERAL (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	Emergency services response times delayed/response prevented.	Inadequate width/height of existing highway network	1. Option may prevent access to the properties east of the railway bridge due to the 13'6"/4.1m height & 5m width restriction at the bridge and the 7.5t weight restriction at Cantley Lane South/Station Lane junction. 2. Lower the carriageway beneath the bridge or raise the bridge structure. 3. Provide additional road warning signs.	HIGH
	Drivers use local roads to access wider highway network.	Driver overshoots stop/give way markings at junctions.	Provide clear and concise road markings and signs and consider gantry signage. Consider street lighting.	Medium
	Drivers use local roads to access wider highway network.	Inadequate width/height of existing highway network	1. Option is not an attractive route due to the 13'6"/4.1m height & 5m width restriction at Cantley Lane South railway bridge and the 7.5t weight restriction at Cantley Lane South/Station Lane junction. 2. Access to/from Cantley Lane South from Thickthorn Interchange will be removed as part of the scheme. 3. Provide additional road warning signs.	HIGH



	Falling into earthworks, trenches, chambers, ducts.	Injury	1. Option will require deep excavations within cutting slopes, trenches, chambers, ducting and the like. 2. Any earthworks, open trenches, chambers or ducts to be suitably fenced off by the contractor to minimise the probability of occurence.	Low
EXCAVATIONS (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	Unstable ground due to poor ground conditions / high groundwater table.	Injury	Option will require deep excavations within cutting slopes. Ground investigation to be carried out. GI report and drawings to be provided.	HIGH
	Deep cutting to accommodate the underpass (1:3 side slopes up to 11m in height).	Injury	Option generates significant additional excavated material which adds to the surplus of excavated material already generated by the scheme.	HIGH
	Crest of proposed cutting directly adjacent to Network Rail assets and railway.	Side slope stability	Option may require steeper cutting side slope or side slope strengthening/stabilisation or retaining wall may be required to ensure the structural integrity of the side slope adjacent to the railway is acceptable.	Medium
OCCUPATIONAL HEALTH (INCLUDE HEMP WHERE REQUIRED)	Noise	Effect on hearing	Option is within cutting slope and further from a number of residential properties within Cringleford. It is anticipated that traffic noise would decrease as a result.	Low
	Vibration	Effect on local features/property	Option is within cutting slope and further from a number of residential properties within Cringleford. It is anticipated that vibration would decrease as a result.	Low
	Visual	Risk of objection by local residents and requirement of Planning.	Option is within cutting slope which provides an element of visual screening from the surroundings.	Low



TEMPORARY WORKS (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE PREPARED)	Works at height	Injury	1. Option will require deep excavations within cutting slopes, trenches, chambers, ducting and the like. > Any earthworks, open trenches, chambers or ducts to be suitably fenced off by the contractor to minimise the probability of occurence.	Low
CONFINED SPACES (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE PREPARED) WATER (INCLUDE GD04 RISK ASSESSMENT RESULTS WHERE				
PREPARED)	Contaminated land. Possible Contamination resulting from historical landfil	Infection	Ground Investigation required to confirm.	Low
MATERIALS (INCLUDE GD04 RISK ASSESSMENT WHERE PREPARED)	Asbestos	Personal exposure, long term injury, abestos related diseases	1. Ground Investigation required to confirm. 2. GI report and drawings, to be provided. 3. No demolition/dismantling of any structure/furniture unless it has been positively identified by a competent person not to contain asbestos.	Medium
	Removal of tar bound pavement	Personal exposure, long term injury	1. Option may require works within existing pavement that may contain tar. 2. Operatives should not work on an existing pavement unless it has been positively identified as not containing tar materials.	Medium
			OVERALL RATING	HIGH