
Appendix B Option 3 - Risk Assessment

Option 3 Risk Assessment

Ref No	Risk(s)	Mitigation	Comment(s)/Residual Risk
001	Objection from Cringleford Extension Development.	Discuss proposals with Developer and gain agreement to tie in with the development road network.	Objection to Option 3 with potential for compensation.
002	Objection from residents of Cantley Lane due to unsafe WCHR route and 'rat running'.	Discuss proposals with residents and gain agreement to tie in with the development road network.	Objection to Option 3.
003	Objection by a local landowner due to severance of Plot 52A.	Discuss proposals with land owner and gain agreement.	Objection to Option 3.
004	Impacts upon archaeological remains and potential for additional remains to be located.	Geophysical survey to confirm extents of archaeological remains.	Potential impact upon scheduled monument and archaeological remains.
005	Impacts upon a historical 'borrow-pit' for previous highway construction. The pit backfill material is, however, unknown.	Geophysical and Geotechnical survey to confirm extents of borrow pit and remedial works required.	Remedial works required.
006	Cutting adds to earthworks to be disposed of either on or off site.	Confirm if landscape bunds can be provided to reduce disposal off site.	Potential for disposing of earthworks off site.
007	Drainage may require pumped solution due to cutting.	Confirm if a gravity system can be provided to outfall to Intwood Stream adjacent to railway.	Potential for pumped drainage system.
008	Vehicle collisions at low radius bends as a result of high speeds.	Alignment design in accordance with Manual for Streets which is applicable to urban environment 20/30mph speed limits. Requires Local Authority approval for change of speed limit and design standard. Provide clear and concise road markings and signs. Consider installation of street lighting.	Vehicle collisions due to low radii.

Ref No	Risk(s)	Mitigation	Comment(s)/Residual Risk
009	Motor vehicle collision with pedestrians, cyclists and horse riders.	Option 3 provides an opportunity for traffic from a wider area to avoid the Thickthorn Interchange and travel to/from the Station Road/A11 Junction via Cantley Lane. Option 3 is not an attractive route due to the 13'4.0m height & 5m width restriction at Cantley Lane South railway bridge and the 7.5t weight restriction at Cantley Lane South/Station lane junction. Consider street lighting on approach to junctions.	Motor vehicle collision with pedestrians, cyclists.
010	Personal safety of walkers, cyclists and horse riders using the underpass beneath existing A47 Dual Carriageway.	Street lighting and CCTV may be required within the underpass to provide an element of security for walkers, cyclists and horse riders.	Personal safety.
011	Noise impacts.	Option 3 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.	Noise mitigation measures likely required.
012	Visual impacts.	Option 3 is within cutting slope which provides an element of visual screening from the surroundings.	Visual mitigation measures likely required.

Appendix C Option 4 Risk Assessment

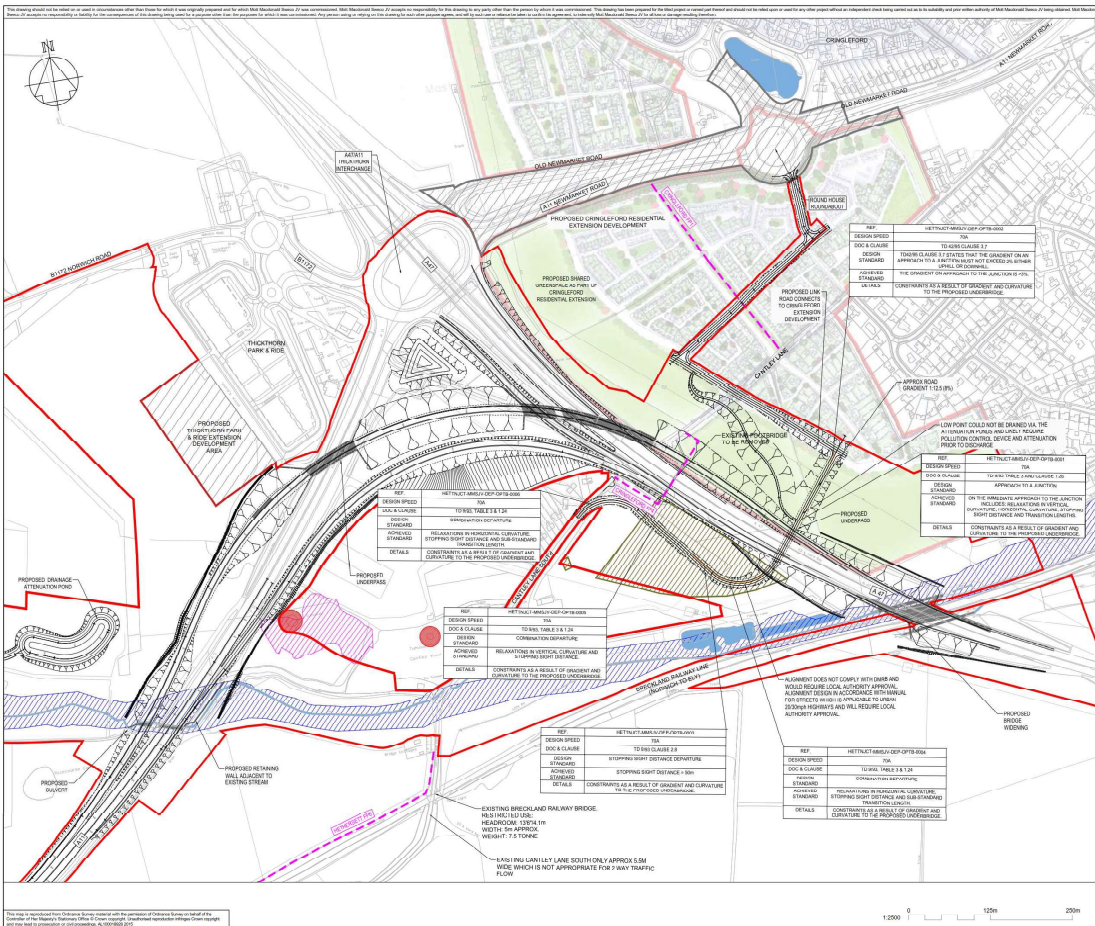
Option 4 Risk Assessment

Ref No	Risk(s)	Mitigation	Comment(s)/Residual Risk
001	Severance of land west of the Park & Ride.	Alter the alignment to reduce severance.	Objection to Option 4 with potential for compensation.
002	Presence of contaminated land, landfill gases and leachate associated with historic landfill.	Ground Investigation to confirm extent of contaminated land.	Potential impact on the historical landfill west of Cantley Lane South. If contaminated ground is present, this will pose a constraint on the route alignment. However, currently there is no site-specific information to confirm this.
003	Impacts upon scheduled monument comprising 2 tumuli, a nationally significant designated asset and buried archaeological remains associated with the asset.	Geophysical survey to confirm extents of archaeological remains.	Potential impact upon scheduled monument and archaeological remains.
004	Impacts upon flood protection zone of Intwood Stream at Cantley Lane South tie in.	Provide additional flood compensatory measures.	Potential for additional land-take.
005	Fill embankment reduces earthworks to be disposed of either on or off site.	Confirm if landscape bunds can be provided to reduce disposal off site.	Potential for disposing of earthworks off site.
006	Impact on Thickthorn Park & Ride Extension development.	Option 4 is outwith the area identified for the future Thickthorn Park & Ride Extension development.	Objection to Option 4 with potential for compensation.
007	Noise impacts.	Option 4 is on an 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.	Noise mitigation measures likely required.
008	Visual impacts.	Option 4 is on an embankment slope albeit further away from the residential properties within Cringleford which will be more prominent in its surroundings.	Visual mitigation measures likely required.

Appendix D Departure from Standards Summaries and Drawings

Summary Tables and Drawings:

Reference Number	Drawing Title
HE551492-MMSJV-HAC-000-DR-CH-00002	Cantley Lane Option 3 - Departure Summary Drawing
HE551492-MMSJV-HGN-000-SH-CH-0002	Cantley Lane Option 3 - Departure from Standards Summary table
HE551492-MMSJV-HAC-000-DR-CH-00001	Cantley Lane Option 4 - Departure Summary Drawing
HE551492-MMSJV-HGN-000-SH-CH-0001	Cantley Lane Option 4 - Departure from Standards Summary table
HE551492-MMSJV-HAC-000-DR-CH-00004	Cantley Lane Option 5 - Departure Summary Drawing
HE551492-MMSJV-HGN-000-SH-CH-0003	Cantley Lane Option 5 - Departure from Standards Summary table
HE551492-MMSJV-HAC-000-DR-CH-00005	Cantley Lane Option 6 - Departure Summary Drawing
HE551492-MMSJV-HGN-000-SH-CH-0004	Cantley Lane Option 6 - Departure from Standards Summary table
HE551492-MMSJV-HAC-000-DR-CH-00003	Cantley Lane Option 7 - Departure Summary Drawing
HE551492-MMSJV-HGN-000-SH-CH-0005	Cantley Lane Option 7 - Departure from Standards Summary table



Notes

1. ALL DIMENSIONS ARE GIVEN IN METERS UNLESS OTHERWISE STATED AND ARE SUBJECT TO CORRECTION BY TOPOGRAPHICAL SURVEY OR SIMILAR.
2. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE STATED.
3. FOR THE FULL SET OF DRAWINGS IS AVAILABLE BEFORE THE DESIGN REVIEW MEETING HE051492 MMS AV GEN 000 SH 22 0003

Key to symbols

- ENVIRONMENTAL AGENCY FLOOD ZONE 1
- SCHEDULED MONUMENT
- CONTAMINATED LAND
- EXISTING FOOTPATH
- WATER BODY
- AREA OF HISTORICAL GRAVEL PIT
- HEIGHTS IMPROVEMENTS TO BE UNDERTAKEN AS PART OF THE ROADWORKS INCLUDING DRAINAGE DEVELOPMENTS
- ROADWORKS AND INFRASTRUCTURE FROM ENVIRONMENTAL SCOPING REPORT
- EXTENT OF DONATION

REV	DATE	FOR REVIEW & COMMENT	BY	SL	APP'D
1	20/04/18	FOR REVIEW & COMMENT			
2		Amendment Details			

Mott MacDonald Sweco

FOR REVIEW & COMMENT Details S3

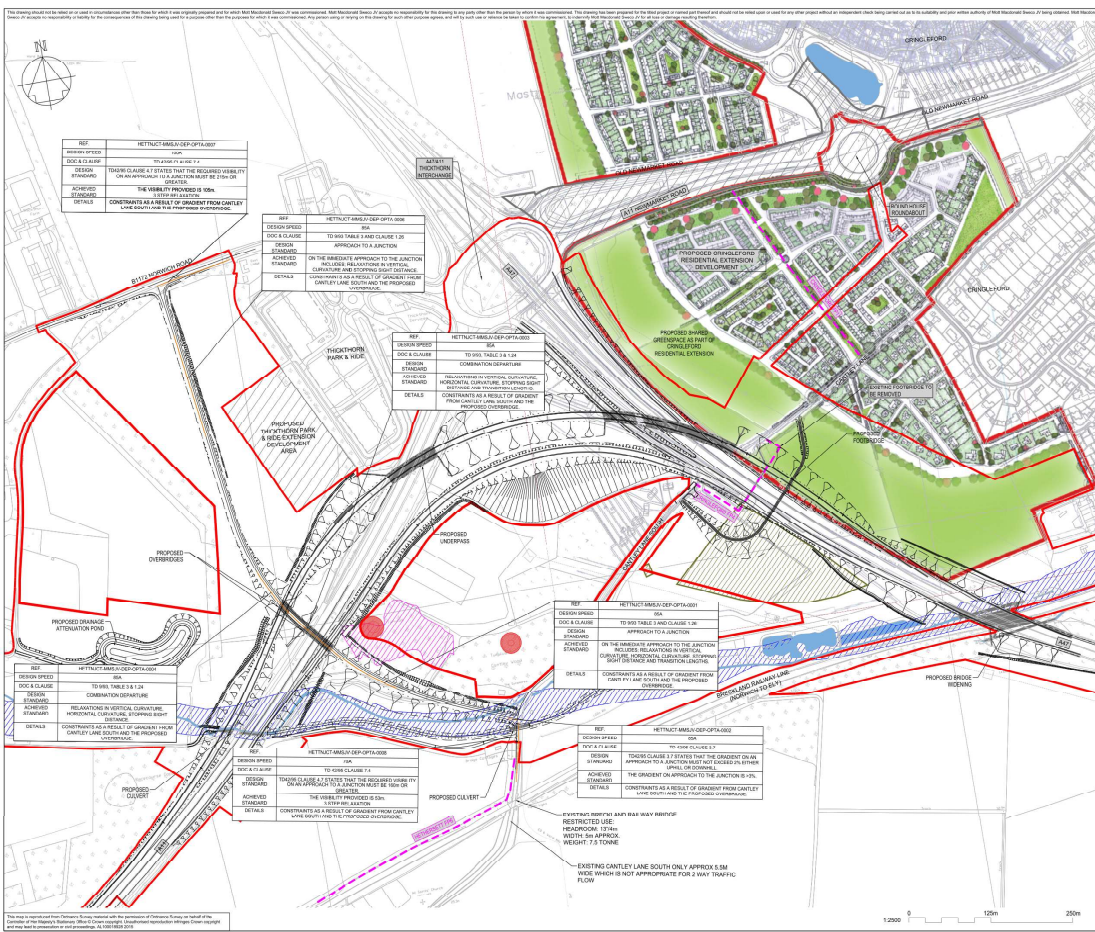
Project No: A47/A11 THICKTHORN JUNCTION

Contract No: CANTLEY LAKE OPTION 3 DEPARTURES SUMMARY

Sheet	Design No	Design Title	Design Stage	Design Date	Design By	Design Check	Design Appr
HE051492 - MMS AV - HAC -	000	DR - CH -		00002			
							HE051492
							P01

Scheme Title: A47 Thickthorn Junction with A11
HE551492-MMSJV-HGN-000-SH-CH-0002
Departures and Relaxations expected for Option 3

Departure/Relaxation	Reference	Discipline	Standard	Location	Design Speed	Traffic (AADT)	Chainage Start	Chainage End	Standard Required	Description - Standard Provided	Comments
Departure	HETTINCT-MMSJV-DEP-OPTB-0001	Geometry	TD 9/93, Table 3 & Cl 1.26	Cantley Lane Option 3	70A	120	30	210	TD 9/93 Clause 1.26 states that relaxations in Stopping Sight Distance (SSD=120m) and vertical curvature for crest curves (K=30) and absolute minimum for sag curves (K=20) are not permitted on the immediate approaches to junctions.	Within the immediate approach to the junction the design includes: 1. 2 step relaxation in vertical sag curve (K=9) 2. 2 step relaxation in vertical crest curve (K=10) 3. 3 step relaxation in horizontal curvature (R=64m) 4. maximum of 2 step relaxation in stopping sight distance (SSD=70m) 5. Sub-standard transition lengths on approach/exit from the horizontal curve.	Design speed is based on TD 9/93, adjoining existing unaltered and new route to assess a 2km minimum length. The layout constraint Le has been increased by 5gph because the narrow nature of the existing carriageway is out with the TD9/93 assessment. Design speed has been reduced by 1 step from that calculated for a 2km free flow road. Confirm reduction in design speed with stake holders. Design speed in this location is not likely to be achieved as approach to the junction is steep. (>6 %) Typical mitigation is advance signage.
Departure	HETTINCT-MMSJV-DEP-OPTB-0002	Geometry	TD 42/95 Cl 3.7	Cantley Lane Option 3	70A	120	30	45	TD42/95 Clause 3.7 states that the gradient on an approach to a junction must not exceed 2% either uphill or downhill.	The gradient on approach to the junction is 4%.	The gradient chosen alleviates the vertical alignment and allows access below the existing A47. To remove this departure earthworks would increase considerably and likely to increase the reduced level of connection with the tie-in to the proposed development street.
Departure	HETTINCT-MMSJV-DEP-OPTB-0003	Geometry	TD 9/93 Table 3 and Cl 2.8	Cantley Lane Option 3	70A	120	375	245	TD9/93 Table 3 states that the desirable minimum stopping sight distance should = 120m for a Design Speed of 70kph. Clause 2.8 permits a 2-step relaxation (70m)	A 3 Step relaxation in the stopping sight distance is provided. (SSD=50m)	Departure occurs near the bottom of a steep gradient (8 %). Typical mitigation is to provide curve widening (provided), signage, edge markings and high friction surfacing.
Departure	HETTINCT-MMSJV-DEP-OPTB-0004	Geometry	TD 9/93 Cl 1.24	Cantley Lane Option 3	70A	120	210	330	TD9/93 Clause 1.24 States that only a combination of relaxations of up to 1 design step below desirable minimum for SSD (90m) and horizontal curvature (255mR) are permitted, all other combinations of relaxations are NOT permitted and shall be treated as Departures.	A 3 Step relaxation in the SSD and a 3 step relaxation in horizontal curvature is provided. Horizontal curve provided is R=64m. SSD provided is 50m.	Curve widening around sub-standard bend. Typical mitigation is to provide curve widening (provided), signage, edge markings and high friction surfacing.
Departure	HETTINCT-MMSJV-DEP-OPTB-0005	Geometry	TD 9/93 Cl 1.24	Cantley Lane Option 3	70A	120	410	480	TD9/93 Clause 1.24 States that only a combination of relaxations of up to 1 design step below desirable minimum for SSD (120m) and horizontal curvature (360mR) are permitted, all other combinations of relaxations are NOT permitted and shall be treated as Departures.	A 2 step relaxation in the SSD and a 2 step relaxation in vertical curvature is provided. Crest curve provided is K=12. SSD provided is 70m.	SSD may be increased depending on available verge widening. To remove this departure is to increase the K with subsequent increase in earthworks which would affect the existing borrow pit. Typical mitigation is to provide signage and edge markings.
Departure	HETTINCT-MMSJV-DEP-OPTB-0006	Geometry	TD 9/93 Cl 1.24	Cantley Lane Option 3	70A	120	480	587	TD9/93 Clause 1.24 States that only a combination of relaxations of up to 1 design step below desirable minimum for SSD (120m) and horizontal curvature (360mR) are permitted, all other combinations of relaxations are NOT permitted and shall be treated as Departures.	A 3 step relaxation in the SSD, a 2 step relaxation in vertical curvature a 3 step relaxation in horizontal curvature. Horizontal curve provided is R=64m. SSD provided is 50m. Vertical curve provided is K=12. Sub-standard transition lengths on approach/exit from the horizontal curve.	Curve widening around sub-standard bend. SSD may be increased depending on available verge widening. Typical mitigation is to provide curve widening (provided), signage, edge markings and high friction surfacing.
Departure	HETTINCT-MMSJV-DEP-OPTB-0007	Geometry	TD 9/93 Table 3 and Cl 2.8	Cantley Lane Option 3	70A	120	530	587	TD9/93 Table 3 states that the desirable minimum stopping sight distance should = 120m for a Design Speed of 70kph. Clause 2.8 permits a 2 step relaxation (70m)	A 3 step relaxation in the stopping sight distance is provided. (SSD=50m)	Departure occurs through horizontal curvature. Typical mitigation is to provide curve widening (provided), verge widening (not provided), signage, edge markings and high friction surfacing.
Departure	HETTINCT-MMSJV-REL-OPTB-0001	Geometry	TD 9/93 Cl 4.1	Cantley Lane Option 3	70A	120	85	145	TD9/93 Clause 4.1 states that the gradient on a single carriageway must not exceed 6%.	The gradient over this extent = 8%.	



Notes

1. ALL DIMENSIONS ARE BASED ON ORDNANCE SURVEY AND ARE SUBJECT TO CORRECTION BY TOPOGRAFICAL SURVEY OR SAILER.
2. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE STATED.
3. FOR DETAILS OF STANDARDS SUMMARY REFER TO DESIGN NATIONAL SPECIFICATION HES51492-GEN-000-SH-ZZ-0003

Key to Symbols

- ENVIRONMENTAL AGENCY FLOOD ZONE 3
- SCHEDULED MONUMENT
- CONTAMINATED LAND
- EXISTING FOOTPATH
- WATER BODY
- AREA OF HISTORICAL GRAVEL PIT
- HIGHWAY AMENDMENTS TO BE UNDERTAKEN AS PART OF THE CANTLELANE RESIDENTIAL EXTENSION DEVELOPMENT
- DOO BOUNDARY AS SUBMITTED WITHIN ENVIRONMENTAL SCOPING REPORT
- EXTENT OF DEPARTURE

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Mott MacDonald Sweco

highways england

FOR REVIEW & COMMENT Submittal: S3

Project No: A47/A11 THICKTHORN JUNCTION

Client Title: CANTLELANE OPTION 4 DEPARTURES SUMMARY

Issue	Number	Assigned	By	Assigned	Checked	By	Assigned
Original	001	05/04/16	05/04/16	05/04/16	05/04/16	05/04/16	05/04/16
Design	000	DR	CH	00001	00001	00001	00001

Project No: HES51492
Revision: P01

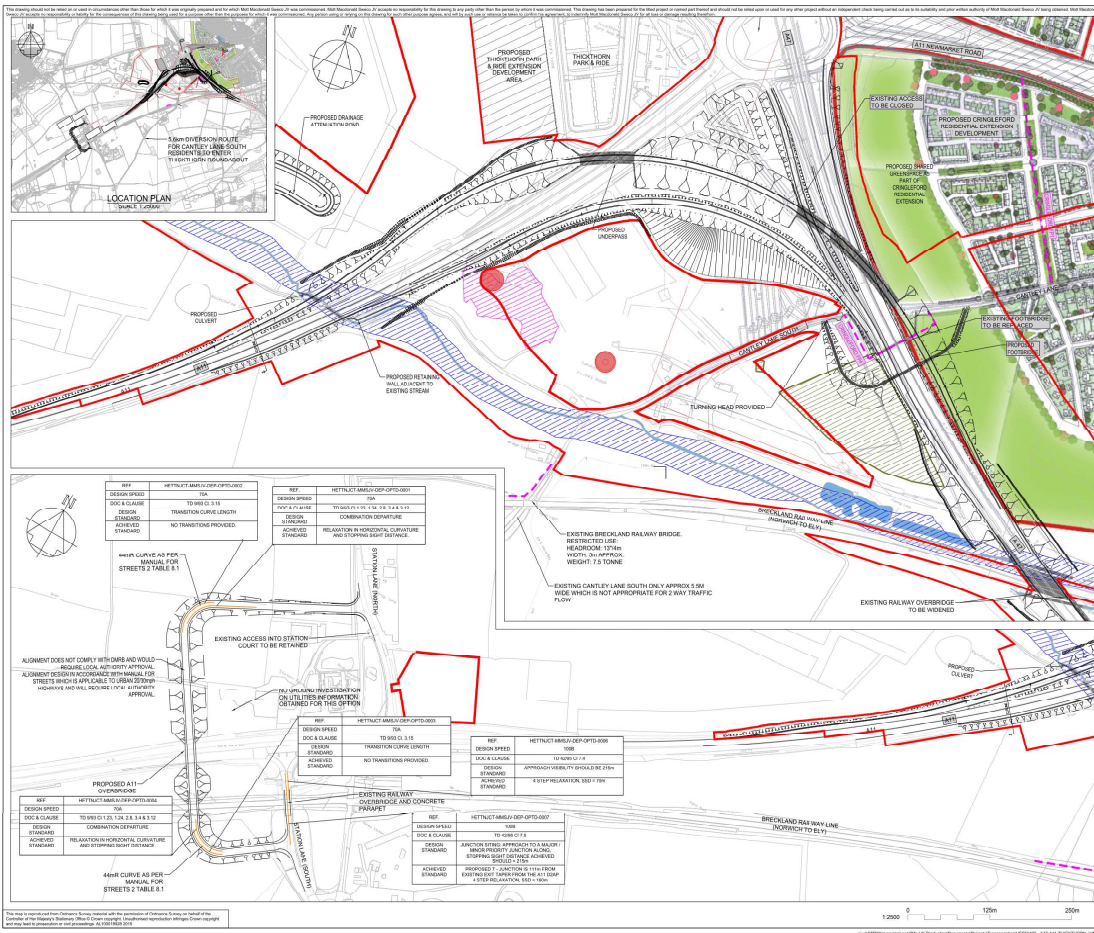
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Project: A47/A11 THICKTHORN JUNCTION Highway Approval & Consent Details & Details - 20/04/2016 10:00:00 AM

Scheme Title: A47 Thickthorn Junction with A11
HE551492-MMSJV-HGN-000-SH-CH-0001
Departures and Relaxations expected for Option 4

Departure/Relaxation	Reference	Discipline	Standard	Location	Design Speed	Traffic (AADT)	Chainage Start	Chainage End	Standard Required	Description - Standard Provided	Comments
Departure	HETT/UCT-MMSJV-DEP-OPTA-0001	Geometry	TD 9/93, Table 3 & Cl 1.26	New Link Road	1000	85A	205	258	TD 9/93 Clause 1.26 states that relaxations in desirable stopping sight distance (160m) and vertical curvature for crest curves (K=55) and below absolute minimum for sag curves (K=20) are not permitted on the immediate approaches to junctions.	Within the immediate approach to the junction the design includes: 2 step relaxation in vertical crest curve (K=23.5) Maximum of 2 step relaxation in stopping sight distance (SSD=90m).	Design speed is based on TD 9/93; however the Link Road is below the minimum 2kilometre length. Therefore the layout constraint Lc has been increased by 8-10kph and Design speed has been reduced by 1 step from that calculated for a 2km free flow road. Confirm reduction in design speed with stake holders Minimum SSD calculated. (SSD improves on approach to the give - way line and SSD is obtained to the give - way line). 6 % gradient over 100m in length on approach to junction. Typical mitigation is signage (max. speed etc) and high friction surfacing.
Departure	HETT/UCT-MMSJV-DEP-OPTA-0002	Geometry	TD 42/95 Cl 3.7	New Link Road	1000	85A	18	33	TD42/95 Clause 3.7 states that the gradient on an approach to a junction must not exceed 2% either uphill or downhill.	The dwell area gradient on approach to the junction is >3%.	6 % gradient over 100m in length on approach to junction. Typical mitigation is signage and high friction surfacing.
Departure	HETT/UCT-MMSJV-DEP-OPTA-0003	Geometry	TD 9/93 Table 3 & Cl 1.24	New Link Road (Southbound)	1000	85A	258	400	TD9/93 Clause 1.24 states that only a combination of relaxations of up to 1 design step below desirable minimum for SSD (120m) and horizontal curvature (360mR) are permitted, all other combinations of relaxations are not permitted and shall be treated as departures.	A 2 step relaxation in vertical crest curve (K=23.5) 1 step relaxation in vertical crest curve (K=30) Maximum of 2 step relaxation in stopping sight distance (SSD=90m).	The combination is through the summit of the crest curve where gradients are small. Typical mitigation is signage (max. speed etc) and additional road markings.
Departure	HETT/UCT-MMSJV-DEP-OPTA-0004	Geometry	TD 9/93 Cl 1.26a	New Link Road (Southbound)	1000	85A	400	490	TD9/93 Clause 1.24 states that only a combination of relaxations of up to 1 design step below desirable minimum for SSD (120m) and horizontal curvature (360mR) are permitted, all other combinations of relaxations are not permitted and shall be treated as departures.	A 1 step relaxation in vertical crest curve (K=30), a maximum of 1 step relaxation in stopping sight distance (SSD=120m).	Minimum SSD calculated. The combination is through a crest curve where the maximum gradient is 4 %. Typical mitigation is signage and additional road markings.
Departure	HETT/UCT-MMSJV-DEP-OPTA-0006	Geometry	TD 9/93, Table 3 & Cl 1.26	New Link Road	1000	85A	712	875	TD 9/93 Clause 1.26 states that relaxations in stopping sight distance (160m) and vertical curvature for crest curves (K=55) and absolute minimum for sag curves (K=20) are not permitted on the immediate approaches to junctions.	On the immediate approach to the junction includes; 1 step relaxation in vertical crest curve (K=35) and a maximum of 1 step relaxation in stopping sight distance (SSD=120m).	Minimum SSD calculated. (SSD improves towards the give - way line and is fully compliant within 1.0 x SSD from give way line). Typical mitigation is approach signage.
Departure	HETT/UCT-MMSJV-DEP-OPTA-0007	Geometry	TD 42/95 Cl 7.4.	T - Junction with Norwich Road (looking east)	1000	100A			Approach visibility to be desirable minimum SSD ("Y" dimension = 215m)	3 step relaxation (105m)	Existing established trees and foliage out with verge constrict visibility. Mainline speeds may be lower than design speed as traffic is leaving a roundabout. 2.4m relaxation provides a 2 step departure (145m). Typical mitigation is approach signage and high friction surfacing.
Departure	HETT/UCT-MMSJV-DEP-OPTA-0008	Geometry	TD 42/95 Cl 7.4.	T - Junction with Cantley Lane (looking west)	1000	70A			Approach visibility to be desirable minimum SSD ("Y" dimension = 120m)	3 step relaxation (53m)	Property boundary restricts visibility. Speeds may be lower than design speed as traffic is approaching through narrow bridge abutments immediately following a tight bend. 2.4m relaxation provides a 2 step departure (78m). Typical mitigation is approach & STOP signage.
Relaxation	HETT/UCT-MMSJV-REL-OPTA-0001	Geometry	TD 42/95 Cl 7.6c & 7.8	T - Junction with Norwich Road	1000	100A			"x" distance to be 9.0m	"x" distance = 4.5m for lightly trafficked junction.	
Relaxation	HETT/UCT-MMSJV-REL-OPTA-0002	Geometry	TD 42/95 Cl 7.6c & 7.8	T - Junction with Cantley Lane	1000	70A			"x" distance to be 9.0m	"x" distance = 4.5m for lightly trafficked junction.	
Relaxation	HETT/UCT-MMSJV-REL-OPTA-0003	Geometry	TD 9/93 Cl 2.8	New Link Road (Southbound)	1000	70A	490	600	TD 9/93 Clause 2.8 states that up to 2 design speed step relaxations below the Desirable Minimum for Stopping Sight Distance is permitted.	A maximum of 2 step relaxation in stopping sight distance (SSD=90m).	



Notes

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2. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE STATED.
3. FOR DETAILS OF DEPARTURES SUMMARY REFER TO DESIGN RATIONALE HESS1492/MSJ/GEN-000-SH-ZZ-0003

Key to Symbols

- ENVIRONMENTAL AGENCY FLOOD ZONE 1
- SCHEDULED MONUMENT
- CONTAMINATED LAND
- EXISTING FOOTPATH
- WATER BODY
- AREA OF HISTORICAL GRAVEL PIT
- HIGHWAY APPROXIMATIONS TO BE UNDERTAKEN AS PART OF THE CHANGELANE/RESIDENTIAL EXTENSION DEVELOPMENT
- DOG BOUNDARY AS SUBMITTED WITHIN DEVELOPMENTAL SCHEME REPORT
- EXTENT OF DEPARTURE

REV	DATE	FOR REVIEW & COMMENT	BY	DL	APP'D
1	2024-10	FOR REVIEW & COMMENT			
Rev	Date	Amendment Details	Drawn	CHK'd	App'd

Mott MacDonald Sweco

FOR REVIEW & COMMENT S3

Project No: **A47/A11 THICKTHORN JUNCTION**

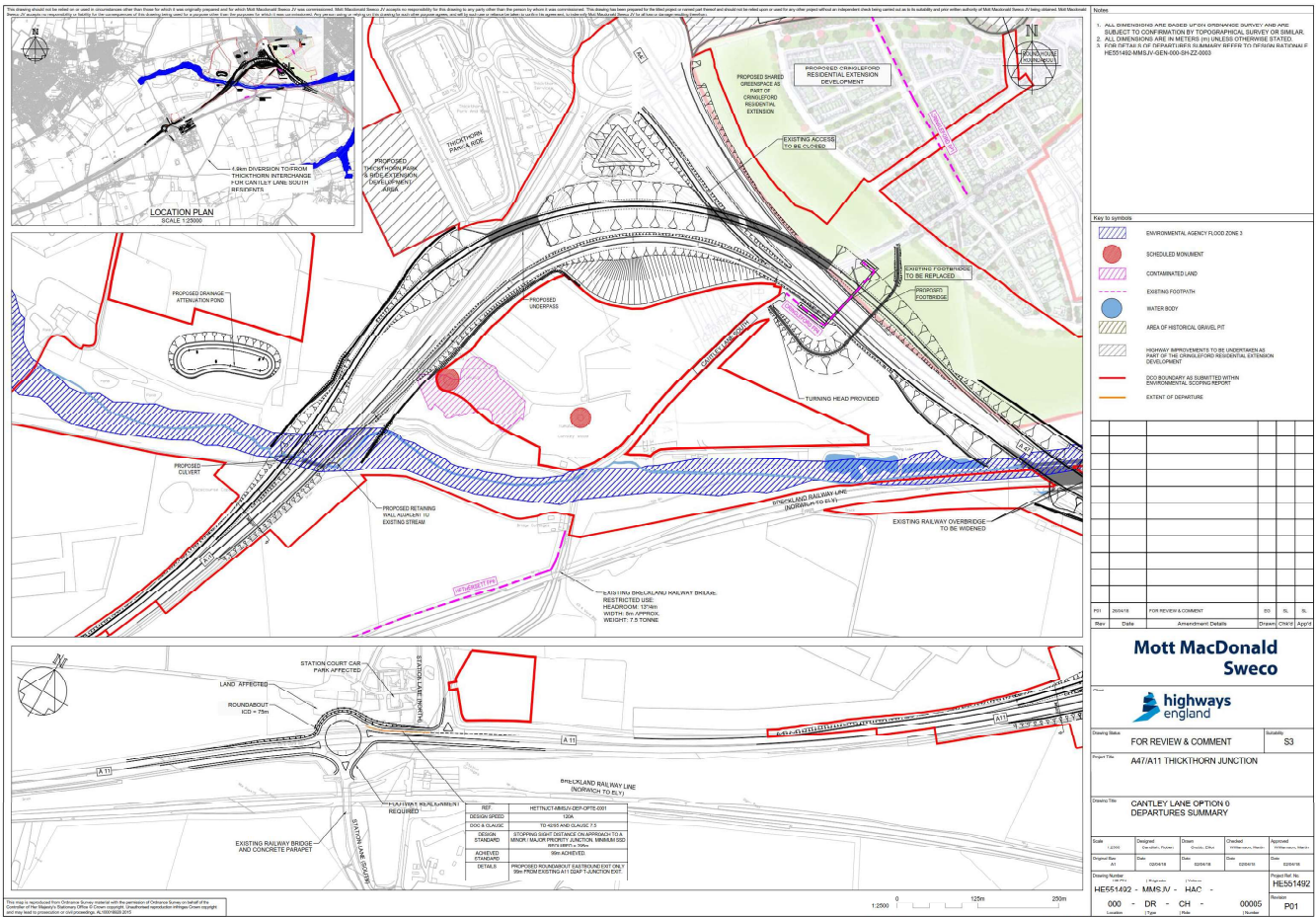
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Scale	Author	Checked	Approved
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Design: HESS1492	MSJ/IV	H&C	
Issue: 000	DR	CH	
Number:		00004	
Revision:			P01

Project No: HESS1492
Drawing Title: DEPARTURES SUMMARY
Revision: P01

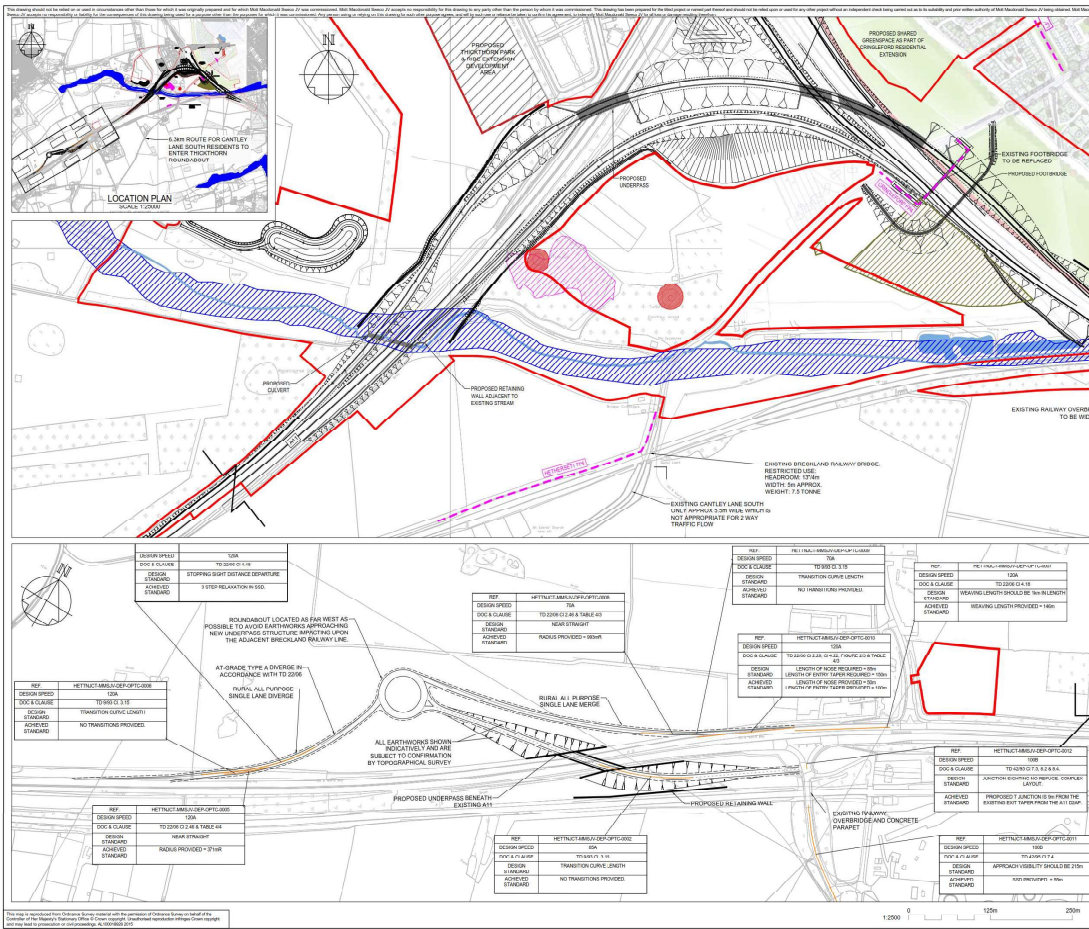
Scheme Title: A47 Thickthorn Junction with A11
HE551492-MMSJV-HGN-000-SH-CH-0003
Departures and Relaxations expected for Option 5

Departure/Relaxation	Reference	Discipline	Standard	Location	Design Speed	Traffic (AADT)	Chainage Start	Chainage End	Standard Required	Description - Standard Provided	Comments
Departure	HETTINCT-MMSJV-DEP-OPTC-0002	Geometry	TD 9/93 Cl 3.15	Link Road	85A	1000	267	420	Transition curves to be provided on curves the radius of which are less than that shown in TD9 Table 3, Minimum R without elimination of adverse camber and transitions.	No transitions provided. 360mR curve requires 60m length of transition (q=0.6 m/s ²)	The link is national speed limit and is a just over half of a kilometre long. (The addition of transition curves is likely to increase skew and span of the proposed A11 bridge over. Structure is already significantly skewed). Minimum SSD calculated. The extent of the mainline SSD (295m) encapsulates slip road give way line. Give way line should be seen for full length of slip road.
Departure	HETTINCT-MMSJV-DEP-OPTC-0004	Geometry	TD 22/06 Cl 4.18	Diverge Slip Road back of nose	120A	(500)	50	230	Maintain mainline SSD up to back of nose. SSD = 295m	3 step reduction in the SSD. Minimum SSD provided is 150m.	For compliance verge widening to be 25m at maximum width with subsequent significant increase in earthworks.
Departure	HETTINCT-MMSJV-DEP-OPTC-0005	Geometry	TD 22/06 Cl 2.46 Tbl 4/4	Diverge Slip Road back of nose	120A	(500)	70	140	Length of near straight to be equal in length to the nose length for the road class (70m & 1020mR min.)	Radius provided = 371mR max.	No transitions provided for tight horizontal curvature. Nose taper is 1 in 9.6. (Minimum is 1 in 15). Providing appropriate transition will alter footprint and likely alter position of the junction further west.
Departure	HETTINCT-MMSJV-DEP-OPTC-0006	Geometry	TD 9/93 Cl 3.15	Diverge Slip Road back of nose	120A	(500)	70		Transitions curves to be designed to higher design speed.	No transition provided. 371mR curve requires 94m length of transition (24R) ^{1/2}	Nose taper is 1 in 9.6. (Minimum is 1 in 15). Providing appropriate transition will alter footprint and likely alter position of the junction further west.
Departure	HETTINCT-MMSJV-DEP-OPTC-0007	Geometry	TD 22/06 Cl 4.36 Cl 4.38	Merge Slip Road to next junction (east)	120A	(500)			Desirable minimum weaving length to be 1km.	Weaving length provided = 146m.	Downstream junction is non-compliant - no diverge taper provided which will cause leaving traffic to slow down in the vicinity of the sub-standard merge provided upstream. Conflict between slowing and accelerating traffic. To mitigate this departure is to find another location for the access.
Departure	HETTINCT-MMSJV-DEP-OPTC-0008	Geometry	TD 22/06 Cl 2.34 Tbl 4/3	Merge Slip Road back of nose	70A	(500)	340	425	Length of near straight to be equal in length to the nose length for the road class (85m & 1020mR min.)	Radius provided = 993mR	No transitions provided (for 70kph)
Departure	HETTINCT-MMSJV-DEP-OPTC-0009	Geometry	TD 9/93 Cl 3.15	Merge Slip Road back of nose	70A	(500)	425		Transition curves to be provided on curves the radius of which are less than that shown in TD9 Table 3, Minimum R (1020mR) without elimination of adverse camber and transitions.	No transitions provided. 993mR curve requires 25m length of transition.	Provide appropriate transition will alter footprint and likely alter position of the junction further west. (slight affect)
Departure	HETTINCT-MMSJV-DEP-OPTC-0010	Geometry	TD 22/06 Cl 2.29 Cl 4.22 Fig 2/3 Tbl 4/3	Merge Slip Road nose & taper	120A	(500)			Rural All-Purpose Length of nose - 85m Length of entry taper - 150m	Urban Road Speed limit 50mph max. Length of nose - 50m Length of entry taper - 100m	TD 9/93 Cl 5.19 indicates that unusual exit tapers reduce safety as does siting. To provide standard layout would require re-position of the junction.
Departure	HETTINCT-MMSJV-DEP-OPTC-0011	Geometry	TD 42/95 Cl 7.4.	Existing Station Lane (looking south)	100B				Approach visibility to be desirable minimum SSD ("y" ("y" dimension = 215m)	5 step relaxation (55m)	Crest of existing railway bridge restricts visibility. Typical mitigation is approach signage and high friction surfacing.
Departure	HETTINCT-MMSJV-DEP-OPTC-0012	Junction Siting	TD 42/95 Cl 7.5, 8.2 & 8.4.	T - Junction with Station Lane (South)	100B				Drivers approaching a major/minor priority junction along the major road approaches shall be able to see the minor road entry from a distance corresponding to the Desirable Minimum Stopping Sight Distance (SSD) for the design speed of the major road. (215m spacing) Balance between safety and efficiency "driveability" objective in design.	Proposed T junction is 9m from the existing exit taper from the A11 DZAP. No right turning refuge area into new T-junction. Junction arrangement is not readily understood - too little space between separate traffic movements.	Speeds will be lower than link design speed because of junction location and visibility constraints. There is no space to provide an advance direction sign although this may not be desirable if the new route is to be a link to Cantley Lane only - not required. Traffic leaving the A11 DZAP will be in conflict with right turning traffic waiting within the left turn channelising island. Traffic leaving the A11 will not expect traffic to be stationary within the channelising island. High likelihood of rear end collisions.
Relaxation	HETTINCT-MMSJV-REL-OPTC-0001	Geometry	TD 9/93 Cl 3.4	Link Road	85A	1000	267	420	3 step horizontal curve	360mR - 1 step horizontal curve	Transition curves are required
Relaxation	HETTINCT-MMSJV-REL-OPTC-0002	Geometry	TD 9/93 Cl 2.8	Link Road (Eastbound)	85A	1000	160	267	2 step SSD	120m - 1 step SSD reduction	Minimum SSD calculated.
Relaxation	HETTINCT-MMSJV-REL-OPTC-0003	Geometry	TD 9/93 Cl 2.8	Link Road (Westbound)	85A	1000	540	420	2 step SSD	151m - 1 step SSD reduction	Minimum SSD calculated.
Relaxation	HETTINCT-MMSJV-REL-OPTC-0004	Geometry	TD 42/95 Cl 7.6 & 7.8.	Link Road	85A	1000			"x" distance to be 9.0m	"x" distance = 4.5m for lightly trafficked junction.	



Scheme Title: A47 Thickthorn Junction with A11
HE551492-MMSJV-HGN-000-SH-CH-0004
Departures and Relaxations expected for Option 6

Departure/Relaxation	Reference	Discipline	Standard	Location	Design Speed	Traffic (AADT)	Chainage Start	Chainage End	Standard Required	Description - Standard Provided	Comments
Departure	HETT/ICT-MMSJV-DEP-OPTD-0001	Geometry	TD 9/93 Cl 1.23, 1.24, 2.8, 3.4 & 3.12	Link Road	70A	160	605	480	TD9/93 Clause 1.24 States that only a combination of relaxations of up to 1 design step below desirable minimum for SSD (90m) and horizontal curvature (255mR) are permitted, all other combinations of relaxations are NOT permitted and shall be treated as Departures.	2 step relaxation (extended over VRS) in the SSD and a 6+ step relaxation in horizontal curvature has been provided. Minimum SSD provided is 70m. Horizontal curve provided is 40mR.	Design speed for link road is based on TD 9/93 but link road is below 2km minimum length. Opportunity that design speed can be reduced with stakeholder's involvement with subsequent reduction of relaxations and departures. Southbound direction only - northbound is not as onerous. SSD is based on visibility in front of a Vehicle Restraint System (VRS) which is likely to be present. 2 step relaxation (departure) SSD is provided above a VRS. 1 step relaxation may be available but would require additional land take to ensure the sightline is within the highway estate. Road layout is based on a compact connector road standard or low speed urban road 20/30mph speed limits. The link is national speed limit and is a just over 3/4 of a kilometre long which moves it out of compact connector road requirements.
Departure	HETT/ICT-MMSJV-DEP-OPTD-0002	Geometry	TD 9/93 Cl 3.15	Link Road	70A	160	468	535	Transition curves to be provided on curves the radius of which are less than that shown in TD9 Table 3, Minimum R without elimination of adverse camber and transitions.	No transitions provided.	Road layout is based on a compact connector road standard or low speed urban road 20/30mph speed limits. The link is national speed limit and is a just over 3/4 of a kilometre long which moves it out of compact connector road requirements.
Departure	HETT/ICT-MMSJV-DEP-OPTD-0003	Geometry	TD 9/93 Cl 3.15	Link Road	70A	160	101	175	Transition curves to be provided on curves the radius of which are less than that shown in TD9 Table 3, Minimum R without elimination of adverse camber and transitions.	No transitions provided.	Road layout is based on a compact connector road standard or low speed urban road 20/30mph speed limits. The link is national speed limit and is a just over 3/4 of a kilometre long which moves it out of compact connector road requirements.
Departure	HETT/ICT-MMSJV-DEP-OPTD-0004	Geometry	TD 9/93 Cl 1.23, 1.24, 1.25, 2.8, 3.4 & 3.12.	Link Road	70A	160	180	101	TD9/93 Clause 1.24 States that only a combination of relaxations of up to 1 design step below desirable minimum for SSD (90m) and horizontal curvature (255mR) are permitted, all other combinations of relaxations are NOT permitted and shall be treated as Departures. TD9/93 Clause 1.26 states that relaxations below desirable minimum in SSD (120m) are NOT permitted on the immediate approach to junctions.	Within the approach to a junction, 2 step relaxation (extended over VRS) in the SSD and a 6+ step relaxation in horizontal curvature has been provided. Minimum SSD provided is 70m. Horizontal curve provided is 40mR.	Southbound direction only - northbound is not on an approach to a junction. SSD is based on visibility in front of a VRS which is likely to be present. 2 step relaxation (departure) SSD is provided above a VRS. 1 step relaxation may be available but would require additional land take to ensure the sightline is within the highway estate. Road layout is based on a compact connector road standard or low speed urban road 20/30mph speed limits. The link is national speed limit and is a just over 3/4 of a kilometre long which moves it out of compact connector road requirements.
Departure	HETT/ICT-MMSJV-DEP-OPTD-0006	Geometry	TD 42/95 Cl 7.4.	T- Junction with Station Lane (South -looking south)	100B				Approach visibility to be desirable minimum SSD (215m)	1 step relaxation (160m)	To achieve the 160m visibility will require extensive verge clearance.
Departure	HETT/ICT-MMSJV-DEP-OPTD-0007	Geometry	TD 42/95 Cl 7.4.	T- Junction with Station Lane (South -looking north)	100B				Approach visibility to be desirable minimum SSD (120m to start of road)	4 step relaxation (70m)	Crest of existing railway bridge restricts visibility.
Departure	HETT/ICT-MMSJV-DEP-OPTD-0008	Junction Siting	TD 42/95 Cl 7.5.	T- Junction with Station Lane (South)	100B				Drivers approaching a major/minor priority junction along the major road approaches shall be able to see the minor road entry from a distance corresponding to the Desirable Minimum Stopping Sight Distance (SSD) for the design speed of the major road. (215m spacing)	Proposed T junction is 111m from the existing exit taper from the A11 D24P. 4 step relaxation in SSD (70m)	Crest of existing railway bridge restricts visibility. Speeds will be lower than link design speed because of junction location and visibility constraints. There should be space to provide an advance direction sign although this may not be desirable if the new route is to be a link to Cantley Lane only. Available signage space constrained by existing rail bridge.
Relaxation	HETT/ICT-MMSJV-REL-OPTD-0001	Geometry	TD 42/95 Cl 7.6c & 7.8.	Link Road (South)	70A	160			"x" distance to be 9.0m	"x" distance = 4.5m for lightly trafficked junction.	
Relaxation	HETT/ICT-MMSJV-REL-OPTD-0002	Geometry	TD 42/95 Cl 7.6c & 7.8.	Link Road (North)	70A	160			"x" distance to be 9.0m	"x" distance = 4.5m for lightly trafficked junction.	



NOTE

1. ALL DIMENSIONS ARE GIVEN UNLESS OTHERWISE SPECIFIED AND ARE SUBJECT TO CONFIRMATION BY TOPOGRAPHICAL SURVEY OR SIMILAR.
2. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE STATED.
3. FOR 10% TYPICAL SLOPES TO BE SHOWN BEFORE THE PROPOSED NATIONAL HE051402 MMS/A1-GEN-000-SH-ZZ-0003

KEY TO SYMBOLS

- ENVIRONMENTAL AGENCY FLOOD ZONE 1
- SCHEDULED MONUMENT
- CONTAMINATED LAND
- EXISTING FOOTPATH
- WATER BODY
- AREA OF HISTORICAL GRAVEL PIT
- PROPOSED IMPROVEMENTS TO BE UNDERTAKEN AS PART OF THE OVERPASS/UNDERPASS EXTENSION DEVELOPMENT
- PROPOSED UNDERPASS AS SHOWN IN ENVIRONMENTAL SCOPING REPORT
- EXTENT OF DEVELOPMENT

REV	DATE	FOR REVIEW & COMMENT	BY	DL	APP'D
1/11	2014/8	FOR REVIEW & COMMENT			
Rev	Date	Amendment Details	Drawn	CHK'd	App'd

Mott MacDonald Sweco

FOR REVIEW & COMMENT

Sheet No: S3

Project Title: A47/A11 THICKTHORN JUNCTION

Drawing Title: CANTLEY LANE OPTION 7 DEPARTURES SUMMARY

Scale	Author	Checked	Drawn	Approved
1:2500	DR	CH		

HE051402 - MMS/A1 - HAC - 00003

HE051402 - MMS/A1 - HAC - 00003

HE051402 - MMS/A1 - HAC - 00003

HE051402 - MMS/A1 - HAC - 00003

Scheme Title: A47 Thickthorn Junction with A11
HE551492-MMSJV-HGN-000-SH-CH-00005
Departures and Relaxations expected for Option 7

Scheme	Departure / Relaxation	Reference	Discipline	Standard	Location	Design Speed	Traffic (AADT)	Chainage Start	Chainage End	Standard Required	Description - Standard Provided	Comments
A47 THICKTHORN JUNCTION WITH A11	Departure	HETT/NCT-MMSJV-DEP-OPTC-0001	Junction Siting	TD 42/95 Cl 7.5.	Roundabout location with existing Station Lane T-Junction.	120A				Drivers approaching a major/minor priority junction along the major road approaches shall be able to see the minor road entry from a distance corresponding to the Desirable Minimum Stopping Sight Distance (SSD) for the design speed of the major road. (295m spacing)	Proposed roundabout eastbound exit is 99m from the existing A11 D2AP T-Junction exit. 4 step relaxation in SSD (99m)	Speeds will be lower than link design speed because approaching traffic require to negotiate the roundabout geometry. There should be space to provide an advance direction sign to the existing junction.
A47 THICKTHORN JUNCTION WITH A11	Departure	HETT/NCT-MMSJV-DEP-OPTC-0002	Alignment	TD 9/93 Cl 3.15	Link road	85A				Transition curve to 85A kph	No transition curve provided	Transition curve required
A47 THICKTHORN JUNCTION WITH A11	Departure	HETT/NCT-MMSJV-DEP-OPTC-0005	Alignment	TD 22/06 Cl 2.46 & Table 4/4	Diverge	120A				Near straight required	371m radius	Near straight required at the end of the diverge nosing to ensure braking/slowing does not occur on a radius.
A47 THICKTHORN JUNCTION WITH A11	Departure	HETT/NCT-MMSJV-DEP-OPTC-0006	Alignment	TD 9/93 Cl 3.15	Link road	120A				Transition curve to 85A kph	No transition curve provided	Transition curve required
A47 THICKTHORN JUNCTION WITH A11	Departure	HETT/NCT-MMSJV-DEP-OPTC-0007	Alignment	TD 22/06 Cl 4.18	Link road	120A				1km Weaving length	146m Weaving length	Insufficient weaving length for vehicles merging and diverging.
A47 THICKTHORN JUNCTION WITH A11	Departure	HETT/NCT-MMSJV-DEP-OPTC-0008	Alignment	TD 22/06 Cl 2.46 & Table 4/4	Merge	70A				Near straight required	993m radius	Near straight required at the end of the diverge nosing to ensure merge approach does not occur on a radius.
A47 THICKTHORN JUNCTION WITH A11	Departure	HETT/NCT-MMSJV-DEP-OPTC-0009	Alignment	TD 9/93 Cl 3.15	Link road	70A				Transition curve to 70A kph	No transition curve provided	Transition curve required
A47 THICKTHORN JUNCTION WITH A11	Departure	HETT/NCT-MMSJV-DEP-OPTC-0010	Alignment	TD 22/06 Cl 2.29, Cl 4.22, Figure 1/3 & Table 4/3	Merge	70A				Length of nose = 85m Length of Entry Taper = 150m	Length of nose = 50m Length of Entry Taper = 100m	Reduced nose and taper length results in reduced merging length for vehicles entering the A47.
A47 THICKTHORN JUNCTION WITH A11	Departure	HETT/NCT-MMSJV-DEP-OPTC-0011	Visibility	TD 42/95 Cl 7.4	Approach to junction	100B				215m	55m	Reduced visibility increases risk of incidents.
A47 THICKTHORN JUNCTION WITH A11	Departure	HETT/NCT-MMSJV-DEP-OPTC-0012	Visibility	TD 42/95 Cl 7.5, 8.2 & 8.4	Approach to junction	100B				Junction sighting no refuge and complex layout.	Proposed T junction only 9m from the existing exit taper from the A11.	Reduced visibility and close proximity of the T junction increases risk of incidents.