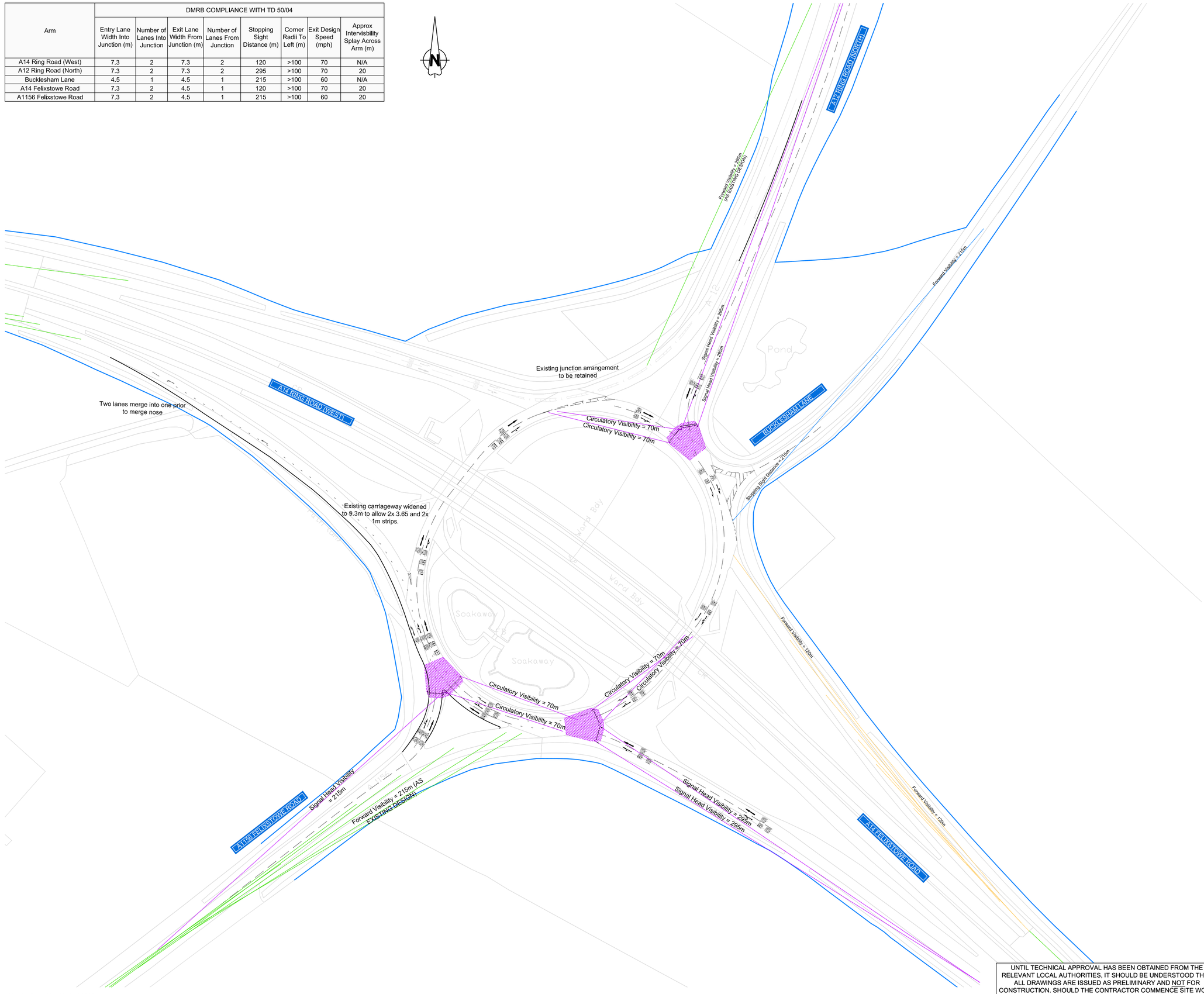
Original Drawing Size A1

Arm	DMRB COMPLIANCE WITH TD 50/04							
	Entry Lane Width Into Junction (m)	Number of Lanes Into Junction	Exit Lane Width From Junction (m)	Number of Lanes From Junction	Stopping Sight Distance (m)	Corner Radii To Left (m)	Exit Design Speed (mph)	Approx Intervisbility Splay Across Arm (m)
A14 Ring Road (West)	7.3	2	7.3	2	120	>100	70	N/A
A12 Ring Road (North)	7.3	2	7.3	2	295	>100	70	20
Bucklesham Lane	4.5	1	4.5	1	215	>100	60	N/A
A14 Felixstowe Road	7.3	2	4.5	1	120	>100	70	20
A1156 Felixstowe Road	7.3	2	4.5	1	215	>100	60	20



Construction Design and Management (CDM)
Key Residual Risks
Contractors entering the site should gain permission from the relevant land owners and/or principle contractor working on site at the time of entry. Contractors shall be responsible for carrying out their own risk assessments and for liaising with the relevant services companies and authorities. Listed below are Site Specific key risks associated with the project.

1) Overhead and underground services
2) Street Lighting Cables
3) Working adjacent to water courses and flood plain
4) Soft ground conditions
5) Working adjacent to live highways and railway line
6) Unchartered services
7) Existing buildings with potential asbestos hazards

NOTES:

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2. All dimensions are in metres unless otherwise stated.
3. Brookbanks Consulting Ltd has prepared this drawing for the sole use of the client. The drawing may not be relied upon by any other party without the express agreement of the client and Brookbanks Consulting Ltd. Where any data supplied by the client or from other sources has been used, it has been assumed that the information is correct. No responsibility can be accepted by Brookbanks Consulting Ltd for inaccuracies in the data supplied by any other party. The drawing has been produced based on the assumption that all relevant information has been supplied by those bodies from whom it was requested.
4. No part of this drawing may be copied or duplicated without the express permission of Brookbanks Consulting.
5. The junctions, roundabouts and links have been designed in accordance with the following DMRB standards:
   - TA 23/81: Junctions and Accesses - Determination of Size of Roundabouts and Major-Minor Junctions
   - TA 90/05: The Geometric Design of Pedestrian, Cycle and Equestrian Routes;
   - TA 91/05: Provision for Non-Motorised Users;
   - TD 9/93: Highway Link Design;
   - TD 50/04: The Geometric Layout of Signal-controlled Junctions and Signalized Roundabouts;
   - Traffic Advisory Leaflet 3/03: Equestrian Crossings.

KEY:

- Assumed Highway Boundary
- Signal Head Visibility
- Traffic Signal Head
- High-mast Traffic Signal Head
- Intersignal Visibility
- Forward Visibility on Exit
- Forward Visibility on Entry

F	Widening of A14 (west) off-slip	GG	DN	DN 13.09.17
E	Amendments to kerb and road signs	GG	DN	DN 25.08.17
D	Amendments to reflect traffic modelling.	MDM	LW	PAB 26.06.17
C	Amendments as per Road Safety Audit.	MDM	LW	PAB 12.06.17
B	Amendments as per client's requests.	MDM	LW	PAB 10.03.17
A	Amendments as per client's requests.	MDM	LW	PAB 19.10.16
-	First Issue	-	-	- 19.10.16

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Carlyle Land Ltd and Commercial Estates Group

Land South and East of Adastral Park, Ipswich

Off-site Highway Mitigation: A14 Roundabout Signalisation

Status		Status Date
Approval		Oct 2016
Drawn	Checked	Date
MDM	LW	19.10.2016
Scale	Number	Rev
1:1000	10391-HL-11	F

0 10 20 30 40 50
METRES

UNTIL TECHNICAL APPROVAL HAS BEEN OBTAINED FROM THE RELEVANT LOCAL AUTHORITIES, IT SHOULD BE UNDERSTOOD THAT ALL DRAWINGS ARE ISSUED AS PRELIMINARY AND NOT FOR CONSTRUCTION. SHOULD THE CONTRACTOR COMMENCE SITE WORK PRIOR TO APPROVAL BEING GIVEN, IT IS ENTIRELY AT HIS OWN RISK.

Technical Note for Design Strategy

Project Name: Land South and East of Adastral Park, Ipswich, Suffolk
Project Number: 10391
Client Name: Carlyle Land Ltd and Commercial Estates Group
Note Number: 22
Date: September 2017
Prepared By: Matthew Moss
Checked By: Lee Witts
Subject/Topic: Proposed Foxhall Road Roundabout Mitigation Measures

Item	Subject
1	Brookbanks Consulting Limited is appointed by CEG to provide transportation advice for a proposed mixed-use development on land at Adastral Park near Ipswich in Suffolk. The aim of this roundabout design is to mitigate the additional traffic caused by the development to minimize congestion at this junction. This note should be read in conjunction with drawing no: 10391-HL-22. The existing length of the A12 Dual Carriageway, Foxhall Road and Newbourne Road affected by this scheme are: • Approximate carriageway and footway dimensions: A12 (North and South): 2 No. 7.3m Carriageways, 5m Central Reservation. Foxhall Road and Newbourne Road: 7.3m Carriageways. No footways. • Local Vegetation/Existing Constraints: None. • Local Speed Limits: A12 (North and South): 70 mph (120 kph). Foxhall Road and Newbourne Road: 60 mph (100 kph). • Street Lighting: Junction is fully lit. • Local water courses that may constrain the site: None. • Local Accesses that must be maintained: None. No discussions have taken place with the Local Authority or Highways England at the time of writing.  **Figure 1:** A12 (North) looking South  **Figure 2:** Newbourne Road (East) looking West

Figure 3: A12 (South) looking North

Figure 4: Foxhall Road (West) looking East

2 **Design Standards:**

The design parameters of the proposed junction have been determined following a review of the following documents:-

- Design Manual for Roads and Bridges:
  - TA 23/81: Junctions and Accesses – Determination of Size of Roundabouts and Major-Minor Junctions;
  - TD 9/93: Highway Link Design;
  - TD 16/07: The Geometric Design of Roundabouts
- Traffic Signs Manual Design Standard: Chapter 5 Road Markings

3 **Site Surveys:**

No surveys were carried out for the site at the time of writing.

4 **2D Design Elements:**

- Northern Arm (Major): A12 Ring Road (North) 70 mph
- Eastern Arm (Minor): Newbourne Road 60 mph
- Southern Arm (Major): A12 Ring Road (South) 70 mph
- Western Arm (Minor): Foxhall Road 60 mph
- Design Speed for the Major Road = 120 kph (TD 9/93, Table 2);
- Design Speed for the Minor Road = 100 kph (West) and 60 kph (East) (TD 9/93, Table 2);
- Desirable Minimum Stopping Sight Distance Major Road = 295m (TD 9/93, Table 3. TD 16/07 Item 8.3 and Figure 8/1.);
- Desirable Minimum Stopping Site Distance Minor Road = 215m (TD 9/93, Table 3. TD 16/07 Item 8.3 and Figure 8/1.);
- Visibility Distance for a roundabout with an Inscribed Circle Diameter of 60m to 100m = 50m (TD 16/07, Table 8/1);
- Forward Visibility at Entry (TD 16/07, Item 8.4 and Figure 8/2) = 50m;
- Visibility to the Right (TD 16/07, Items 8.5 to 8.7 and Figures 8/3 and 8/4) = 50m;
- Circulatory Visibility (TD 16/07, Item 8.9 and Figure 8/5) = 50m;

The definition of a Normal Roundabout as described in Items 3.1 and 3.2 of TD 16/07 is as follows:-

3.1 A Normal Roundabout has a kerbed central island at least 4 metres in diameter (Figure 3/1). Its approaches may be dual or single carriageway roads. Usually, a Normal Roundabout has flared entries and exits to allow two or three vehicles to enter or leave the roundabout on a given arm at the same time. If so, its circulatory carriageway needs to be wide enough for two or three vehicles to travel alongside each other on the roundabout itself.

3.2 If a Normal Roundabout has more than four arms, it becomes large with the probability that higher circulatory speeds will result. Either a Double Roundabout or a Signalised Roundabout is a potential solution in these circumstances.

	DMRB COMPLIANCE WITH TD 16/07							
	Entry Width (m)	Entry Radius into Rotary (m)	Exit Radius from Rotary (m)	Stopping Sight Distance (m)	Entry Angle (degrees)	Entry/Exit Design Speed (mph)	Approx. Indicative Circular Diameter (m)	Maximum Radius of Deflection (m)
A12 Ring Road (North)	14.0	20	No Change	295	20	70	79	100
Newbourne Road	10.5	20	33	215	24	60	79	90
A12 Ring Road (South)	14.0	20	No Change	295	24	70	79	95
Foxhall Road	10.5	20	No Change	215	23	60	79	76

5 **Relation to Existing Access Points**

The proposed roundabout has been located near a proposed signalized junction access to the development to the north. It is located an appropriate distance from this junction. Any traffic movements undertaken into or out of these existing access points are not restricted by the proposed roundabout.

6 **Traffic Signs**

Advance Direction Signs (ADS) shall be provided on the approaches to the roundabout, as well as Flag type directional signs on the exit arms as prescribed in the Traffic Signs Regulations and General Directions (TRSGD). Care has been taken with the positioning and the size of these signs so that they do not interfere with driver's visibility requirements. A 2m mounting height will be provided to Flag type signs to ensure visibility is not restricted (Mandatory Item 8.2).

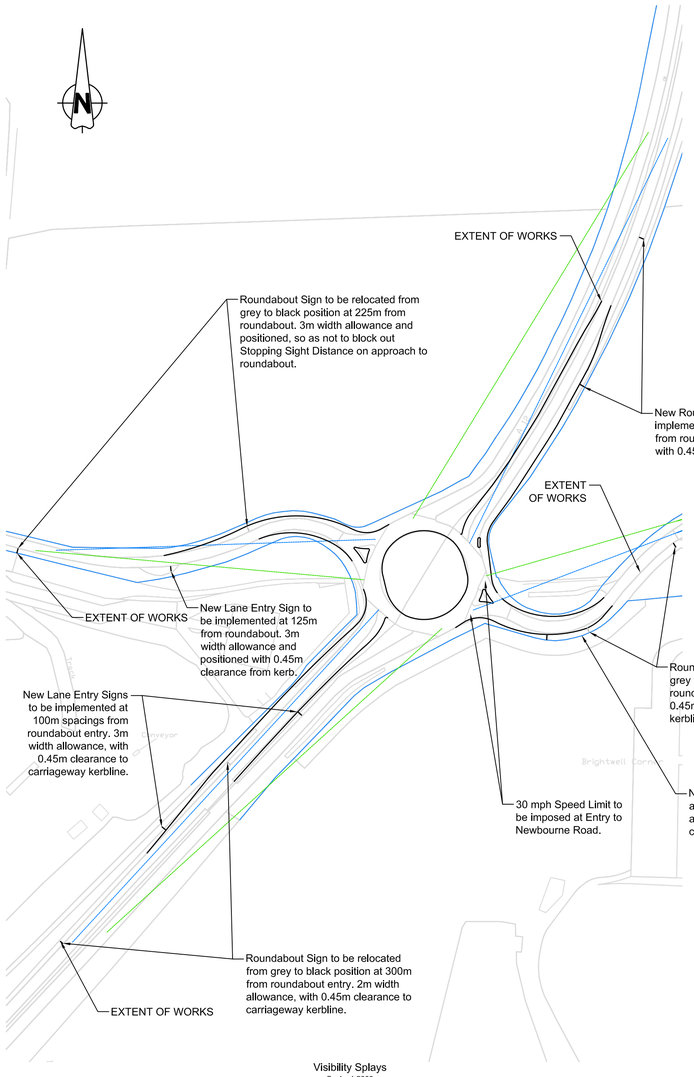
Guidance on the design of directional traffic signs is given in the Traffic Signs Manual (Chapter 7) and LTN 1/94 – 'The Design and Use of Directional Informatory Signs', particularly Appendix A. The 'x' heights for these directional sign have been informed by the existing 70 mph and 60 mph speed limits as well as the 30 mph speed limit being imposed on the highway.

Road Markings

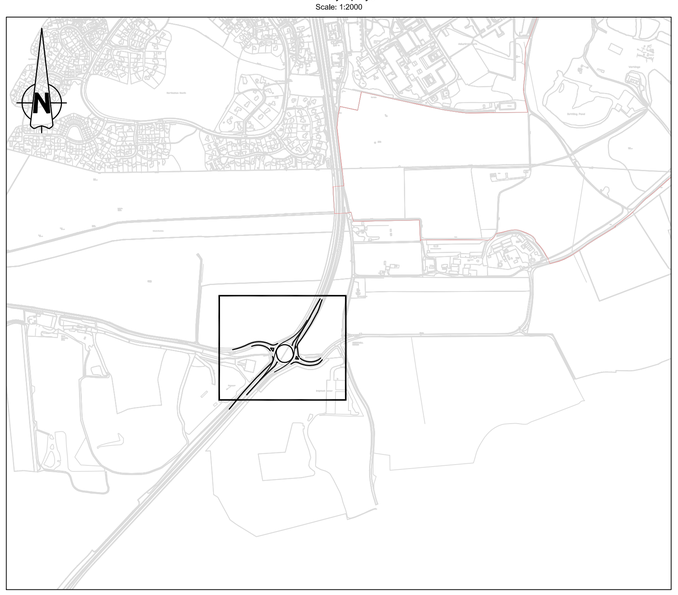
The existing road markings along the A12 Dual Carriageway and Foxhall Road have been provided in response to the current speed limits of 70 mph and 60 mph respectively. The proposed speed limit along Newbourne Road (30 mph) has required the road markings to be designed to reflect this lower limit. All road markings have been informed by Traffic Signs Manual Chapter 5.

7	**Highway Boundary** The location of the existing highway boundary has been determined using plans provided by Suffolk County Council which has been transferred onto survey data. It has been confirmed by Suffolk County Council that the Highway Boundary is located as indicated on the drawings. The design of this roundabout requires additional carriageway width in order to accommodate the infrastructure. The roundabout will be constructed slightly off line to the existing carriageway so that no works encroach onto 3rd party land not within the control of the Developer or Highway Authority.
8	**Street Lighting** The proposed junction already has a system of street lighting in place. However, the proposed roundabout improvements are recommended to be illuminated by an appropriate system of street lighting. The extent and classification of lighting will be determined by Suffolk County Council.

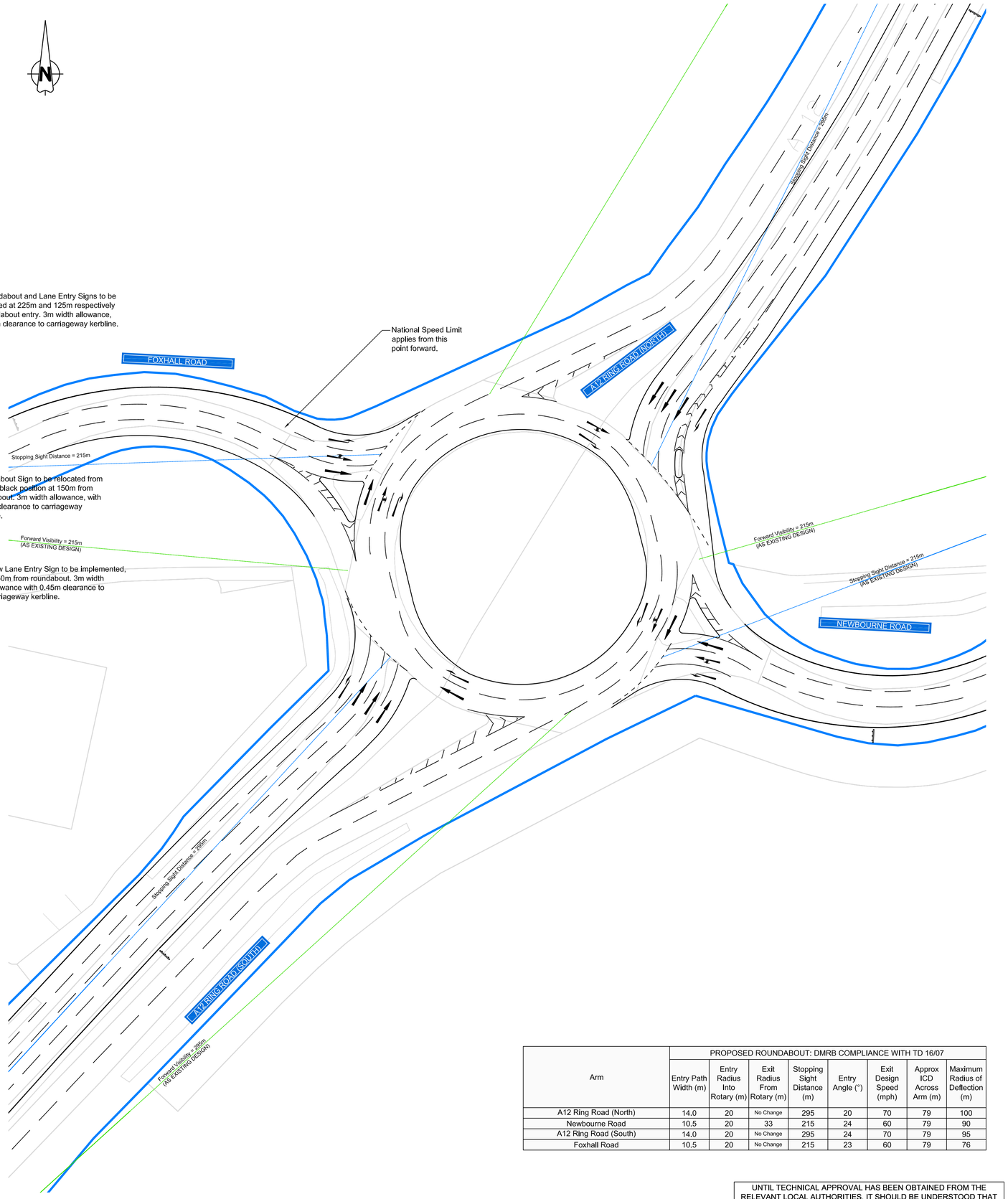
Original Drawing Size A1



Visibility Splays
Scale: 1:2000



Context Plan
Scale: 1:10000



Indicative Junction Layout
Scale: 1:500

Arm	PROPOSED ROUNDABOUT: DMRB COMPLIANCE WITH TD 16/07							
	Entry Path Width (m)	Entry Radius Into Rotary (m)	Exit Radius From Rotary (m)	Stopping Sight Distance (m)	Entry Angle (°)	Exit Design Speed (mph)	Approx ICD Across Arm (m)	Maximum Radius of Deflection (m)
A12 Ring Road (North)	14.0	20	No Change	295	20	70	79	100
Newbourne Road	10.5	20	33	215	24	60	79	90
A12 Ring Road (South)	14.0	20	No Change	295	24	70	79	95
Foxhall Road	10.5	20	No Change	215	23	60	79	76

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Construction Design and Management (CDM)
Key Residual Risks

Contractors entering the site should gain permission from the relevant land owners and/or principle contractor working on site at the time of entry. Contractors shall be responsible for carrying out their own risk assessments and for liaising with the relevant services companies and authorities. Listed below are Site Specific key risks associated with the project.

1) Overhead and underground services
2) Street Lighting Cables
3) Working adjacent to water courses and flood plain
4) Soft ground conditions
5) Working adjacent to live highways and railway line
6) Unchartered services
7) Existing buildings with potential asbestos hazards

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   - TA 23/81: Junctions and Accesses - Determination of Size of Roundabouts and Major-Minor Junctions
   - TD 16/07: The Geometric Design of Roundabouts.
   - TD 9/93: Highway Link Design;

KEY:

- Site Boundary
- Highway Boundary
- Stopping Sight Distance on Approach
- Forward Visibility on Exit

A	Updates as per client requirements.	MDM	LW	PAB 25.08.17
-	First Issue	-	-	- 25.07.17

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6150 Knights Court Solihull Parkway Birmingham B37 7WY
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Carlyle Land Ltd and
Commercial Estates Group

Land South and East of
Adastral Park, Ipswich

Off-site Highway Mitigation:
Foxhall Roundabout Mitigation

Status			Status Date
Approval			July 2017
Drawn	Checked		Date
MDM	LW		24.07.2017
Scale	Number		Rev
As Shown	10391-HL-31		A

0 10 20 30 40 50
METRES

Technical Note for Design Strategy

Project Name: Land South and East of Adastral Park, Ipswich, Suffolk
Project Number: 10391
Client Name: Carlyle Land Ltd and Commercial Estates Group
Note Number: 23
Date: June 2017
Prepared By: Matthew Moss
Checked By: Lee Witts
Subject/Topic: Proposed Adastral Park Roundabout and Gloster Road Mitigation Measures

Item	Subject
1	Brookbanks Consulting Limited is appointed by CEG to provide transportation advice for a proposed mixed-use development on land at Adastral Park near Ipswich in Suffolk. The aim of this roundabout design is to mitigate the additional traffic caused by the development to minimize congestion at these junctions. This note should be read in conjunction with drawing no: 10391-HL-23. The existing length of the A12 Dual Carriageway, Barracks Square, Gloster Road and Eagle Way affected by this scheme are: • Approximate carriageway and footway dimensions: A12 (North and South): 2 No. 7.3m Carriageways, 5m Central Reservation. Barrack Square, Gloster Road and Eagle Way: 7.3m Carriageways. No footways. • Local Vegetation/Existing Constraints: All approaches will need vegetation to be cropped back. Approach Visibility from A12 North is constrained by a footbridge, however this is still DMRB compliant. • Local Speed Limits: A12 (North and South): 70 mph (120 kph). Barrack Square, Gloster Road and Eagle Way: 30 mph (60 kph). • Street Lighting: Junction is fully lit. • Local water courses that may constrain the site: None. • Local Accesses that must be maintained: None. No discussions have taken place with the Local Authority or Highways England at the time of writing.  **Figure 1:** A12 (North) looking South  **Figure 2:** Barrack Square looking West towards Gloster Road

Figure 3: Gloster Road (West) looking South

Figure 4: Barrack Square looking East towards Gloster Road

Figure 5: Barrack Square looking West

Figure 6: A12 (South) looking North

2

Design Standards:

The design parameters of the proposed junction have been determined following a review of the following documents:-

- Design Manual for Roads and Bridges:
  - TA 23/81: Junctions and Accesses – Determination of Size of Roundabouts and Major-Minor Junctions;
  - TD 9/93: Highway Link Design;
  - TD 16/07: The Geometric Design of Roundabouts
  - TD 42/95: The Geometric Design of Major-Minor Priority Junctions
- Traffic Signs Manual Design Standard: Chapter 5 Road Markings
- Manual for Streets

3

Site Surveys:

No surveys were carried out for the site at the time of writing.

4

2D Design Elements:

• Northern Arm (Major):	A12 Ring Road (North)	70 mph
• Eastern Arm (Minor):	Barrack Square	30 mph
• North-Eastern Arm (Minor):	Gloster Road	30 mph
• Southern Arm (Major):	A12 Ring Road (South)	70 mph
• Western Arm (Minor):	Eagle Way	30 mph

- Design Speed for the Major Road = 120 kph (TD 9/93, Table 2);
- Design Speed for the Minor Roads = 60 kph (TD 9/93, Table 2) and 48 kph (Manual for Streets Table 7.1);

- Desirable Minimum Stopping Sight Distance Major Road = 295m (TD 9/93, Table 3. TD 16/07 Item 8.3 and Figure 8/1.);
- Desirable Minimum Stopping Site Distance Minor Road = 90m (TD 9/93, Table 3. TD 16/07 Item 8.3 and Figure 8/1.) and 43m (Manual for Streets Table 7.1);
- Visibility Distance for a roundabout with an Inscribed Circle Diameter of 60m to 100m = 50m (TD 16/07, Table 8/1);
- Forward Visibility at Entry (TD 16/07, Item 8.4 and Figure 8/2) = 50m;
- Visibility to the Right (TD 16/07, Items 8.5 to 8.7 and Figures 8/3 and 8/4) = 50m;
- Circulatory Visibility (TD 16/07, Item 8.9 and Figure 8/5) = 50m;

The definition of a Normal Roundabout as described in Items 3.1 and 3.2 of TD 16/07 is as follows:-

3.1 A Normal Roundabout has a kerbed central island at least 4 metres in diameter (Figure 3/1). Its approaches may be dual or single carriageway roads. Usually, a Normal Roundabout has flared entries and exits to allow two or three vehicles to enter or leave the roundabout on a given arm at the same time. If so, its circulatory carriageway needs to be wide enough for two or three vehicles to travel alongside each other on the roundabout itself.

3.2 If a Normal Roundabout has more than four arms, it becomes large with the probability that higher circulatory speeds will result. Either a Double Roundabout or a Signalised Roundabout is a potential solution in these circumstances.

	DMRB COMPLIANCE WITH TD 16/07							
	Entry Width (m)	Entry Radius into Rotary (m)	Exit Radius from Rotary (m)	Stopping Sight Distance (m)	Entry Angle (degrees)	Entry/Exit Design Speed (mph)	Approx. Indicative Circular Diameter (m)	Maximum Radius of Deflection (m)
A12 Ring Road (North)	10.5	20	No Change	295	24	70	81.5	55
Barracks Square	10.5	27	39	43 (MfS)	36	30	81.5	39
A12 Ring Road (South)	10.5	20	No Change	295	23	70	81.5	87
Eagle Way	No Change	No Change	No Change	No Change	No Change	No Change	81.5	59

The definition of a Major/Minor Priority Junction as described in Item 2.1 of TD 42/95 is as follows:-

2.1 Major/minor priority junctions are the most common form of junction control. Traffic on the minor road gives way to traffic on the major road and is normally controlled by "Give Way" signs and road markings. However, where there are severe visibility restrictions, "Stop" signs and road markings may be considered, with appropriate reference to the Traffic Signs Regulations and General Directions.

2.2 The advantage of all major/minor priority junctions is that through traffic on the major road is not delayed. However, high major road speeds or the possibility of major road overtaking traffic manoeuvres should not be encouraged at major/minor priority junctions.

2.3 For more heavily used junctions, more complex forms of junction layout are required. Due to the uncertainty of traffic forecasting, designers should always consider whether the layout they are designing could be upgraded to provide more capacity, if this should prove necessary in the future.