The Norfolk County Council (Norwich Northern Distributor Road (A1067 to A47(T))) Order

5.5 Transport Assessment Appendices

Planning Act 2008

Infrastructure Planning

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

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NDR Transport Assessment

Scoping Proposals

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Mott MacDonald

NDR Transport Assessment

Scoping Proposals

June 2013

Norfolk County Council

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Content

1. Introduction

Mott MacDonald (MM) has been appointed by Norfolk County Council (NCC) to prepare a scoping report for the production of a Transport Assessment (TA) for the Norwich Northern Distributor Road (NDR). The purpose of the scoping report is to set out the steps required in the production of the TA and the interdependencies with other disciplines, as well as obtaining feedback from NCC DC officer and other NCC officers.

The NDR is presently going through the Nationally Significant Infrastructure Project (NSIP) pre-application process. The TA would be one of the required documents for the submission to the Planning Inspectorate's National Infrastructure Planning process. The TA is a standalone document in addition to the Environmental Statement (ES).

The need for the NDR was considered and set out by Adams Henry in its NDR Needs Case, a summary of which is provided below:

- Travel patterns in the Norwich area are complex with trips both within and outside the built up area. At present there is a reliance on Norwich Outer Ring Road, which is congested. There is also rat-running on unsuitable roads. This leads to access difficulties for both residents and businesses as well as safety concerns.

- The A47 trunk road bypass caters for the east / west movements but there is no equivalent to cater for the north / south movements. There is a lack of highway provision across the northern part of Norwich.

- In response to the above two points, the Norwich Area Transportation Strategy (NATS) has been devised. It has three key elements: a new distributor road around the northeast of Norwich linking to the A47 at Postwick, bus rapid transit (BRT) and improvements to core bus routes on key radial routes into the city, and a programme of city centre measures to reduce through traffic.

- Implementation of the NATS strategy is imperative for the delivery of the adopted Joint Core Strategy which incorporates significant growth.

- The NDR would provide good road links, allow better bus services to the city centre and provide mode choices. It would also reduce traffic levels on the Outer Ring Road, thereby allowing displacement of city centre traffic and in turn enabling the city centre measures.

Discussions were held approximately a year ago with both Norfolk County Council (NCC) with regards to the scope required for this TA. Below a summary of these discussions:

- The TA needs to be produced in accordance with the document "Guidance on Transport Assessment" published by Department for Transport (DfT) in March 2007.

- A full assessment of existing facilities for all modes of transport and their adequacy to meet the travel demands of the proposal needs to be produced. Where facilities are deficient, the TA must identify measures to rectify this.

- Consultation with the HA is required as the NDR links onto the A47(T) at the eastern end via a new junction at Postwick.

- Review the status of new NDR links and existing roads leading to them.
- The study area should comprise all junctions with the NDR and any junctions on the local highway network predicted to experience a 10% increase in traffic, or 5% increase at junctions with known congestion problems, accident history or sub-standard design.
- The effects of severance to existing walking and cycling routes within a 2km and 5km travelling distance of the route should be considered.
- It should be demonstrated that the scheme would be of at least no detriment to existing bus services.
- Growth factors as per the Norwich Area Transportation Study (NATS) SATURN model should be used.
- The impact of construction traffic in terms of congestion caused by deliveries and physical damage to the road network by HGV vehicles should be considered. A construction management plan should be provided.

The Norwich Area Transportation Study (NATS) SATURN model is presently being updated using data collected in 2012 and this will be used to produce traffic forecasts for the scheme for the opening year 2017, and fifteen years later 2032.

The remaining sections of this report are structured as follows:

Section 2 sets out the proposed structure of TA.

Section 3 specifies the tasks to be carried out under each heading and the methodology to be employed.

Section 4 contains present assumptions.

2. Proposed Structure

The Transport Assessment (TA) will be prepared in accordance with the current TA guidance; "*Guidance on Transport Assessments*" – DfT, 2007.

The TA report is proposed to include the following headings:

- Introduction
  - Scheme Background, Definition and Description
  - Discussions with Highway Authorities / Agreement on Scope
- Policy Context
  - National / Regional / Local Context
- Network Conditions
  - Existing / Future
- SATURN Highway Model Tasks
  - Identification of Affected Junctions / Definition of Study Area
  - Identification of Survey Requirements (for junctions where the SATURN model should be supplemented with survey data)
  - Derivation of Traffic Flow Information for those junctions where the SATURN model flows can be used
  - Traffic Growth from the SATURN model for those junctions where additional surveys are used.
- Sustainable Transport
  - Public Transport – Existing / Future
  - Non-motorised Users – Existing / Future
- Traffic Impact Assessment
  - On-line Junctions
  - Off-line Junctions
  - Trunk Road Junctions
- Road Safety Review (Stage 1)

- Construction Impact Assessment
- Mitigation
- Conclusions

Section 3 of this Scoping report sets out what is proposed to be included under the above headings and what methodology will be employed to undertake the assessment.

3. Transport Assessment Tasks

3.1 Introduction

3.1.1 Scheme Background and Description

This section will detail the scheme background and include a summary of why the NDR scheme is necessary. It will also highlight the existing issues, constraints and deficiencies which result in delay and economic detriment to the Norwich and wider Norfolk area and set the scheme within the context of the Norwich Area Transportation Strategy (NATS) and the Joint Core Strategy (JCT). It will include headline consideration of the problems encountered by public transport users, private vehicles, freight movement and non-motorised travellers / users.

Following the above, the NDR scheme will be described including all its complementary measures which are included to support the wider NDR / NATS package, including a brief description of the route, highway design, highway structures and proposed complementary measures. This section will also present the scheme aims and objectives.

3.1.2 Discussions with Highway Authorities / Agreement on Scope

Discussions with both Norfolk County Council (NCC) and the Highways Agency (HA) have been on-going for a number of years. They cover the modelling aspects and have in the past touched on the preparation of a TA for the NDR. They have been re-activated with a view to agree the following:

- Review of the discussion with NCC officers as presented in **Section 1**.
- Junctions affected by the NDR and definition of junctions that require assessment thereby agreeing the Study Area. Following the draft scoping report, this second issue includes a more defined list of off-site junctions for consideration by the officers.
- Agreement with HA on which Trunk Road junctions require assessment.

3.2 Policy Context

In this section current national, regional and local policy will be reviewed with a view to demonstrate how the proposed NDR scheme aligns with those policies.

Land use and transport policy will be considered in addition to other broader policy and initiatives.

3.3 Network Conditions

This section will set out the existing traffic conditions in the wider NDR area. This will include a review of existing travel patterns on key routes, including:

- Outer Ring Road

- A147 Inner Ring road
- A47(T)
- A11(T)
- A140 Ipswich Road / Aylsham Road / Cromer Road / Holt Road
- A1067 Drayton High Road / Fakenham Road
- A1151 Wroxham Road / Sprowston Road
- B1150 Constitution Hill / North Walsham Road
- B1149 Holt Road

Following on from this, initial results of the SATURN traffic model will be reviewed to present likely changes in traffic movements that are predicted to occur based on the introduction of the NDR scheme.

3.4 SATURN Highway Model Tasks

3.4.1 Identification of Affected Junctions / Definition of Study Area

As stated in Section 1.0 of this report, previous discussions defined that the study area should comprise all junctions with the NDR and any junctions on the local highway network predicted to experience a 10% increase, or 5% increase at junctions with known congestion problems, accident history or sub-standard design. More recent discussions with NCC officers revealed that junctions which are materially affected by the NDR should be assessed. The fixed percentages as discussed previously may not necessarily be the determining factor. Furthermore, unlike a “traditional” TA, the document should also concentrate on capturing the benefits of the NDR scheme rather than just looking at “problem” junctions. It was agreed that this could be done qualitatively by presenting difference plots showing where the NDR would lead to reduction in flows.

The SATURN model includes the following scenarios, years and assessment periods:

- A Do-Minimum (DM) scenario for the future years, assuming background growth, any committed developments and highway measures not directly associated with NDR.
- A Do-Something (DS) scenario that introduces NDR and its supporting / complementary measures to the Do-Minimum model.
- Forecast years – 2017 (opening year) and 2032 (design year).
- Time periods – a morning peak hour (AM peak), an inter-peak and an evening peak hour (PM Peak).

It is proposed to use the above Do-Minimum and Do-Something scenarios and both forecast years (2017 and 2032) for assessment in the TA.

It is proposed that junction assessments will be carried out for the AM and PM peaks; the inter-peak period will not be included in the TA assessment unless it is felt that it is required for certain junctions to demonstrate the benefits of the scheme.

The traffic modelling will take account of the spatial allocation and dependency of developments on transport schemes. For this reason there are two approaches, one that limits the spatial allocation using the guidance in WebTAG to include only near certain and more than likely developments, and another that is unconstrained in this respect. The table below shows the proposed growth scenarios:

Table 3.1: Growth scenarios

Scenario	2017	2032
Core Scenario	Only non-dependent, near certain or more than likely developments would be spatially allocated, whilst the majority of growth is controlled to NTEM	Only non-dependent, near certain or more than likely developments would be spatially allocated, whilst the majority of growth is controlled to NTEM
Alternative Core Scenario	Include dependent developments and near certain and more than likely developments, controlled to NTEM	Include all JCS, controlled to NTEM

Source: Meeting with NCC 17 April 2013

Whilst in reality it is unlikely that the Alternative Core Scenario is achievable in the Do Minimum (i.e. without the NDR), it is essential for TA purposes that a 'like for like' situation is compared. It is therefore proposed that both the Do Minimum and the Do Something uses the Alternative Core Scenario matrices.

A list of potential additional off-line junctions that may be problematic has been prepared by NCC officers – the list is included in **Appendix A** to this scoping report. This list was further discussed during a meeting on 1 May 2013 with David Higgins and Ian Parkes. The concluding view was that off-line junctions needing assessment were likely to be those on radial routes crossing the NDR, the Outer Ring Road and on A47. Data extracted from the SATURN model was used to identify junctions requiring detailed assessment based on the following criteria:

- Junctions with an increase in traffic flows between Do Minimum and Do Something scenarios of more than 50 PCUs per hour.
- Junctions where the SATURN model shows approaches being oversaturated (V/C greater than 95%).
- Junctions where the SATURN model shows V/C differences between Do Minimum and Do Something to be greater than +/- 10%.

In addition to the above, changes in turning movements were considered. **Appendix B** contains the list of junctions as discussed during the meeting on 1 May 2013 as well as junctions for which any of the above criteria apply. It also contains comments on the model comparison and whether it is considered the junction should be assessed in detail. Note: qualitative comparisons will be carried out for those junctions where the NDR shows a beneficial impact to demonstrate the benefits of the scheme.

3.4.2 Derivation of Traffic Flow Information

Following the above, the model will be interrogated with regards to traffic flow information for the detailed assessment. For those junctions that are fully represented in the SATURN model, consideration will have to be given to the accuracy of the model data and whether it can be solely used for TA purposes. This will be dependent on how well the model is calibrated or validated in that particular location.

Full turning flows will have to be extracted from the model for both AM and PM peaks in the DM and DS scenarios for those junctions considered suitably represented in the SATURN model.

3.4.3 Identification of Traffic Survey Requirements

For those junctions that are not fully represented in the model or where there is not sufficient confidence in the junction data, traffic surveys will have to be specified at the earliest opportunity. For these junctions, a combination of survey data and model data will be used to analyse the impacts of the scheme.

All additional traffic surveys required for TA purposes should be carried out by the end of June 2013, taking account of school half-term holidays, bank holidays and any significant local events (Norfolk Show on 26/27 June 2013). The surveys should include queue data to allow validation of modelling results.

3.4.4 Traffic Growth

Traffic Growth will be required from the model for those junctions as described in Section 3.4.3 where additional traffic surveys will be carried out. Growth will have to be provided as a factor for the difference between existing (2013) to both future years. The model will also have to be used to quantify the difference between Do-Minimum and Do-Something. Background growth is included in the SATURN model.

3.5 Sustainable Transport

This section will review the existing sustainable transport provision, including public transport (bus, rail, coach and air travel), and provision for Non-Motorised Users (NMUs), which includes walking, cycling and equestrian activity in the study area and on the surrounding highway network. The aim is to identify how the provision of the NDR may impact upon these sustainable transport users and whether any facilities will be required for them.

The impact of the proposed NDR scheme will also be considered on each of the existing Public Rights of Way (PRoW), permissive paths and cycleways which will be intersected by the NDR, and where relevant any measures to address the severance of paths will be described.

3.6 Traffic Impact Assessment

3.6.1 On-line Junctions

Detailed junction assessment using appropriate software (ARCADY / PICADY / LinSig / TRANSYT) will be undertaken on all junctions along the proposed NDR alignment for the two future assessment years. Assessments will be carried out for the AM and PM peak periods.

The geometric measurements required for input into the software packages will be provided by NCC for the on-line junctions (Do-Something network). The table below contains a list of the on-line junctions:

Table 3.2: On-line Junctions

Number	Junction Name	Number	Junction Name
1	Fakenham Road	8	North Walsham Road
2	Reepham Road	9	Wroxham Road
3	Drayton Lane	10	Salhouse Road
4	Holt Road / Drayton Lane	11	Plumstead Road North
5	Cromer Road South	12	Plumstead Road South
6	Cromer Road North	13	Business Park
7	Airport		

3.6.2 Postwick Junctions

The NDR links to the A47 at its southeastern end at the existing A47 Postwick interchange. This area is presently subject of detailed consideration and remodelling in form of junction alterations and new junctions to provide access to new development areas. The proposed junctions have to date been modelled without full JCS growth and therefore will require assessment in the TA. The table below contains a list of the Postwick junctions:

Table 3.3: Postwick Junctions

Number	Junction Name	Number	Junction Name
14	Broadland Gate	17	Postwick Northeast
15	Peachman Way	18	Oak's Lane
16	Postwick Northwest	19	P&R junction

3.6.3 Off-line Junctions

Since the draft scoping report, further assessment has been carried out to allow early identification of off-line junctions that will need to be assessed in line with the approach described in **Section 3.4.1**. The list of junctions is based on a comparison between Do Minimum and Do Something of the latest model runs available. It should be noted that these model runs are not yet calibrated. More detailed comments are included in **Appendix B**. The table below contains a list of off-line junctions for which it is considered that detailed assessment may be required. It also contains all the A47 junctions for which agreement with the HA will have to be sought.

Table 3.4: Off-line Junctions requiring detailed assessment

Number	Junction Name	Number	Junction Name
21	A1067 Fakenham Road / Fir Covert Road	22	A140 Boundary Road / Reepham Road / Cromer Road / A1042
23	A1042 Mile Cross Lane / St Faith Road / Catton Grove Road	24	B1150 N Walsham Road / Crostwick Lane / Rackheath Lane
25	B1150 N Walsham Road / White Woman Lane	26	A1151 Wroxham Road / Muck Lane
27	A1151 Wroxham Road / Green Lane W	28	Salhouse Road / Green Lane W / Green Lane E
29	A1042 / Salhouse Road / Gurney Road	30	Plumstead Road / Woodside Road / Thunder Lane
31	A146 / Martineau Lane	32	Bracondale / King Street
40	A47 / A146 Trowse	41	A47 / Ipswich Road (A140)
42	A47 / A11	43	A47 / Watton Road
44	A47 / Longwater		

The junctions that require detailed assessment will be dealt with in the same way as the on-line junctions and will be included in the TA.

3.7 Road Safety Review

This section will review the potential impact of the NDR scheme on road safety levels.

For all junctions in the Study Area (as described in **Section 3.4.1**) and the links in between the junctions the collision (accident) history of that location will be reviewed (for the last 3-years) to identify any collision clusters and identify any causal trends that might be exacerbated / impacted upon – either positively or negatively by the scheme package.

Where it is considered the increase in traffic flow will contribute to the worsening of such clusters, mitigation measures will be developed.

3.8 Construction Impact Assessment

The construction programme and its phasing which has been produced for ES purposes will be reviewed with regards to impacts on the transport network. Assumptions about site access and traffic management will be discussed with the County Council and their contractor with the aim to minimise any construction related impacts.

3.9 Mitigation

For all junctions assessed in detail within this TA that are affected by the NDR proposals, mitigation measures will be considered and presented as necessary. Furthermore, mitigation measures may be required for public transport and/or NMUs as described in **Section 3.5** of this scoping report.

3.10 Conclusions

The final section of the TA will contain a summary of all the tasks carried out and conclusions resulting from the analysis.

4. Assumptions

4.1 Assumptions

The assumptions this scoping study is based on are as follows:

- Cover the whole of the NDR including the Postwick junctions.
- Growth scenarios to match those agreed with NCC on 17/4/13.
- Demonstrate no detriment to existing public transport services.
- Assess the years 2017 and 2032.
- No Travel Plan is to be carried out.
- No Road Safety Audits will be carried out as part of this Transport Assessment.

Appendices

Appendix A. Initial List of Potential Off-line Junctions

NDR TA - List of junctions that potentially require assessment

The following is a list of key off-line junctions developed by NCC where further interpretation and investigation may be required.

1. Surrey Street/St Stephens Street signal junction - This is a key junction as it directly affects the bus station and a lot of bus routes.
2. St Andrews Street junctions with Exchange Street and Duke Street - this is a particularly sensitive part of the network within the city centre.
3. St Stephens Roundabout - this is highly congested and sensitive to any increase. It is also a key junction on the Route Hierarchy as well as a key junction for public transport.
4. Chapel Field and Convent Roundabouts - again on the Route Hierarchy and sensitive to any change as highly congested.
5. St Crispin's Roundabout - As above
6. Barrack Street and the displaced traffic on nearby residential roads - Barrack Street is on the Route Hierarchy but concern over the impact on nearby residential roads.
7. All Queens Road Junctions (from City Road to Bus Station) - this is a key public transport route, is on the Route Hierarchy and is already heavily congested at peak hours.
8. Unthank Road/Christchurch Road - This is a Local Access Route.
9. Dereham Road/Old Palace Road signal junction - Again on the Route Hierarchy and already congested in peak hours
10. Drayton Road/Mile Cross Road Roundabout including crossings - As above
11. Mile Cross Road/Aylsham Road signals - As above
12. Catton Grove Roundabout - This is a key bus route.
13. The triangle of junction Aylsham Road/Drayton Road/St Martins Road - As above and on the Route Hierarchy.
14. St Augustine's Gate - As above
15. Eade Road/Patteson Road/Buxton Road – residential roads seeing increase in traffic
16. Impact on residential streets in the triangle within Bull Close Road/Magdalen Road-Sprowston Road/Silver Road
17. Outer Ring Road/Newmarket Road Roundabout - One of the key junctions on the Outer Ring Road and already heavily congested in the peak hours. Also on the route Hierarchy.
18. Outer Ring Road/Unthank Road Signals - As above
19. Outer Ring Road/Bowthorpe Road - As above
20. Catton Grove/Outer Ring Road - Bus route
21. Constitution Hill Roundabout - On the Route Hierarchy

22. Outer Ring Road/Roundtree Way with Salhouse Road/Gurney Road - As above
23. Heartsease Roundabout - As above
24. Martineau Lane/Trowse By-pass - As above and heavily congested in the peak hours
25. Ipswich Road/Hall Road - On the Route Hierarchy
26. Aylsham Road/Fifers Lane - As above
27. Vulcan Road/Fifers Lane ((HGV Access routes) - As above
28. Southbound Wroxham Road approach to past bus lane to roundabout - As above
29. A47/A146 south-eastern junction - On the Route Hierarchy and a junction with the Trunk Road.
30. Earlham Green area - bus routes
31. A146/B1332 - On the Route Hierarchy
32. Ipswich Road/B1113 - On the Route Hierarchy and heavily congested in the peak hours
33. Longwater interchange including P&R - On the Route Hierarchy and a junction with the Trunk Road. Heavily congested in the peak hours.
34. Additional traffic on residential or country lanes from Hellesdon Hall Lane out past Costessey/Taverham to beyond Hockering.
35. B1150 signalled junctions with White Woman Lane and Barkers Lane - On the Route Hierarchy.
36. B1150 Crostwick staggered junction - As above and also safety concerns.
37. Plumstead Road/Green Lane junction - As above
38. B1150 southbound into Coltishall - Village Residential
39. A47/Ipswich Road roundabout including P&R - On the Route Hierarchy and a junction with the Trunk Road. Heavily congested in the peak hours.
40. A47 at Trowse slip roads - On the Route Hierarchy and a junction with the Trunk Road. Heavily congested in the peak hours.
41. Postwick Hub including P&R - On the Route Hierarchy and a junction with the Trunk Road. Heavily congested in the peak hours.
42. Additional traffic through the western suburbs of Norwich, an area bounded by Newmarket Road and Earlham Road - residential roads.
43. Additional traffic through Thorpe Hamlet - residential roads
44. Additional traffic on City Road and Hall Road in the south-east city.
45. A1067 junctions in central Drayton - Route Hierarchy

46. Fakenham Road/Beech Avenue/Fir Covert Road staggered junction - Route hierarchy and on NDR.

47. Thickthorn Roundabout including P&R - On the Route Hierarchy and a junction with the Trunk Road. Heavily congested in the peak hours.

48. Westlegate/St Stephens Street/Rampant Horse Street signals - Sensitive bus route and already congested.

49. All Saints Green/Surrey Street signals - As above

50. Newmarket Road/Christchurch Road/Lime Tree Avenue signals - Strategic network, already congested, ties in with Outer Ring Road/Newmarket Road junction.

51. Outer Ring Road/Newmarket Road Roundabout with Eaton Road/Leopold Road - As above

52. Outer Ring Road/Long John Hill signals - Route Hierarchy and already congested at peak hours.

53. Outer Ring Road/Mansfield Lane signals - As above

54. Earlham Fiveways - Route Hierarchy, significant bus routes, very sensitive and already congested.

55. Additional traffic through Thorpe Hamlet residential roads - residential streets should not experience an increase in traffic

56. Plumstead Road double mini-roundabouts at Woodside - On the Route Hierarchy and already congested.

Appendix B. Further Developed List of Potential Off-line Junctions

Junction	Type	Comment	Model Results (08/05/13)	Assess in detail?
A1067 Fakenham Rd / Fir Covert Rd	Priority	Stagger with Beech Ave	Significant decreases in flows on Fakenham Rd. Increase in right-turn (Fakenham E -> Fir Covert).	maybe
A1067 Drayton Rd / Costessey Ln / School Rd	Priority	Low Road in close proximity	Significantly reduced flows in Do Something	N
A1067 Drayton Rd / Boundary Rd (ORR)	Signals		Reduction in flows overall and particularly on critical movements (Boundary -> Drayton High) in Do Something	N
A 140 Holt Rd / Cromer Rd / Fifers Ln / Meadow Way	Signals		Significant decreases in flows on this junction. Except for right-turn Holt -> Meadow in Do Something PM (movement has no flows except for this scenario - CHECK MODEL!)	N
A140 Boundary Rd / Reepham Rd / Cromer Rd / A1042	Signalised gyratory	Aylsham Rd to city centre	Overall, flows decrease at this junction with the exception of Cromer -> Reepham. This is a give-way link and may therefore be critical to the operation of this junction. Model flows should be reviewed in more detail.	maybe
A1042 Mile Cross Ln / St Faith Rd / Catton Grove Rd	Signals		Junction at / over capacity. Flows generally decreasing except for St Faith's Rd in the AM. Junction may have to be looked at in detail.	maybe
Spixworth Rd / White Woman Ln / Lodge Ln	Signals		Junction below capacity. Flows generally decreasing except for significant increase Spixworth N -> Spixworth S in the AM. Given reduction in other movements, junction should be able to accommodate this increase, model v/c still below capacity.	N
B1150 N Walsham Rd / Crostwick Ln / Rackheath Ln	Stagger	One arm to be closed off?	Junction below capacity in Do Min and Do Something. Closure of Rackheath Ln not yet modelled. Significant increases in traffic on N Walsham Rd combined with right-turn movement increases (AM: N Walsham -> Crostwick, PM: Crostwich -> N Walsham) may require for this junction to be assessed in detail.	maybe
B1150 N Walsham Rd / White Woman Ln	Signals	T-junction	Junction over capacity in AM. Increase in left-turn out of White Woman and equivalent decrease in right-turn, which should lead to better performance of junction. PM also shows increase in right-turn N Walsham -> White Woman which could have an impact on junction performance.	maybe
B1150 N Walsham Rd / Barker's Ln	Signals		Junction below capacity. Flows decreasing with minor increases in 2 movements in the PM.	N
A1042 Chartwell Rd / B1150 Constitution Hill	RBT		Junction below capacity. Flows decreasing on an arm basis. Minor increases in left-turn movements on Chartwell W and Constitution with significant decreases in ahead movements on these arms.	N
A1151 Wroxham Rd / Muck Ln	Priority		Most recent modelling has revealed problems at this junction due to traffic from the proposed Rackheath Ecotown.	maybe
A1151 Wroxham Rd / Green Ln W	Priority	Ghost Isl to be introduced	Junction below capacity in Do Something. Significant decreases in traffic on Wroxham N arm, increases on Wroxham S arm, decreases in right-turn out of Green Ln. Junction performance expected to significantly improve in Do Something. Latest modelling indicates significant flows out of Green Ln E taking the junction over capacity in both Do Minimum and Do Something due to the proposed Rackheath Ecotown.	maybe
A1151 Wroxham Rd / Blue Boar Ln	RBT		Junction below capacity. Significant decreases in flows in Do Something	N
A1042 Chartwell Rd / A1151 Wroxham Rd / Sprowston	RBT		Junction at / over capacity in Do Min, below capacity in Do Something. Flows decreasing on all arms.	N
Salhouse Rd / Green Ln W / Green Ln E	RBT		Most recent modelling has revealed problems at this junction due to traffic from the proposed Rackheath Ecotown.	maybe
Salhouse Rd / Blue Boar Ln / Woodside Rd	Signals		Junction below capacity. Decreases in flows on each arm in Do Something. Only increase in movement that could potentially be problematic is AM right-turn Woodside -> Salhouse.	N
A1042 / Salhouse Rd / Gurney Rd	Signals		Junction at / over capacity. Flows generally decreasing except for Gurney in the AM. Only left-turn movements increase which should be beneficial to junction performance.	maybe

Junction	Type	Comment	Model Results (08/05/13)	Assess in detail?
Plumstead Rd / Green Ln N / Heath Rd	Crossroads		Junction below capacity in Do Something. Significant increases in flows along Plumstead Rd (AM inbound / PM both directions). Decrease in right-turn movement into Green Ln, hence junction performance should improve. Heath Rd not modelled!	N
Plumstead Rd / Woodside Rd / Thunder Ln	Double mini		Junction at/over capacity. Decreases in flows on all arms except for minor increase on Plumstead W in PM despite significant increase on Plumstead ahead movement inbound in AM, outbound in PM. Junction is likely to perform better in Do Something than Do Minimum.	maybe
A1042 Heartease / Plumstead Rd	RBT	5-ARM roundabout	Junction at/over capacity in AM. Flows generally decrease in Do Something improving junction performance.	N
A1042 Ring Rd / Dussindale Dr	Signals		Junction below capacity. Flows decreasing on all arms.	N
Dussindale Dr / Yarmouth Rd	RBT		Junction below capacity. Flows decreasing on all arms.	N
A47 / A146 Trowse	Signals	2 junctions	Increase in right-turn movement A146E -> A47N and increase on A47SB off-slip	Y
A146 / Martineau Ln	Signals		Increase in right-turn movements in PM A146 -> Martineau N / Martineau S -> A146	Y
Martineau Ln / County Hall	RBT		One PM movement increases (Martineau -> Bracondale W). RBT overall within capacity. Works access arm not modelled	N
Bracondale / King St	Signals		Junction over capacity in Do Min + Do Something. Flows overall reduce in Do Something. PM right-turn into King St increase could potentially be critical.	maybe
A47 / Ipswich Rd (A140)	RBT		AM: jct slightly over capacity, 2 arms with increased flows (A140 sb / A47 offslip wb). PM: jct below capacity, A47 offslip wb with increased flows. HA may require assessment	agree with HA
A47 / A11	RBT	signalised	Initial assessment indicates that flows are lower at this junction in Do Something. HA may however require assessment of this junction.	agree with HA
A47 / Watton Rd	RBT		Initial assessment indicates that jct is not at capacity and impact of NDR on this jct is very limited. HA may however require assessment of this junction.	agree with HA
A47 / Longwater	RBT	2 roundabouts	Initial assessment indicates that jct is not at capacity and impact of NDR is marginal.	agree with HA
Costessey Area			Model outputs should only minor increases combined with decreases in this area.	N

Appendix B – Note considering Junctions to be assessed in detail

Model analysis for NDR TA

The model runs for the Alternative Core strategy, which reflects the JCS growth spatially, has been analysed to understand the impact of the NDR at key junctions to determine whether they need to be considered in greater detail. This modelling includes the city centre measures which are intended to reduce the amount of through traffic and enhance the city centre environment for walking, cycling and public transport.

A1067/Fir Covert Road junction

Modelled two way daily traffic flows at A1067/Fir Covert Road junction

AADT (24 hour) **Arm**	**2012**	**2017**	**2017 NDR**	**2032**	**2032 NDR**	**Growth 2012 to 2032**	**2032 NDR % change**
A1067 west	9100	10200	3300	11900	3600	31%	-91%
Fir Covert Road	6000	6700	5900	8800	8800	47%	0%
A1067 east	8900	10000	7400	11400	8800	28%	-29%
Beech Avenue	2800	3900	3000	5600	5200	100%	-14%
Average	6700	7700	4900	9425	6600	41%	-42%

The model predicts that this junction will be relieved by the NDR and in particular the A1067 arms. Considering an average of all the arms the impact of the NDR is that it offsets the predicted growth from 2012 to 2032.

In addition, a development proposal for a new superstore will signalise and improve this junction and this may well be in place before the NDR is constructed.

Modelling shows that the NDR has a positive impact at this junction and that further analysis for the Transport Assessment (TA) is not required.

A140 and Reepham Road/Outer Ring Road junction

Modelled two way daily traffic flows at A140 and Reepham Road/Outer Ring Road junction

AADT (24 hour) **Arm**	**2012**	**2017**	**2017 NDR**	**2032**	**2032 NDR**	**Growth 2012 to 2032**	**2032 NDR % change**
Reepham Road	9100	9800	11400	10300	11000	13%	8%
A140 Cromer Road	19100	19300	15400	19900	16200	4%	-19%
ORR east	23700	25000	21000	27400	23300	16%	-17%
Aylsham Road	16800	17100	16900	17400	17500	4%	1%
ORR west	22300	23600	21200	25800	24200	16%	-7%
Average	18200	18960	17180	20160	18440	11%	-9%

The model predicts that all arms at this junction will be relieved by the NDR except for Reepham Road. Considering an average of all the arms the impact of the NDR is that it almost offsets all of the predicted growth from 2012 to 2032.

Modelling shows that the NDR has a positive impact at this junction and that further analysis for the Transport Assessment (TA) is not required.

St Faiths Road/Outer Ring Road junction

Modelled two way daily traffic flows at St Faiths Road/Outer Ring Road junction

AADT (24 hour) **Arm**	**2012**	**2017**	**2017 NDR**	**2032**	**2032 NDR**	**Growth 2012 to 2032**	**2032 NDR % change**
ORR west	21800	22900	19000	25200	21100	16%	-19%
St Faiths road	12400	15000	12400	15700	12700	27%	-24%
ORR east	27700	28600	24900	31800	27100	15%	-17%
Catton Grove Road	5900	6400	5600	6600	5500	12%	-19%
Average	16950	18225	15475	19825	16600	17%	-19%

The model predicts that all arms at this junction will be relieved by the NDR Considering an average of all the arms the impact of the NDR is that it offsets the predicted growth from 2012 to 2032.

Modelling shows that the NDR has a positive impact at this junction and that further analysis for the Transport Assessment (TA) is not required.

B1150 North Walsham Road/Crostwick Lane junction

Modelled two way daily traffic flows at B1150 North Walsham Road/Crostwick Lane junction

AADT (24 hour) **Arm**	**2012**	**2017**	**2017 NDR**	**2032**	**2032 NDR**	**Growth 2012 to 2032**	**2032 NDR % change**
Crostwick Lane	2100	3700	2700	4400	3200	110%	-57%
B1150 north	11200	10300	13800	11600	15900	4%	38%
Rackheath Lane	3400	3300	0	3300	0	-3%	-97%
B1150 south	10600	10900	16500	12900	19000	22%	58%
Average	6825	7050	8250	8050	9525	18%	22%

The model predicts large increases on the B1150 North Walsham Road with the NDR and this is to be expected as the traffic diverts from unsuitable rural routes onto the NDR and uses the North Walsham Road to access the NDR. An improvement is proposed at this junction as part of the NDR scheme and this involves closing off the Rackheath Lane arm which will make it easier for traffic to emerge from Crostwick Lane.

As an improvement is proposed to this junction as part of the NDR scheme, it may be appropriate to consider it in the TA.

B1150 North Walsham Road/White Woman Lane junction

Modelled two way daily traffic flows at B1150 N Walsham Road/White Woman Lane junction

AADT (24 hour) **Arm**	**2012**	**2017**	**2017 NDR**	**2032**	**2032 NDR**	**Growth 2012 to 2032**	**2032 NDR % change**
B1150 north	10700	6900	6900	10100	8800	-6%	-12%
White Woman Lane	4600	4600	4900	5000	5400	9%	9%
B1150 south	14700	9100	7500	12000	9000	-18%	-20%
Average	10000	6867	6433	9033	7733	-10%	-13%

The model predicts that the B1150 arms at this junction will be relieved by the NDR but that traffic will increase on White Woman Lane. This is probably related to the inclusion of the Beyond Green internal link road which is in both the NDR amd non NDR scenarios. Considering an average of all the arms the impact of the NDR is that it further reduces traffic through this junction.

Modelling shows that the NDR has a positive impact at this junction and that further analysis for the Transport Assessment (TA) is not required.

A1151 Wroxham Road/Muck Lane junction

Modelled two way daily traffic flows at A1151 Wroxham Road/Muck Lane junction

AADT (24 hour) **Arm**	**2012**	**2017**	**2017 NDR**	**2032**	**2032 NDR**	**Growth 2012 to 2032**	**2032 NDR % change**
A1151 Wroxham Road north	14600	14000	16500	14200	18500	-3%	29%
Muck Lane	2000	2100	700	1600	400	-20%	-60%
A1151 Wroxham Road south	14600	13900	17100	12600	18100	-14%	38%
Average	10400	10000	11433	9467	12333	-9%	28%

The model predicts increases on Wroxham Road with the NDR and this is to be expected as the traffic diverts from unsuitable rural routes onto the NDR and uses the Wroxham Road to access the NDR. The reduction on Muck Lane reflects that this route would be severed by the large development at Rackheath (4000 homes and 25ha of employment by 2032). However, the modelling assumptions, in terms of where traffic from the new development loads onto the highway network, is critical for this junction.

It is likely that Muck Lane will be a key access point for this new development, but this is not currently reflected in the model as these details will not be fully known for many years.

If Muck Lane does become a key access point, an improvement to this junction is likely to be required in the future but essentially as a consequence of the large development levels predicted by 2032, not the NDR, so further analysis for the Transport Assessment (TA) is not required.

A1151 Wroxham Road/Green Lane West junction

Modelled two way daily traffic flows at A1151 Wroxham Road/Green Lane West junction

AADT (24 hour) **Arm**	**2012**	**2017**	**2017 NDR**	**2032**	**2032 NDR**	**Growth 2012 to 2032**	**2032 NDR % change**
A1151 Wroxham Road north	14600	13900	17100	12600	18100	-14%	38%
Green Lane West	5000	5200	2200	8700	5800	74%	-58%
A1151 Wroxham Road south	11800	12300	18800	14700	23800	25%	77%
Average	10467	10467	12700	12000	15900	15%	37%

The model predicts increases on Wroxham Road with the NDR and this is to be expected as the traffic diverts from unsuitable rural routes onto the NDR and uses the Wroxham Road to access the NDR. The reduction on Green Lane West with the NDR is likely to reflect through traffic on that rural road diverting onto the NDR.

Modelling assumptions, in terms of where traffic from the large development at Rackheath (4000 homes and 25ha of employment by 2032) loads onto the highway network, is critical for this junction. These details will not be fully known for many years until the development commences and it may be that the current modelled assumptions are not a realistic representation.

Although traffic levels on Green Lane West are reduced by the NDR, because traffic levels on Wroxham Road will increase, an improvement to the junction is proposed as part of the NDR scheme to help traffic turning out of Green Lane West.

As an improvement is proposed to this junction as part of the NDR scheme, it may be appropriate to consider it in the TA.

Further improvements to this junction are likely in the future as a consequence of the large development levels predicted by 2032, rather than the NDR.

Salhouse Road/Green Lane West junction

Modelled two way daily traffic flows at Salhouse Road/Green Lane West junction

AADT (24 hour) **Arm**	**2012**	**2017**	**2017 NDR**	**2032**	**2032 NDR**	**Growth 2012 to 2032**	**2032 NDR % change**
Green Lane west	5000	5300	2500	12900	9700	158%	-64%
Salhouse Road north	5000	5400	5900	6500	7100	30%	12%
Green Lane east	6700	6800	700	8000	700	19%	-109%
Salhouse Road south	5400	6900	8400	8800	15900	63%	131%
Average	5525	6100	4375	9050	8350	64%	-13%

The model predicts increases on Salhouse Road with the NDR and this is to be expected as the traffic diverts from unsuitable rural routes onto the NDR and uses the Salhouse Road to access the NDR. The reduction on Green Lane West with the NDR in place is likely to reflect through traffic on that rural road diverting onto the NDR. The reduction on Green Lane East is largely because this road is closed at the eastern end as part of the NDR scheme.

Further improvements to this junction are likely to be required in the future but this is essentially as a consequence of the large development levels predicted by 2032, not the NDR, so further analysis for the Transport Assessment (TA) is not required.

Salhouse Road/Outer Ring Road junction

Modelled two way daily traffic flows at Salhouse Road/Outer Ring Road junction

AADT (24 hour) **Arm**	**2012**	**2017**	**2017 NDR**	**2032**	**2032 NDR**	**Growth 2012 to 2032**	**2032 NDR % change**
ORR west	23500	24100	20000	25000	20700	6%	-18%
Salhouse Road	12600	13800	12700	16300	14700	29%	-13%
ORR east	17300	17500	14200	16900	13800	-2%	-18%
Gurney Road	10700	11500	10700	12300	11400	15%	-8%
Average	16025	16725	14400	17625	15150	10%	-15%

The model predicts that all arms at this junction will be relieved by the NDR Considering an average of all the arms the impact of the NDR is that it more than offsets the predicted growth from 2012 to 2032.

Modelling shows that the NDR has a positive impact at this junction and that further analysis for the Transport Assessment (TA) is not required.

Plumstead Road/Woodside Road junction

Modelled two way daily traffic flows at Plumstead Road/Woodside Road junction

AADT (24 hour) **Arm**	**2012**	**2017**	**2017 NDR**	**2032**	**2032 NDR**	**Growth 2012 to 2032**	**2032 NDR % change**
Woodside Road	11800	13000	8700	11600	8100	-2%	-30%
Plumstead Road east	13200	14500	12700	11800	10100	-11%	-13%
Thunder Lane	7700	8900	6200	8900	6400	16%	-32%
Plumstead Road west	13200	13800	13100	14600	13100	11%	-11%
Average	11475	12550	10175	11725	9425	2%	-20%

The model predicts that all arms at this junction will be relieved by the NDR. However, the 2032 flows for Woodside Road and Plumstead Road east are lower than 2017. This is likely to be due to the inclusion of a new link road in 2032 associated with JCS development between Salhouse and Plumstead Road. Considering an average of all the arms the impact of the NDR is that it more than offsets the predicted growth from 2012 to 2032.

Modelling shows that the NDR has a positive impact at this junction and that further analysis for the Transport Assessment (TA) is not required.

A146/Martineau Lane junction

Modelled two way daily traffic flows at A146/Martineau Lane junction

AADT (24 hour) **Arm**	**2012**	**2017**	**2017 NDR**	**2032**	**2032 NDR**	**Growth 2012 to 2032**	**2032 NDR % change**
Martineau Lane east	28400	31400	32400	34500	36000	21%	5%
A146 Trowse bypass	37000	41600	43600	47700	49600	29%	5%
Martineau Lane west	16200	18500	19500	20300	21700	25%	9%
Average	27200	30500	31833	34167	35767	26%	6%

Modelling shows that traffic through this junction is predicted to grow by 26% on average between 2012 and 2032. With the NDR in place this increases by a further 6%.

In view of this additional increase it is suggested that this junction is considered in the Transport Assessment (TA).

Bracondale/King Street junction

Modelled two way daily traffic flows at Bracondale/King Street junction

AADT (24 hour) **Arm**	**2012**	**2017**	**2017 NDR**	**2032**	**2032 NDR**	**Growth 2012 to 2032**	**2032 NDR % change**
Bracondale north	17700	17900	18400	18500	19900	5%	8%
King Street	25400	28000	26800	30000	28700	18%	-5%
Bracondale south	30400	32500	32100	34200	33700	13%	-2%
Average	24500	26133	25767	27567	27433	13%	-1%

Modelling shows that the King Street and Bracondale south arms of this junction, the ring road movement, get relief from the NDR, but that the Bracondale north, access to the city centre arm, increases. This is possibly due to the city centre measures which reduce through movements. Overall the average change across all three arms is -1%.

Despite the overall change with the NDR being beneficial, because there are increases on the Bracondale north arm, it is suggested that this junction is considered in the Transport Assessment (TA).

A47/A146 Trowse bypass junction

Modelled two way daily traffic flows at A146/Martineau Lane junction

AADT (24 hour) **Arm**	**2012**	**2017**	**2017 NDR**	**2032**	**2032 NDR**	**Growth 2012 to 2032**	**2032 NDR % change**
A146 Trowse bypass	37000	41600	43600	47700	49600	29%	5%
A47 (east) eastbound	21100	24300	25500	32200	34300	53%	10%
A47 (east) westbound	20500	23100	25700	31300	33800	53%	12%
A146	30200	33700	33000	37700	36300	25%	-5%
A47 (west) westbound	21300	25600	25700	34900	34300	64%	-3%
A47 (west) eastbound	21900	25100	24100	32600	32300	49%	-1%
Average	25333	28900	29600	36067	36767	42%	3%

Modelling shows that all of the arms of the junction increase significantly from 2012 to 2032 and on average by 42%.

With an NDR in place the A47 east arms and the Trowse bypass arm of the junction increase and the remaining arms seeing a reduction. On average the overall increase in traffic flow through the junction due to the NDR is 3%.

In view of this additional increase due to the NDR it is suggested that this junction is considered in the Transport Assessment (TA).

A47/A140 Harford junction

Modelled two way daily traffic flows at A47/A140 Harford junction

AADT (24 hour) **Arm**	**2012**	**2017**	**2017 NDR**	**2032**	**2032 NDR**	**Growth 2012 to 2032**	**2032 NDR % change**
A140 north	15300	17400	17500	22200	22600	45%	3%
A47 (east) eastbound	21900	25100	24100	32600	32300	49%	-1%
A47 (east) westbound	21300	25600	25700	34900	34300	64%	-3%
Markshall Farm Road	4800	5500	5500	5800	5800	21%	0%
A140 south	21400	23400	23500	28800	29100	35%	1%
A47 (west) westbound	20400	24900	24200	34400	33100	69%	-6%
A47 (west) eastbound	21100	25100	23700	33900	32800	61%	-5%
Average	18029	21000	20600	27514	27143	53%	-2%

Modelling shows that traffic levels on all of the arms of the junction increase significantly from 2012 to 2032 and on average by 53%.

With an NDR in place on average there is a slight decrease in traffic flow through the junction of 2%. This is a positive impact of the NDR and further analysis for the Transport Assessment (TA) is not required.

A47/A11 Thickthorn junction

Modelled two way daily traffic flows at A47/A11 Thickthorn junction

AADT (24 hour) **Arm**	**2012**	**2017**	**2017 NDR**	**2032**	**2032 NDR**	**Growth 2012 to 2032**	**2032 NDR % change**
A11 north	30500	36600	36700	44500	44900	46%	1%
A47 (east) eastbound	21100	25100	23700	33900	32800	61%	-5%
A47 (east) westbound	20400	24900	24200	34400	33100	69%	-6%
A11 south	38400	45400	45600	58900	58600	53%	-1%
B1172	11700	13200	13400	16300	16600	39%	3%
A47 (west) westbound	15300	19000	17700	27300	25600	78%	-11%
A47 (west) eastbound	16700	19500	17900	27100	25600	62%	-9%
Average	22014	26243	25600	34629	33886	57%	-3%

Modelling shows that traffic levels on all of the arms of the junction increase significantly from 2012 to 2032 and on average by 57%.

With an NDR in place on average there is a slight decrease in traffic flow through the junction of 3%. The biggest decreases are on the A47 west arms (11% and 9%) which probably indicates that with an NDR in place traffic is going around the southern bypass and using the NDR to access destinations to the north of the Norwich rather than the existing routes across the River Wensum.

This is a positive impact of the NDR and further analysis for the Transport Assessment (TA) is not required.

A47/B1108 Watton Road junction

Modelled two way daily traffic flows at A47/B1108 Watton Road junction

AADT (24 hour) **Arm**	**2012**	**2017**	**2017 NDR**	**2032**	**2032 NDR**	**Growth 2012 to 2032**	**2032 NDR % change**
B1108 east	14400	16600	16400	23700	23400	65%	-2%
A47 (east) eastbound	16700	19500	17900	27100	25600	62%	-9%
A47 (east) westbound	15300	19000	17700	27300	25600	78%	-11%
B1108 west	12700	13800	13700	14100	14100	11%	0%
A47 (west) westbound	14100	17500	15900	23900	21800	70%	-15%
A47 (west) eastbound	16000	19200	17400	25000	22700	56%	-14%
Average	14867	17600	16500	23517	22200	58%	-9%

Modelling shows that traffic levels on all of the arms of the junction increase significantly from 2012 to 2032 and on average by 58%.

With an NDR in place on average there is a decrease in traffic flow through the junction of 9%. The biggest decreases are on the A47 west arms (15% and 14%) which probably indicates that with an NDR in place traffic is going around the southern bypass and using the NDR to access destinations to the north of the Norwich rather than the existing routes across the River Wensum.

This is a positive impact of the NDR and further analysis for the Transport Assessment (TA) is not required.

A47/AA1074 Longwater junction

Modelled two way daily traffic flows at A47/AA1074 Longwater junction

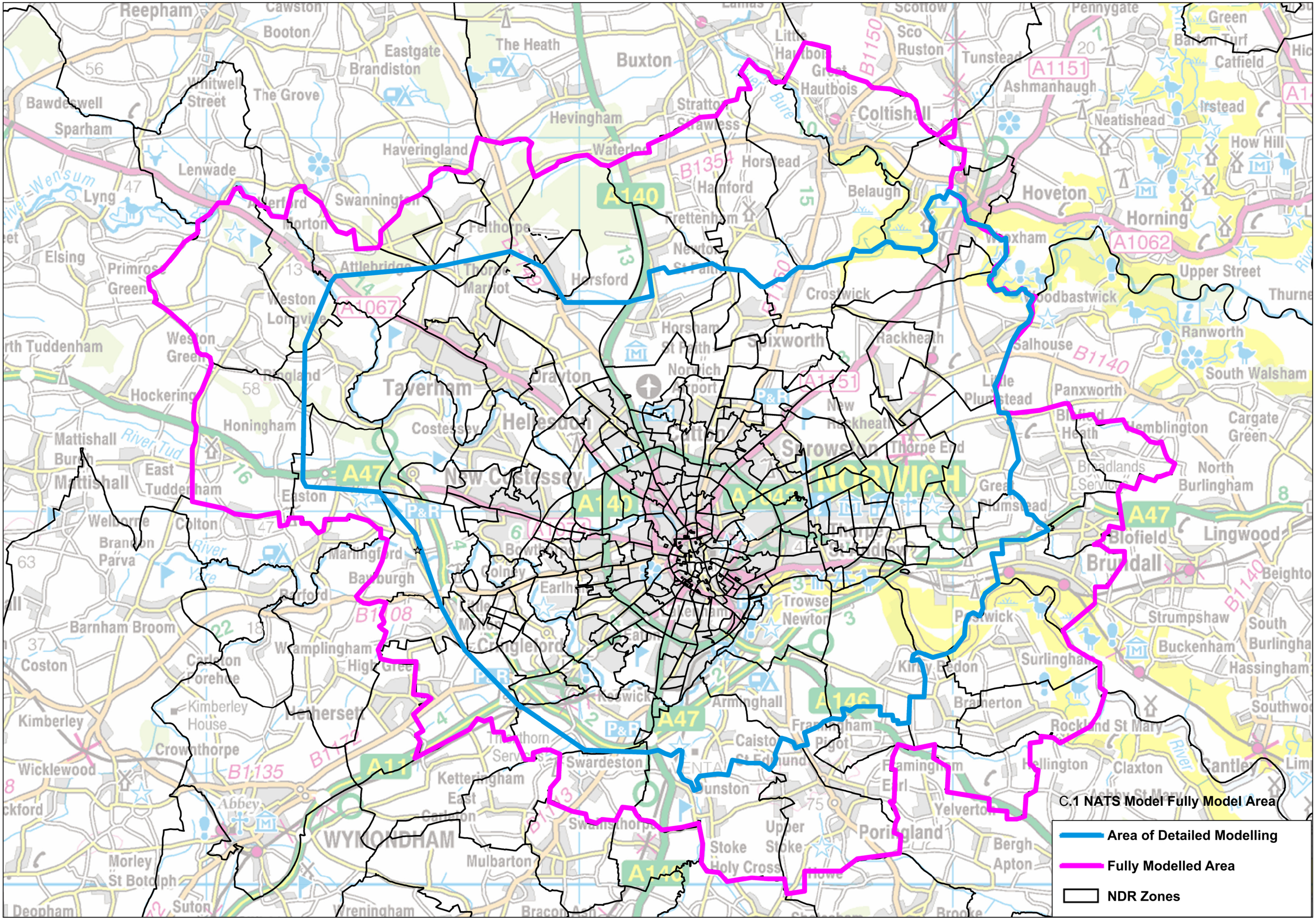
AADT (24 hour) **Arm**	**2012**	**2017**	**2017 NDR**	**2032**	**2032 NDR**	**Growth 2012 to 2032**	**2032 NDR % change**
Longwater/Queens Hills	9300	12700	12800	15200	15300	63%	1%
A1074 Dereham road	18100	20800	19200	25800	24100	43%	-9%
A47 (east) eastbound	16000	19200	17400	25000	22700	56%	-14%
A47 (east) westbound	14100	17500	15900	23900	21800	70%	-15%
Long Lane	3100	4000	4000	4100	4200	32%	3%
Dereham Road west	1900	2200	2000	3900	3500	105%	-21%
A47 (west) westbound	13300	15500	14100	20600	19000	55%	-12%
A47 (west) eastbound	14000	16300	14900	19900	18500	42%	-10%
Average	11225	13525	12538	17300	16138	54%	-10%

Modelling shows that traffic levels on all of the arms of the junction increase significantly from 2012 to 2032 and on average by 54%.

With an NDR in place on average there is a decrease in traffic flow through the junction of 10%.

This is a positive impact of the NDR and further analysis for the Transport Assessment (TA) is not required.

Appendix C – Maps



C.1 NATS Model Fully Model Area

Trunk Roads

Principal Routes
Used to carry the majority of through traffic

Main Distributor Routes
Used for the distribution of more local traffic, particularly between Principal Routes

HGV routes

Local Access Routes
Linking the more significant communtiies with Trunk and Principal Routes,Main Distributor Routes, and HGV routes

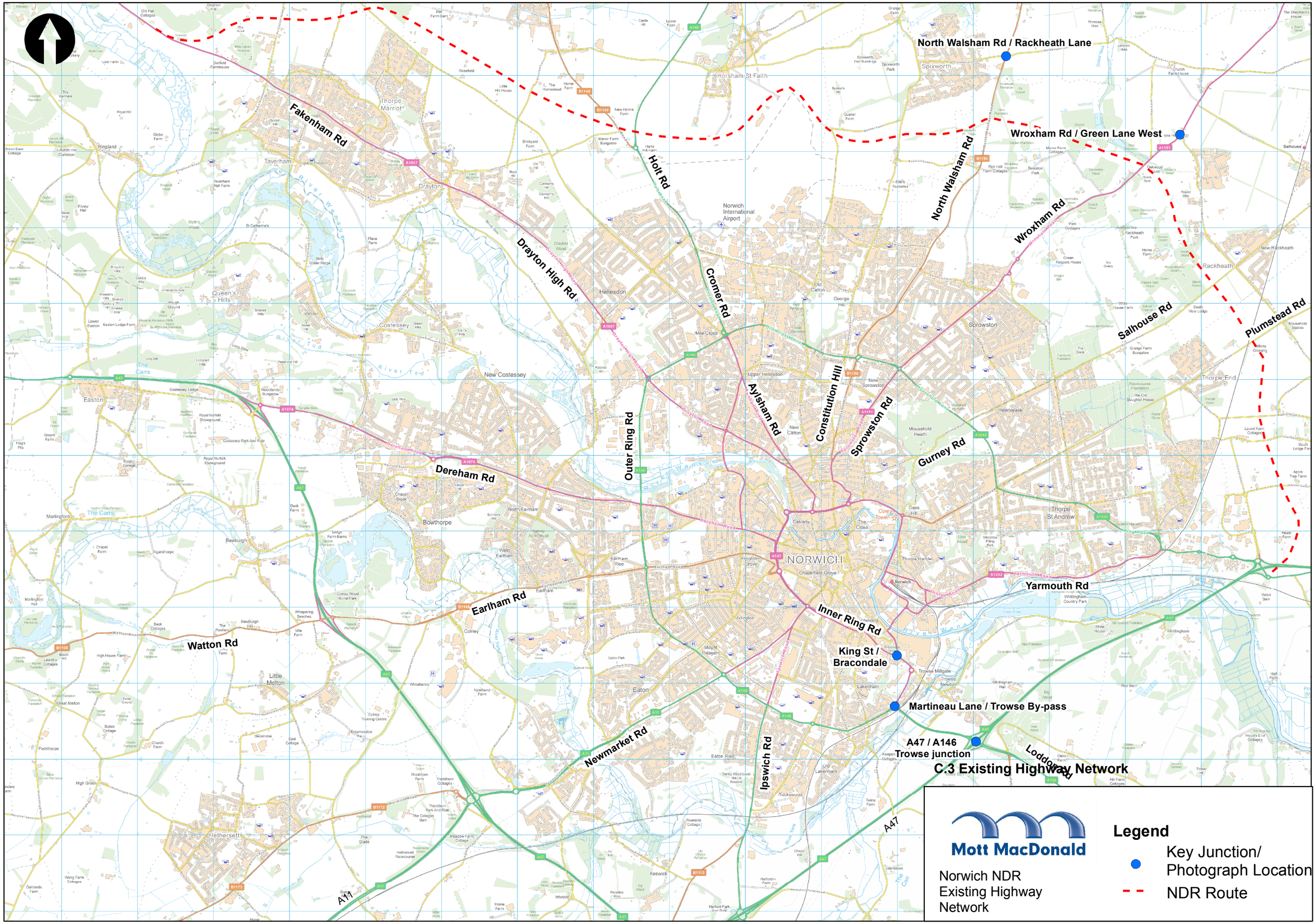
Special Routes

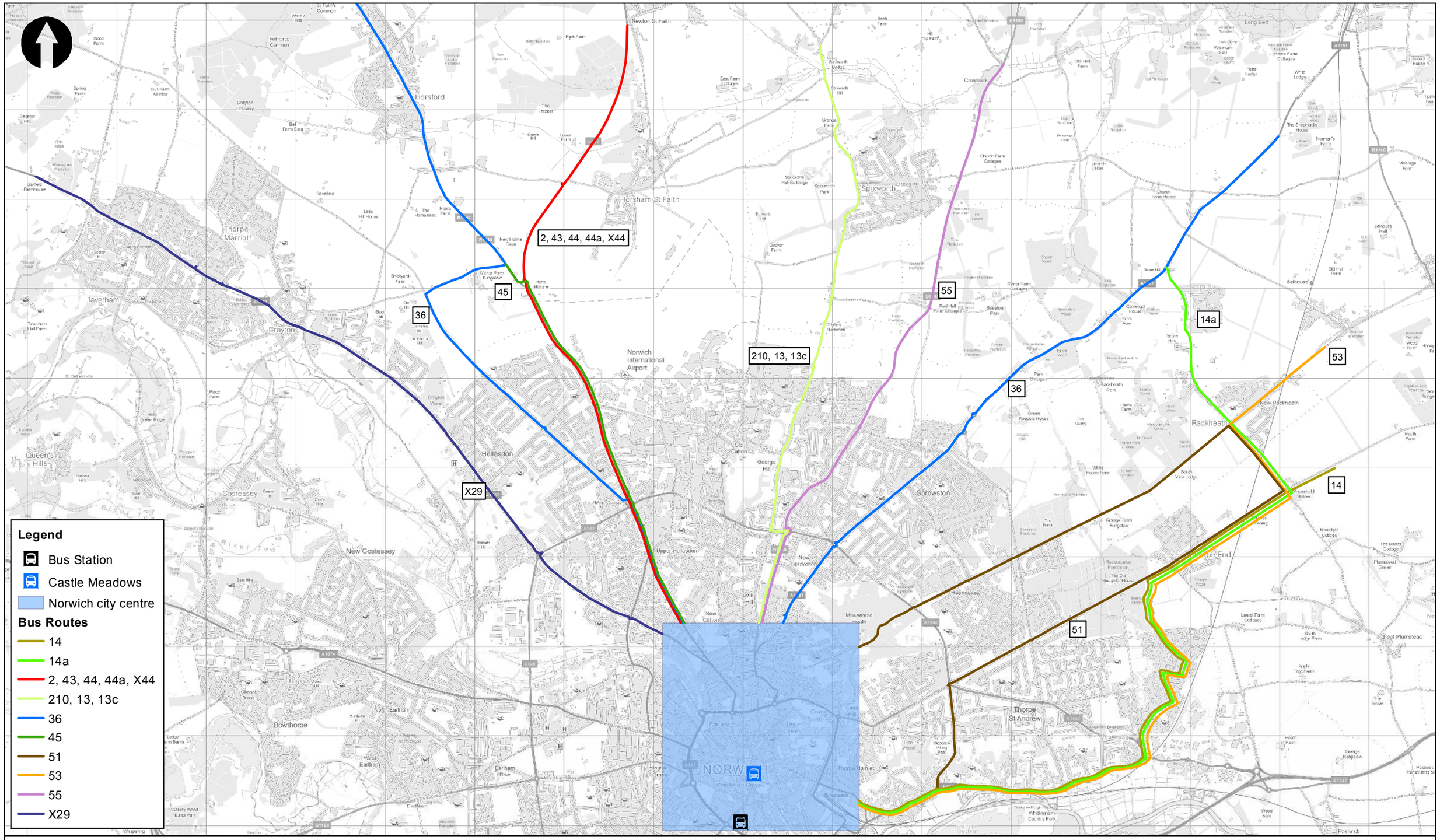
Tourist Routes
Links the recognised tourist attractions with all other types of routes

North

C.2 Norfolk Route Hierarchy

Source: JCS Baseline Conditions Report - January 2010


North Walsham Rd / Rackheath Lane
Wroxham Rd / Green Lane West
Fakenham Rd
Holt Rd
North Walsham Rd
Wroxham Rd
Drayton High Rd
Cromer Rd
Salhouse Rd
Plumstead Rd
Aylsham Rd
Constitution Hill
Sprowston Rd
Gurney Rd
Outer Ring Rd
Dereham Rd
Earlham Rd
Yarmouth Rd
Inner Ring Rd
Watton Rd
King St / Bracondale
Martineau Lane / Trowse By-pass
A47 / A146 Trowse junction
Newmarket Rd
Ipswich Rd
Lodden Rd
C.3 Existing Highway Network
NORWICH
Norwich International Airport
Mott MacDonald
Norwich NDR Existing Highway Network
Legend
Key Junction/ Photograph Location
NDR Route



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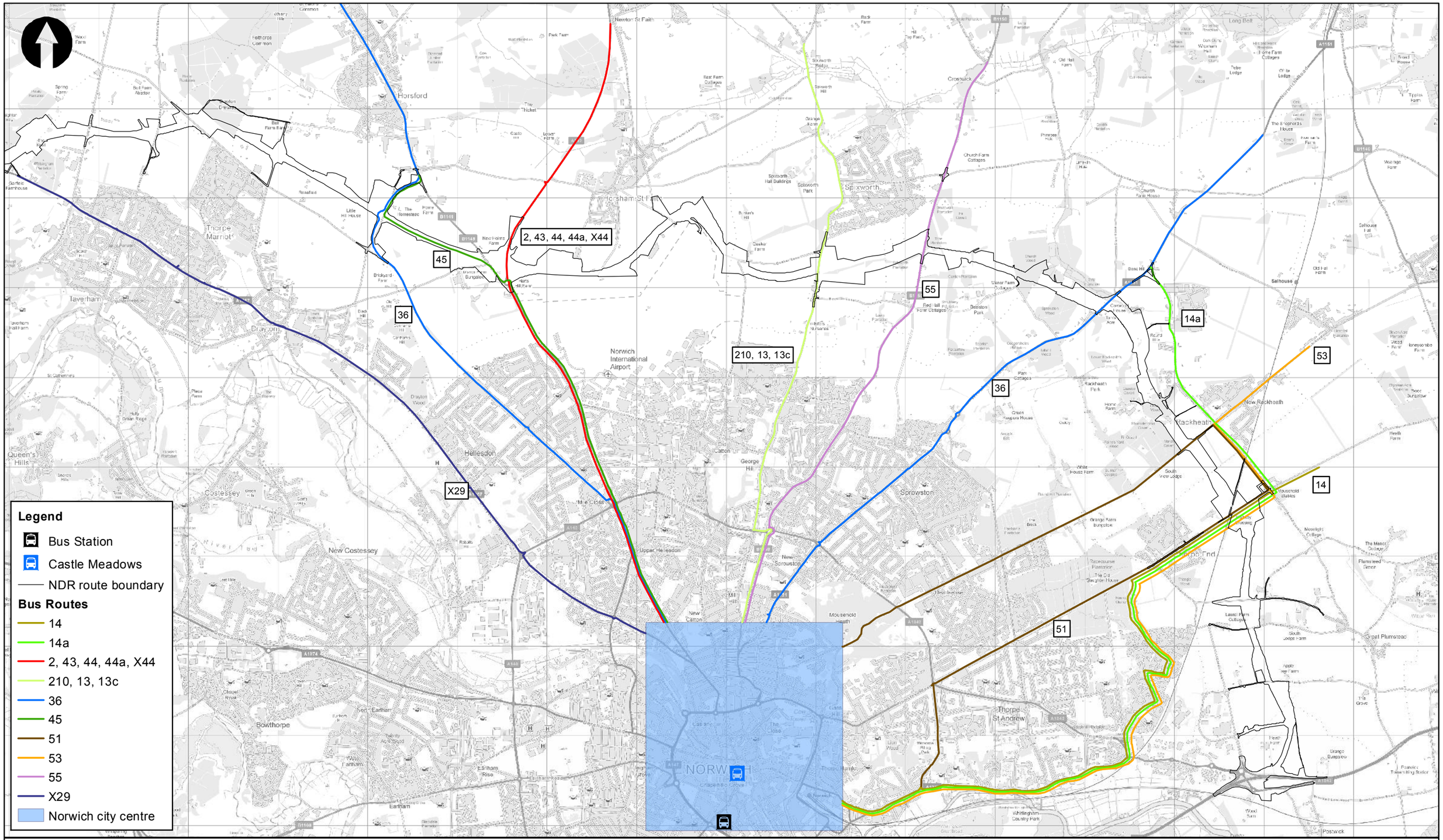
C.4 Bus Routes

Rev	Date	Drawn	Description	Ch'k'd	App'd
0	25/11/2013	SP	Revision for Submission	NC	AO

Title
Norwich Northern Distributor Road

Key Bus Routes in the NDR Corridor

Drawn	SP
Checked	NC
Approved	AO
Scale at A3	1:40,000
Drawing No. MMD-233906-DT-0938	
Rev	0
Status	INF



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C.5 Bus Routes with NDR

Rev	Date	Drawn	Description	Ch'k'd	App'd
0	28/11/2013	SP	Revision for Submission	NC	AO

Title

Norwich Northern Distributor Road

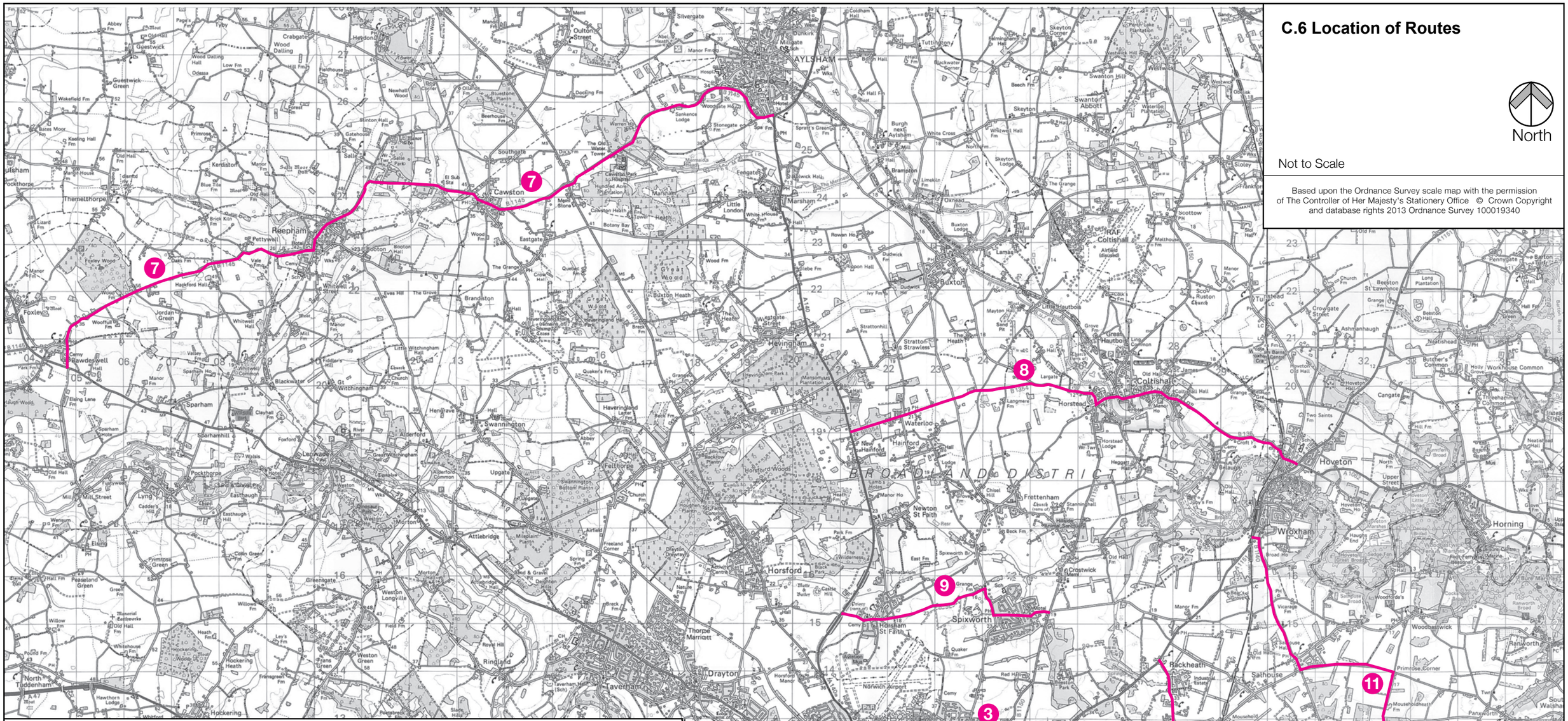
Key Bus Routes in the NDR Corridor

Drawn	SP
Checked	NC
Approved	AO
Scale at A3	1:40,000
Drawing No.	MMD-233906-DT-0938
Rev	0
Status	INF

C.6 Location of Routes

North

Not to Scale



1. Middleton's Lane (which provides a connection between the A1067 and the A140)
2. Fifers Lane/St Faiths Road/Church Street (which collectively provide a connection between the A140 and the C246 Spixworth Road)
3. White Woman Lane (which provides a connection between the C246 Spixworth Road and the B1150 North Walsham Road)
4. Barkers Lane/Church Lane (which collectively provides a connection between the B1150 North Walsham Road and the the A1151 Wroxham Road)
5. Blue Boar Lane (which provides connections between the A1151 Wroxham Road and the C283 Salhouse Road)
6. Woodhouse Road (which provides a connection between the C283 Salhouse Road and the C874 Plumstead Road)
7. The B1145 between the A1067 at Bawdeswell and the A140 at Aylsham via Reepham and Cawston
8. Route between the A140 and Hoveton via Coltishall which utilises the B1354
9. Spixworth Road/Church Lane/Buxton Road/Crostwick Lane route between the A140 and the B1150 North Walsham Road
10. Church Road/Broad Lane/Green Lane West through Great Plumstead
11. Woodbastwick Road/B1140 Low Road and Bell Lane through Salhouse