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# A18-A180 Link: Major Scheme Business Case

## Modelling Scoping Report



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## Modelling Scoping Report

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# A18-A180 Link: Major Scheme Business Case

## Modelling Scoping Report

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# 1 Introduction

## Introduction

- 1.1 At the meeting with the DfT on 29<sup>th</sup> October 2007 to discuss the development of the Major Scheme Business Case for the A18-A180 Link Road, the DfT requested further detail on how the North East Lincolnshire SATURN model will be updated to test the proposals and the suitability of new traffic count data. Since then, North East Lincolnshire Council have commissioned and undertaken additional surveys and JMP Consulting have reviewed the SATURN model and other data sources. This note sets out a summary of the original SATURN model, details of subsequent traffic surveys and the implications for the proposed methodology

## The North East Lincolnshire SATURN Model

- 1.2 Details of the North East Lincolnshire (NEL) SATURN model are provided in the Local Model Validation Report which has already been submitted to the DfT for information. Set out below is a summary of the model and how it was developed including details of the original traffic data which was used to produce this model.
- 1.3 The NEL SATURN model covers the whole of North East Lincolnshire, with a particular focus on Grimsby and Cleethorpes. Models were developed for the AM and PM peak hours only.
- 1.4 Details of the surveys undertaken are included in the Survey Proposals Technical Note which is included as **Appendix A**. Roadside interview surveys were undertaken for the three hour AM (0700-100) and PM (1600-1900) peak periods at the following locations, see **Figure 2.1 in Appendix A**:
- site R1 – A180 west of the A160 interchange;
  - site R2 – A16 junction of A16/Louth Road; and
  - site R3 – A46 junction of A46 Laceby Road/Winchester Avenue.
- 1.5 Additionally, an HGV survey was undertaken in both directions along the A180, A46 and A16 during peak periods, on a typical weekday. The survey recorded a tally of HGV's, the respective vehicle classes and a sample of some operator details, such as name, headquarters of operator and contact reference (telephone or address). Subsequently, a telephone call back was made to establish the trip origin and destination of the observed HGV movements, the frequency of the journey and the type of consignment carried.
- 1.6 Manual classified turning counts were undertaken at 50 locations for the AM and PM Peak periods, 10 of which were undertaken in and around Immingham, see **Figure 2.2 in Appendix A**. Additionally Manual Classified Link Counts were undertaken on 11 links, 3 of which are around Immingham, see **Figure 2.3 in Appendix A**.
- 1.7 Automatic traffic counts were undertaken for a week at 9 locations, see **Figure 2.4 in Appendix A**.
- 1.8 AM and PM Peak hour matrices were derived using the roadside interviews and matrix estimation.
- 1.9 The model was validated across a number of screenlines and cordons and a number of journey time routes which were focussed around Grimsby. The Local Model Validation Report concluded that the AM and PM Peak models are reliable in terms of matrix O/D movements, assigned traffic flows, route choice and network journey times and is therefore robust and sufficiently well validated. As the model validation was focussed around Grimsby, it is recognised that further work is required to update the model for testing the A18-A180 Link Road.

## Scope of Report

- 1.10 This note sets out in **Section 2**, the details of what traffic count data is available and demonstrates that there is sufficient existing data available to update the model to a sufficient level of accuracy for a scheme of this size. **Section 3** then sets out how this data will be used to update the SATURN model.

## 2 Data Available

### Introduction

- 2.1 A number of traffic counts have been undertaken since the NEL SATURN model was developed in 2004/05 which are set out below. Additionally, origin-destination information for HGV movements to and from the docks has been obtained since the meeting with the DfT on 29<sup>th</sup> October 2007.

### Manual Classified Counts

#### Turning Counts

- 2.2 A series of 12 hour manual classified turning counts were undertaken in March 2007. The location of these counts are shown in **Figure 2.1**.

#### Link Counts

- 2.3 Manual classified link counts (MCCs) were undertaken at 3 locations as shown in **Figure 2.1**. These counts were undertaken for a 12 hour period in October 2007. These counts were undertaken on a weekday.

### Automatic Traffic Counts

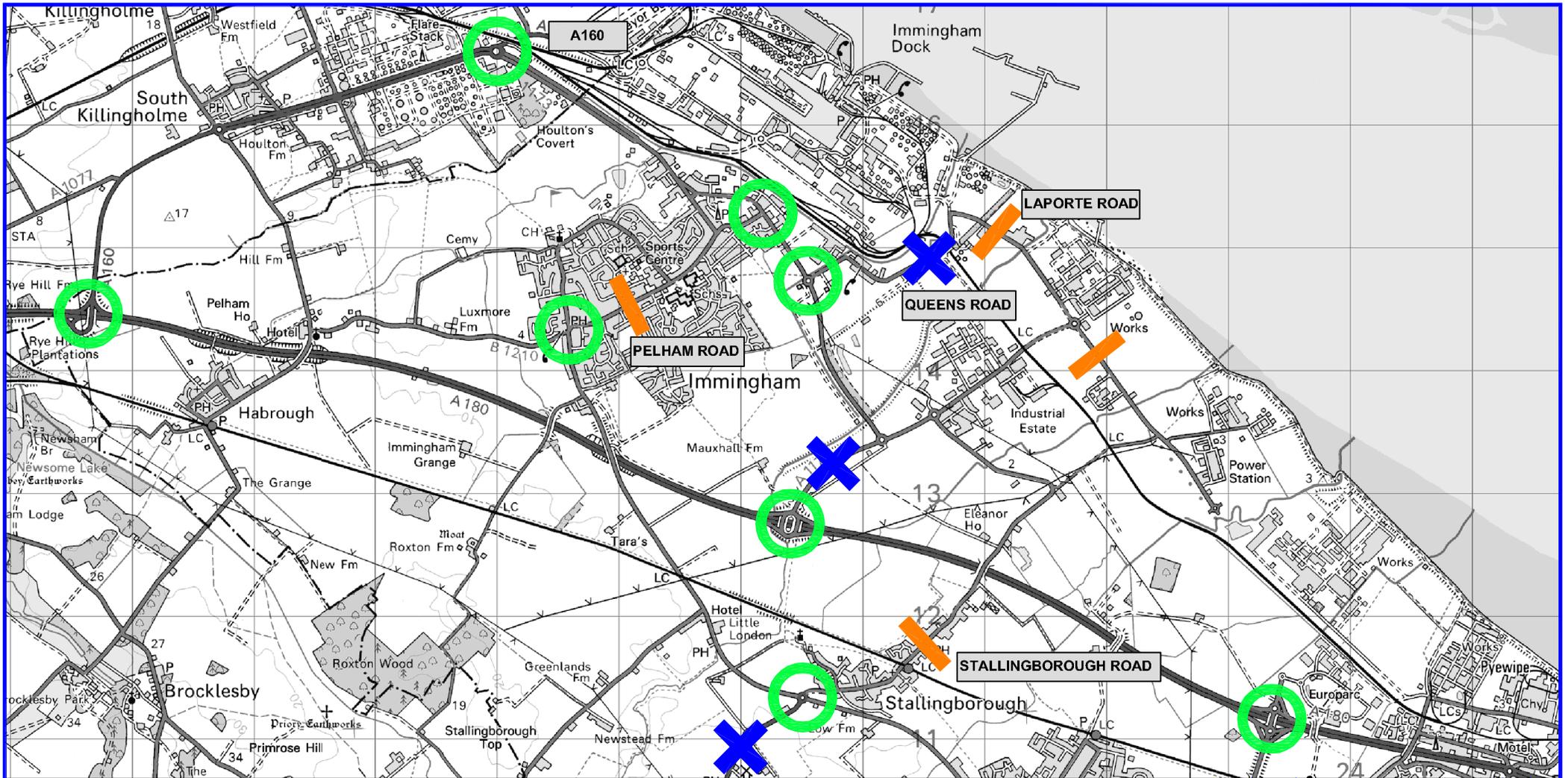
- 2.4 Automatic traffic counts (ATCs) have been undertaken at four locations in the study area as shown in **Figure 2.1**. The Pelham Road count provides monthly average hourly classified flows for the whole of 2006. The ATCs at the other three sites provide hourly classified flows for September 2005. The Pelham Road count provides useful information on the monthly variation in HGVs and shows whether the MCCs are representative, which is discussed in more detail below. Also the Station Road, Stallingborough count shows whether the weight restriction is being observed.

#### Pelham Road

- 2.5 **Figure 2.2 and Table 2.1** shows the average HGV flow on Pelham Road for 2006 by month. This shows that the average inter peak HGV flows are similar to the average peak hour HGV flow. The annual average inter peak flow is 46 vehicles, which is comparable to the average of the AM peak and PM peak hour flows which is 42 vehicles.
- 2.6 **Table 2.1** also shows that March is close to the annual average, and therefore represents a typical month. As a consequence, the MCC data which was undertaken in March represents a typical month for HGV movements.

**Table 2.1: Two Way HGV Flows on Pelham Road**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
AM Peak Hour	49	51	53	57	51	62	58	54	54	62	55	46	<b>54</b>
PM Peak Hour	26	26	31	25	29	32	32	25	30	39	34	26	<b>30</b>
Average Peak Hour	38	39	42	41	40	47	45	40	42	51	45	36	<b>42</b>
Average Inter Peak	44	43	47	44	42	52	46	43	45	51	53	43	<b>46</b>

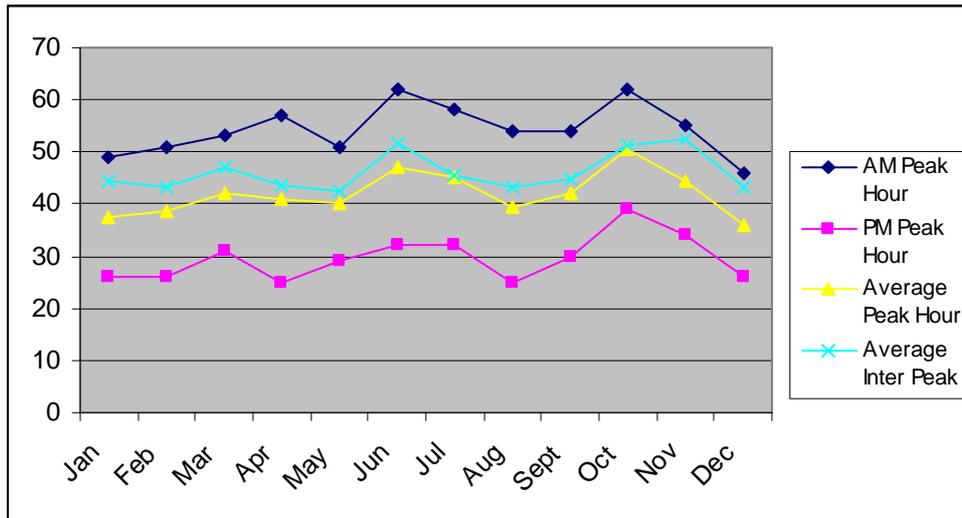


**KEY:**

-  MCC TURN  
07:00 - 19:00HRS - MARCH 2007
-  MCC LINK  
07:00 - 19:00HRS - OCT 2007
-  ATC 24HR COUNT

<b>INFORMATION</b> Drawing Status: NTS Scale: A3 Original dwg. size: A3 Date: 30/11/07 Drawn: MO Checked: EW Approved: EW			Client: North East Lincolnshire Council Project: A18 - A180 Link MSBC	Title: TRAFFIC COUNT LOCATIONS
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Rev.	Date	Revision Details	Drawn	Approved
© This drawing is the property of JMP Consultants Limited and the information can only be reproduced with their prior permission.				
MINERVA HOUSE EAST PARADE LEEDS LS1 5PS  T 0113 244 4347 F 0113 242 3753 E leeds@jmp.co.uk W www.jmp.co.uk				
Drawing Number: FIGURE 2.1			Rev: **	



**Figure 2.2: Two Way HGV Flows on Pelham Road**

2.7 **Figure 2.2** also shows that the average inter peak hour HGV flow is very similar to the average of the AM and PM peak hours.

### Station Road Stallingborough

2.8 The ATC showed that despite there being a weight limit through Stallingborough, a few HGVs do use this route. However, this represents a very small proportion of total traffic, typically less than 1%.

**Table 2.2: 24Hr Two Way flow Station Road Stallingborough**

	Total Vehicles	HGVs	% HGVs
Thursday	2127	17	0.8%
Friday	1928	7	0.4%
Saturday	947	6	0.6%
Sunday	757	7	0.9%
Monday	1900	10	0.5%
Tuesday	2013	19	0.9%
Wednesday	1965	16	0.8%

## Origin – Destination Data

### Freight Survey

2.9 A survey of HGVs leaving Immingham Dock was undertaken on 14<sup>th</sup> and 15<sup>th</sup> November 2007. Surveys were undertaken at both the eastern and western gates. Also, a count of vehicles leaving the site was undertaken, the results of which are given in **Table 2.3**.

2.10 In order to minimise queues into the port and disruption to dock operations, surveys were only undertaken on outbound dock traffic. Inbound flows to the western gate have therefore been derived from traffic counts on the A160; inbound flows to the eastern gate have therefore been derived from traffic counts on Queen’s Road as shown on **Figure 2.1**.

**Table 2.3: Vehicular Count of Vehicles Leaving Immingham Docks**

Time	Western Gate		Eastern Gate	
	Cars/Lights	HGV	Cars/Lights	HGV
0700 - 0800	81	69	18	21
0800 - 0900	141	41	18	11
0900 - 1000	54	58	38	13
1000 - 1100	51	41	34	17
1100 - 1200	42	41	38	12
1200 - 1300	39	25	90	20
1300 - 1400	118	127	68	21
1400 - 1500	50	37	81	32
1500 - 1600	37	39	83	13
1600 - 1700	27	25	241	32
1700 - 1800	24	10	256	21
1800 - 1900	32	1	74	13
<b>Total</b>	<b>696</b>	<b>514</b>	<b>1039</b>	<b>226</b>

2.11 **Table 2.4** shows the number of HGVs surveyed and the total HGV count which enables the proportion surveyed to be derived. This information is given for the eastern and western gates.

**Table 2.4: Proportion HGVs Surveyed**

Time	Western Gate			Eastern Gate		
	HGVs Surveyed	Total HGVs	% HGVs surveyed	HGVs Surveyed	Total HGVs	% HGVs surveyed
0700 - 0800	17	122	14%	15	36	42%
0800 - 0900	32	152	21%	12	23	52%
0900 - 1000	33	157	21%	16	29	55%
1000 - 1100	37	141	26%	12	29	41%
1100 - 1200	36	137	26%	10	22	45%
1200 - 1300	27	166	16%	11	31	35%
1300 - 1400	80	262	31%	26	47	55%
1400 - 1500	30	168	18%	13	45	29%
1500 - 1600	36	133	27%	20	33	61%
1600 - 1700	22	93	24%	25	57	44%
1700 - 1800	11	41	27%	11	32	34%
1800 - 1900	18	53	34%	7	20	35%
<b>Total</b>	<b>379</b>	<b>1625</b>	<b>23%</b>	<b>178</b>	<b>404</b>	<b>44%</b>

2.12 As with all surveys of this type, a number of records will be lost as no origin and/or destination details were given. There are a number of records where only the origin or destination was given. Some of this data could be recovered by looking at the pattern of origins and destinations of complete records. Analysis of this data, shows that approximately 50% of the trips leaving the dock returned to the place they had originally come from. Therefore, a random sample of the incomplete records will be retained by assuming that they have the same origin and destinations.

2.13 On leaving the dock HGV drivers were asked where they had come from prior to arriving at the dock with brief details of the route they had taken, what load they were carrying and where they were going to with brief details of the route. A summary of the key origins and destinations are given in **Table 2.5**.

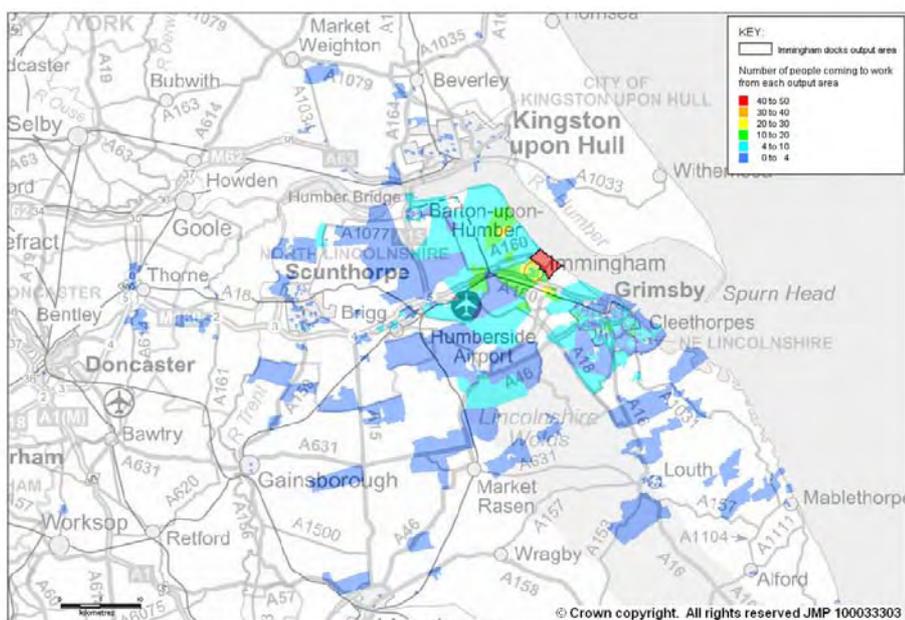
**Table 2.5: Origins and Destinations of HGVs Accessing Immingham Docks**

	Western Gate		Eastern Gate	
	Origins	Destinations	Origins	Destinations
Immingham		10.9%	1.9%	6.5%
Docks Estate		5.0%		
Keelby			0.9%	
Stallingborough	1.0%	1.8%	18.7%	31.2%
Killingholme	6.3%	5.9%	0.0%	0.0%
Grimsby	4.2%	2.7%	11.2%	10.6%
North Lincolnshire	15.6%	13.6%	6.5%	7.6%
Lincolnshire	1.6%	1.4%	13.1%	9.4%
North Humberside	4.2%	3.6%	7.5%	1.8%
West Yorkshire	19.8%	14.0%	6.5%	5.3%
South Yorkshire	7.3%	8.1%	3.7%	1.2%
North Yorkshire	3.6%	3.2%	1.9%	0.6%
North West	8.9%	8.1%	4.7%	4.1%
North East	3.6%	1.8%	0.9%	0.6%
East Midlands	12.0%	6.8%	10.3%	10.0%
West Midlands	3.1%	2.7%	4.7%	1.8%
South East	4.2%	5.4%	4.7%	5.3%
South West	2.6%	3.6%	1.9%	2.9%
Scotland	2.1%	1.4%	0.9%	1.2%

2.14 **Table 2.5** shows that around 10% of traffic accessing the dock via the east gate is coming from/going to Lincolnshire. It is this traffic which will use the new link road.

**Journey to Work Data**

2.15 Journey to work data from the 2001 census provides data on journey to work trips by mode. **Figure 2.3** shows the distribution of trips to Immingham Docks.



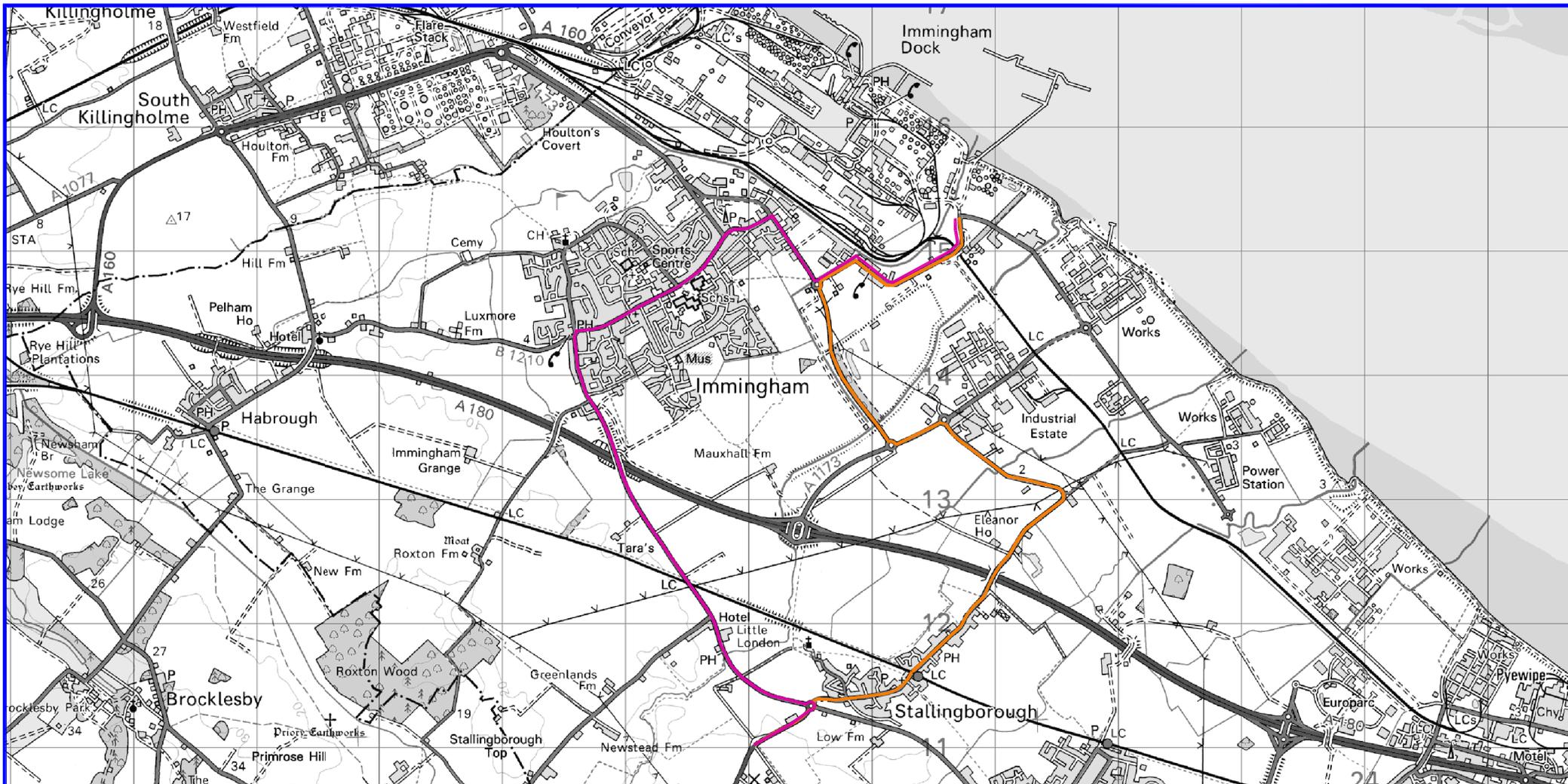
**Figure 2.3: Journey To Work Trips**

## Journey Time Surveys

- 2.16 It is proposed that journey time surveys are undertaken on the following routes:
- Riby Road, Stallingborough Road, Pelham Road, Kings Road and Queens Road;
  - Riby Road, South Marsh Road, North Moss Lane, Kiln Lane, A1173 and Queens Road.
- 2.17 These routes are shown in **Figure 2.4** and will be undertaken in accordance with guidance given in DMRB.

## Conclusion

- 2.18 It is concluded that the new traffic count data along with the new survey data of HGV movements to and from Immingham Dock and the journey to work data, provides sufficient data to update the NEL SATURN model and produce an inter peak matrix to a level of accuracy which is commensurate with the size of the scheme being tested. The proposed methodology for updating the model with this data is presented in the following section.



**KEY:**

- JOURNEY TIME ROUTE 1
- JOURNEY TIME ROUTE 2

INFORMATION			Client	PROPOSED JOURNEY TIME SURVEYS
Scale	Original dwg. size	Date	North East Lincolnshire Council	
NTS	A3	04/12/07		
Drawn	Checked	Approved	Project	
MO	EW	EW	A18 - A180 Link MSBC	

Rev.	Date	Revision Details	Drawn	Approved
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Drawing Number: **FIGURE 2.4**

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## 3 Proposed Methodology

### Introduction

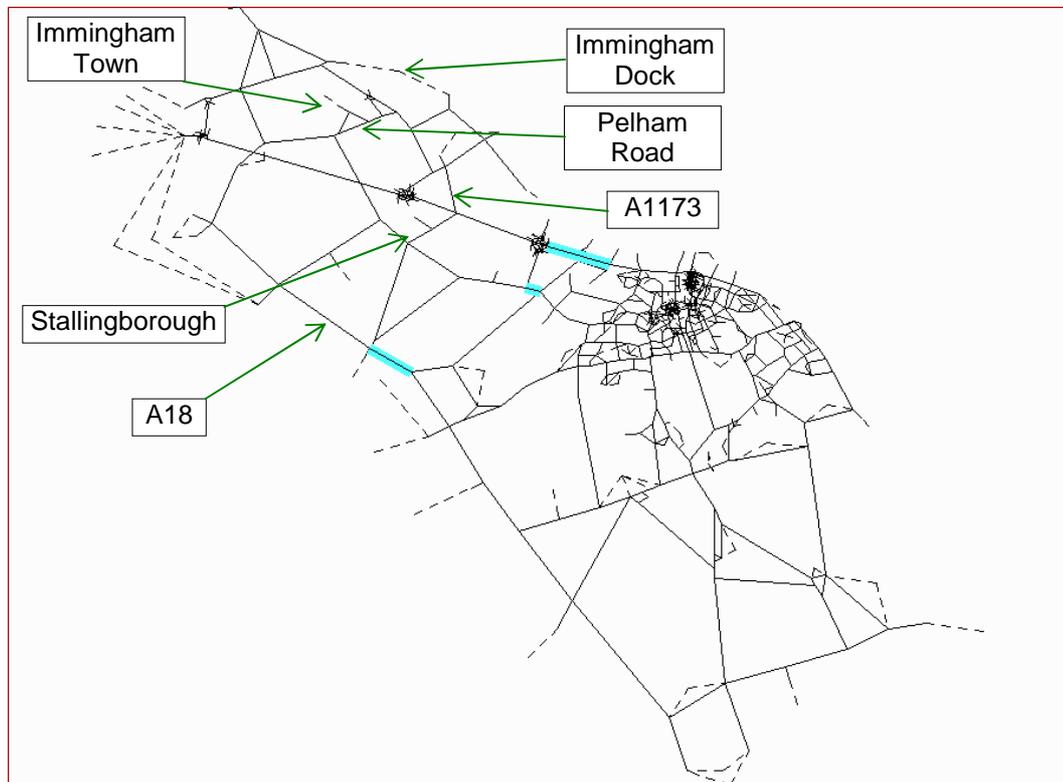
- 3.1 This chapter sets out a methodology for updating the NEL SATURN model. As the scheme is a relatively small scheme at just over £7million in outturn prices, this methodology has been devised which makes best use of existing data with limited additional data collection.

### Network Coding

- 3.2 A thorough check of the network coding in and around Immingham has been undertaken. This has included a check of the coding of all of the simulation nodes. This has highlighted a number of errors with the coding including incorrect number of lanes at junctions, priority markers and roundabouts coded as priority. These have been rectified and the matrix reassigned to network.

### Model Cordoning

- 3.3 The model will be cordoned as shown in **Figure 3.1**. The cordoned network will retain sufficient network to enable route choice to Immingham docks to be modelled.

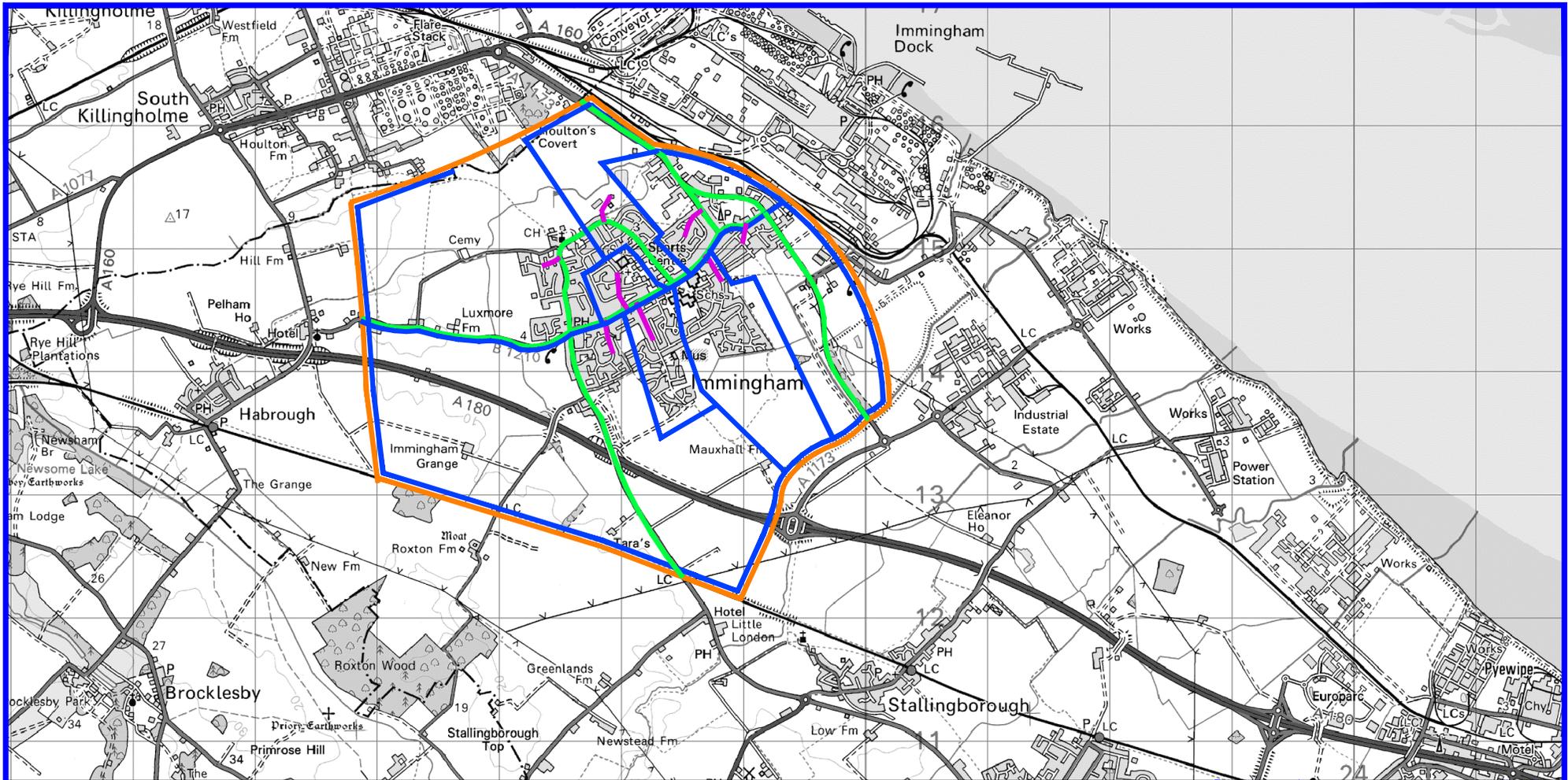


**Figure 3.1: Cordoned Network**

### Matrix Update

#### Immingham Docks Trips (Zone 80)

- 3.4 Census journey to work data will be used to replace light vehicular trips to the Immingham Dock zones in the AM peak matrix. A transpose of the journey to work data will be used to replace the trips from Immingham Dock in the PM peak
- 3.5 The origin-destination data from the survey undertaken at the docks will replace the HGV movements to and from the two new zones representing the docks.



**KEY:**

- EXISTING NETWORK
- NEW NETWORK
- EXSITING ZONE 80
- NEW ZONES

Drawing Status <b>INFORMATION</b>			Client <b>North East Lincolnshire Council</b>		Title <b>DISAGGREGATION OF ZONE 80</b>
Scale	Original dep. date	Date	Project		
NTS	A3	30/11/07	A16 - A100 Link MSBC		
Drawn	Checked	Approved			
MD	EW	EW			

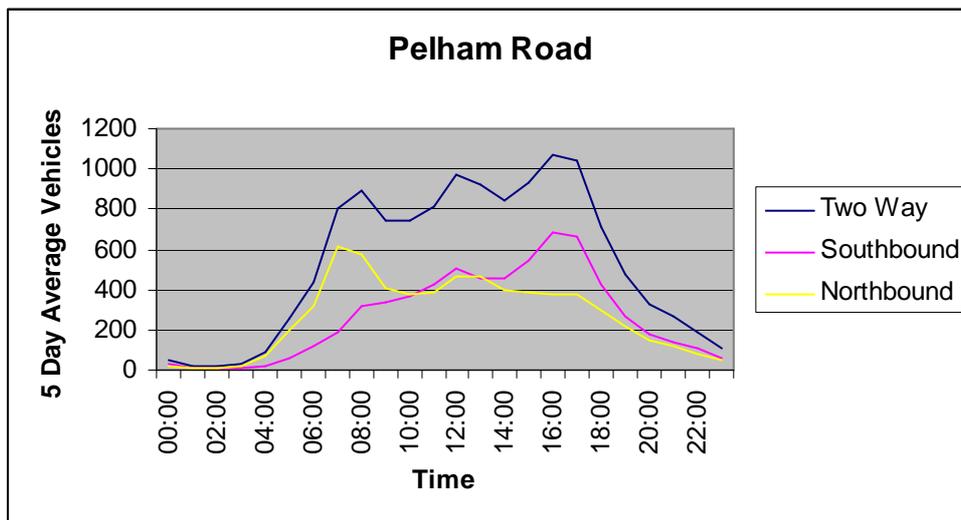
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Drawing Number <b>FIGURE 3.2</b>					Rev. -	

### Matrix Disaggregation

- 3.6 The zone system in the area of interest will be disaggregated. The Zone 90 as shown in Figure 3.4 of the Local Model Validation Report which covers the rural area to the south and east of Immingham is actually three zones within the NEL SATURN model. The three zones represent the following areas:
- Zone 88 – Healing;
  - Zone 89 – Stallingborough;
  - Zone 90 – Keelby.
- 3.7 Immingham Docks is represented by a single zone. This zone will be disaggregated into two zones so that the flows into and out of the two access point can be better represented. This will be split based upon the proportion of trips entering and exiting via the two gates.
- 3.8 Immingham town is also represented as a single zone (zone 80) which feeds on to the network at a single point on Church Lane. This zone will be disaggregated into 8 zones as shown in **Figure 3.2**. This will enable turning movements at Pelham Road/Washdyke Lane and Pelham Bluestone Lane/Pelham Road to be better represented and therefore, delays along Pelham Road, through Immingham, more accurately modelled. The zone will be disaggregated based upon the proportion of households within each new zone. Data on the number of households per zone will be taken from 2001 census data.

### Inter Peak Matrix

- 3.9 The NEL model does not have an inter peak matrix and the original roadside interviews were only undertaken over the AM and PM peak periods. An inter peak matrix needs to be developed for testing the A18-A180 Link Road.
- 3.10 The AM and PM peak matrices will be combined to remove any directional bias within the matrix which would be observed in the peak hours but not during the interpeak as shown in **Figure 3.3**.



**Figure 3.3: 5-Day Weekday Traffic Counts**

- 3.11 The ATC for Pelham Road will be used to derive factors to get from a 2 hour combined peak to a 1 hour average inter peak hour. Separate factors will be derived for lights and heavy goods vehicles. This shows that traffic levels on Pelham Road throughout the day are fairly consistent with no significant peaks in the AM and PM peak hours.

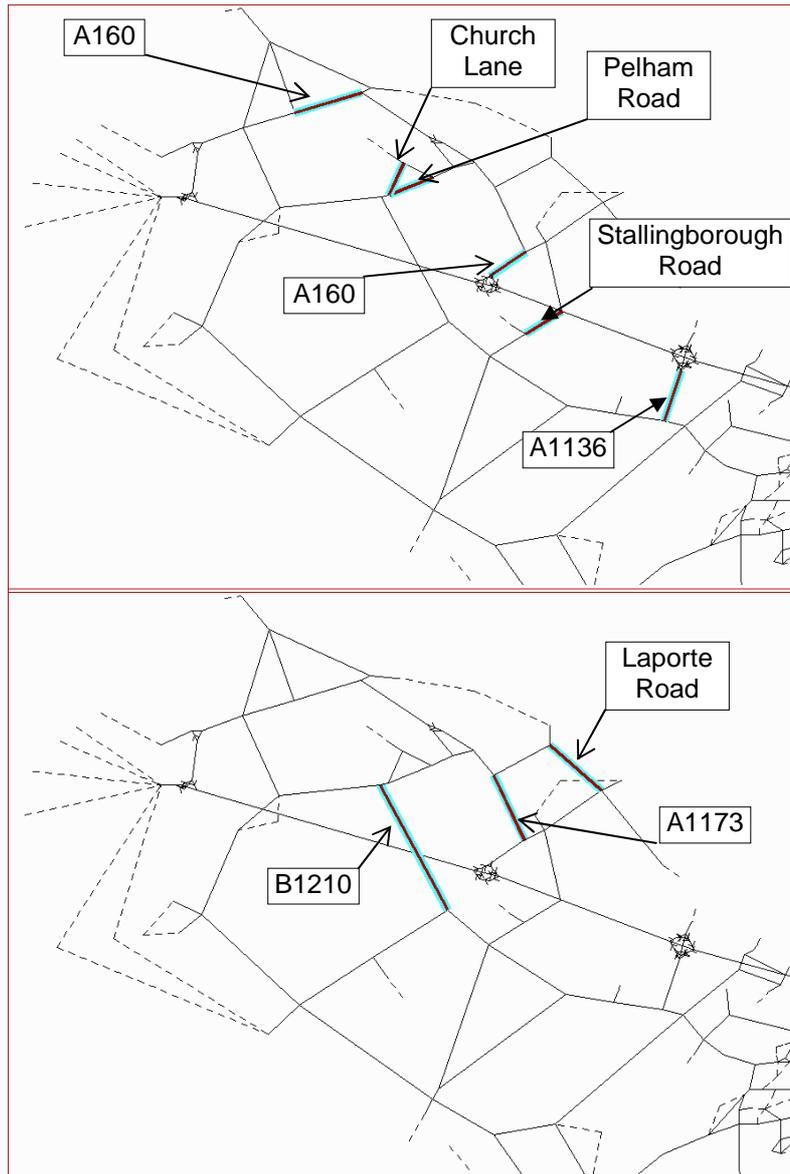
### Matrix Estimation

- 3.12 The MCC turning count data will be used to update the matrix to a 2007 base year using matrix estimation techniques. Initially turning counts will be used in the matrix estimation process. If turning counts are proving too restrictive for the matrix estimation process, link counts will be used instead. Wherever possible, the counts used for matrix estimation will be independent of the counts used for link flow validation.

## Model Validation

### Link Flow Validation

- 3.13 The model will be validated against two screenlines as shown in **Figure 3.4**.



**Figure 3.4: Link Flow Validation Screenlines**

### Journey Time Validation

- 3.14 Journey times will be validated for two routes as shown in **Figure 2.4**. These routes have been selected as these are the two key routes from the A18 to Immingham Docks which traffic would reroute from following the introduction of the A18-A180 link road.



Appendix A  
Survey Proposals  
Technical Note

## **NORTH EAST LINCOLNSHIRE TRANSPORTATION STUDY**

### **TECHNICAL NOTE – SURVEY PROPOSALS**

**AUGUST 2004**

---

#### **1.0 Introduction**

##### **Overview**

- 1.1 A sequence of traffic and transport surveys is proposed, in order to obtain up-to-date information with which to carry out multi-modal assessments on behalf of North East Lincolnshire Council. We aim to undertake these surveys during September and October 2004.

##### **Scope of Technical Note**

- 1.2 The remainder of this note, describes details of the types of transport survey that we propose to undertake.

#### **2.0 Types of Transport Survey Proposed**

- 2.1 There are eleven types of transport survey that are required for the North East Lincolnshire Transportation Study, as follows:

- roadside Interview monitoring of trip O/D's to identify weekday route choices;
- roadside Interview postcard monitoring of trip O/D's to identify weekday route choices;
- manually classified junction counts to identify weekday turning movements at key intersections;
- manually classified link passing counts to identify weekday directional flows, by vehicle type, on key roads;

- automatic traffic counts, to identify weekly variation in passing flows on major roads;
- pedestrian and cyclist weekday crossing counts, at key intersections;
- bus passenger occupancy counts during weekdays on main bus routes, by direction in the study area;
- train passenger occupancy counts on weekdays at main line rail stations;
- heavy goods vehicle (HGV) counts, with telephone call back to obtain freight operator details;
- vehicle journey times along on well-used routes; and
- road junction queue and delay measurements.

2.2 We intend to progress the above surveys using a combination of the consultant team's experienced technical staff, specialist survey contractors and North East Lincolnshire survey staff elected on the basis of their cost estimate and competence.

2.3 In the remainder of this section there is a brief description of the format and locations of the surveys that we are proposing.

### **Roadside Interview Postcard Trip O/D Records**

2.4 We consider it important to establish some up to date evidence regarding vehicle trip origin-destination movements through the study area. We have given careful consideration to North East Lincolnshire's view on Roadside Interviews (RSI's) and the backlash that the traffic congestion and queues could cause. We have therefore chosen the following methodology which will have a minimal impact on traffic.

2.5 The roadside surveys would be carried out at three sites, shown in Figure 2.1, as follows:

- site R1 – A180 west of the A160 interchange;
- site R2 – A16 junction of A16/Louth Road; and
- site R3 – A46 junction of A46 Laceby Road/Winchester Avenue.

2.6 The A180 survey will take place on the Council boundary, about 1 mile west of the A160 interchange using a lay-by interview bay and traffic management which will help to minimise congestion and queuing problems. This survey site is important as it will help us to gather required travel information for Immingham.

- 2.7 The A46 and A16 however, are too busy to allow efficient interviewing of a sufficient sample of drivers without causing delays and tailbacks of traffic. Therefore, we propose instead to sample trip O/D's by handing out postal return forms on the approaches to the traffic signals. Vehicles would be sampled during the red signal phases only by handing postcards to all queuing drivers. No sampling would occur during the green phases. Although the return postcard sample rate may not be high, it is likely to be as great as with the conventional site on the A180, where a considerable proportion of vehicles would need to be let through, so as to avoid excess delay. No sample rate calculations have been performed in advance of the surveys, because our aim will be to hand out postcards to the maximum number of drivers possible, during the red signal phases.
- 2.8 Time periods for the postcard O/D survey would be 3-hours during AM peak (0700-1000) and 3-hours during PM peak (1600-1900), on a typical weekday in September.
- 2.9 Classified vehicle counts will be conducted at the RSI survey sites, in both directions of link travel. These counts will be used to expand the sampled O/D records to the true level of traffic flow.
- 2.10 We envisage enlisting the help of a police officer to control traffic at each RSI site.

### **Manual Classified Junction Counts (MCC)**

- 2.11 Traffic counts will be undertaken at a series of important road junctions to establish the current volumes of flow on particular turning movements. The flows will be classified by vehicle type, including pedestrians and cyclists. The 50 proposed MCC turning counts will be vital for calibrating the forthcoming traffic model and for ensuring that the base model output is a reliable representation of current conditions.
- 2.12 MCC Junction count sites are as shown in Figure 2.2. It is intended that turning flows at sites M1, M3, M4, M38, M40 and M41 should be recorded using video cameras.
- 2.13 Time periods covered by the MCC junction counts will comprise AM peak (07:00-10:00) and PM peak (16:00-19:00), during a typical weekday.
- 2.14 A summary of the 50 proposed turning count sites is as follows:

- site M1 – A180/A160 interchange (Video survey may be required);
- site M2 – A1173/B1210, 4-arm junction;
- site M3 – A180/A1173, 4-arm roundabout with slip movements (Video survey may be required);
- site M4 – A180/A1136, two 4-arm roundabouts with slip movements (Video survey may be required);
- site M5 – A18/B1211, two 3-arm junctions;
- site M6 – A18/A1173, 4-arm junction;
- site M7 – A46/A18, 4-arm junction;
- site M8 – A18/Waltham Road, 3-arm junction;
- site M9 – A18/B1203, 4-arm junction,
- site M10 – B1219/A1031, 3 arm junction;
- site M11 – B1219/A16, 4-arm junction;
- site M12 – B1203/B1219, 3-arm junction;
- site M13 – B1203/Waltham Road, staggered 4-arm junction;
- site M14 – Waltham Road/Bradley Road, 3-arm junction;
- site M15 – A16/Louth Road, 4-arm roundabout;
- site M16 – B1203/Louth Road, 4-arm roundabout;
- site M17 – A16/A1098, 3-arm roundabout;
- site M18 – A1031/North Sea Lane, 3-arm roundabout;
- site M19 – North Sea Lane/Kings Road, 3-arm roundabout;
- site M20 – A1031/A1098, 4-arm roundabout;
- site M21 – A46/B1444, 4-arm roundabout;
- site M22 – A46/B1203, 3-arm roundabout;
- site M23 – A46/B1212, 3-arm junction;
- site M24 – A16/A46, 4-arm junction;
- site M25 – A46/B1213, 3-arm junction;
- site M26 – A46/A1031, 3-arm roundabout;
- site M27 – A1098/B1374, 3-arm junction;
- site M28 – A1098/Kingsway, 3-arm junction;
- site M29 – A180/B1374, 3-arm junction;
- site M30 – A180/A46, 3-arm roundabout;
- site M31 – B1212/B1213, 3-arm junction;
- site M32 – A16/B1212, 3-arm junction;

- site M33 – B1213/Ellis Way, 3-arm junction;
- site M34 – A16/Frederick Ward Way, 4-arm junction;
- site M35 – A16/Market Street, 4-arm junction;
- site M36 – A180/Victor Street/Humber Street, 4-arm junction;
- site M37 – A180/B1213, 4-arm junction;
- site M38 – A16/A180, 4-arm roundabout (Video survey may be required);
- site M39 – Wellington Street/Park Street/Queen Mary Avenue/Durban Road, 5-arm roundabout,
- site M40 – A180/Boulevard Avenue, 4-arm roundabout (Video survey may be required);
- site M41 – A180/Gilbey Road, 4-arm roundabout (Video survey may be required);
- site M42 – Boulevard Road/Cromwell Road, 4-arm roundabout;
- site M43 – A1136/B1444, 3-arm roundabout;
- site M44 – A1136/B1210, 3-arm roundabout;
- site M45 – A1173/Kings Road, 3-arm roundabout;
- site M46 – A1173/A160, 3-arm roundabout;
- site M47 – A160/Top Road, 4-arm junction;
- site M48 – A1077/A160, 3-arm junction;
- site M49 – A1173/Marlby Road, 3-arm junction; and
- site M50 – B1210/Pelham Road, 4-arm Junction.

### **Manual Classified Link Counts (MCC)**

2.15 It is thought that enough Classified vehicle passing count data is already available which covers routes such as A16, A18, A46, A1173 and A1163. These existing MCC link surveys will be used to monitor traffic flows within the study area cordon and will serve to validate the 2004 base traffic model.

2.16 The existing count locations are shown in Figure 2.3.

### **Automatic Traffic Counts (ATC)**

2.17 We consider that it is necessary to monitor some traffic flows for a longer period than the weekday AM and PM peak periods suggested for the MCC junction surveys. This is so as to identify weekly variations in conditions.

2.18 Therefore, a week of hourly flows will be recorded, in both directions, on key roads in the study area, using automatic traffic counters (ATC). Some permanent count data is already available from North East Lincolnshire Council, covering routes such as A18, A1031, A46, A1136 and B1203. Whilst this data will be useful, it should be supplemented by more focused ATC's, at 9 locations in order that a cordon can be created around the study area. The proposed and existing locations are shown in Figure 2.4.

2.19 Locations for the 9 proposed ATC surveys are as follows:

- Site A1 – A1077, single 2-lane carriageway, between B1211 Ulceby and A160 South Killingholme;
- Site A2 – A180, dual 2-lane carriageway, east of the A180/A160 interchange;
- Site A3 – B1211, single 2-lane carriageway, between A1077 Ulceby and B1210 Brocklesby;
- Site A4 – B1210, single 2-lane carriageway, between A18 Kirmington and B1211 Brocklesby;
- Site A5 – A18, single 2-lane carriageway, between Great Limber and Keelby;
- Site A6 – A1173, single 2-lane carriageway, northeast of Riby;
- Site A7 – A46, single 2-lane carriageway, northeast of Irby Upon Humber;
- Site A10 – B1203, single 2-lane carriageway, between East Ravendale and A18 Ashby Hill; and
- Site A12 – A16, single 2-lane carriageway, between B1219 and Holton le Clay.

### **Pedestrian and Cyclist Surveys**

2.20 It is important to identify the level of demand amongst vulnerable travellers (specifically pedestrians and cyclists).

2.21 Crossing movement surveys will therefore be conducted at the same locations as the MCC's.

### **Bus Passenger Occupancy Counts**

2.22 In order to validate the public transport model bus passenger occupancy information will be obtained from operators of well used bus routes, in both directions of travel, during AM and PM peak periods on a typical weekday.

## **Train Passenger Occupancy Counts**

- 2.24 Counts of train passenger occupancy will also be carried out on all rail services. Time periods covered will comprise AM peak (07:00-10:00) and PM peak (16:00-19:00), during a typical weekday.
- 2.25 Weekday directional train passenger occupancy will be recorded during peak periods at the following rail stations, shown in Figure 2.5:
- Site T1 – Ulceby;
  - site T2 – Harborough;
  - site T3 – Stallingborough;
  - site T4 – Healing;
  - site T5 – Great Coates;
  - site T6 – Grimsby Town;
  - site T7 – Grimsby Docks; and
  - Site T8 – Cleethorpes.

## **Heavy Goods Vehicle (HGV) Survey**

- 2.26 Flow volumes of heavy goods vehicles (HGV) on key roads in the study area will be available from the MCC link and junction surveys. However it will also be advantageous to record the varieties of trip origin/destination movement and types of freight consignment that are typical of HGV's travelling in area. An HGV survey should indicate the relative importance of local and strategic freight movements throughout the area.
- 2.27 An HGV survey will be undertaken in both directions along the A180, A46 and A16 during peak periods, on a typical weekday. The proposed survey locations are given in Figure 2.6. The survey will record a tally of HGV's, the respective vehicle classes and a sample of some operator details, such as name/headquarters of operator and contact reference (telephone or address).

2.28 Subsequent to the HGV survey, a telephone call back will be made to establish the trip origin/destination of the observed HGV movements, the frequency of the journey and the type of consignment carried.

### **Vehicle Journey Times**

2.29 It is essential that we gain an accurate and current picture of typical travel times on highway routes through the study area.

2.30 In view of the importance of the journey time data, we propose to undertake a comprehensive survey of routes, as shown in Figure 2.7. There are 7 different routes, each of which will be timed in both directions from end to end, during AM and PM peak periods on a typical weekday. It may be necessary to complete up to 8 separate runs along each route in order to measure a realistic average time.

2.31 We are not aware of a significant amount of journey time information having been collected previously in the study area. Any data that was collected is now outdated and does not include wide coverage of routes.

2.32 Journey times will be measured using the 'moving observer' method and will cover, principally, the A180, A46 and A16, A1031, A1098 and A1173 routes. Details recorded during the surveys will comprise free running time, queuing time and delay from junction control.

2.33 A summary of the proposed journey time routes is as follows:

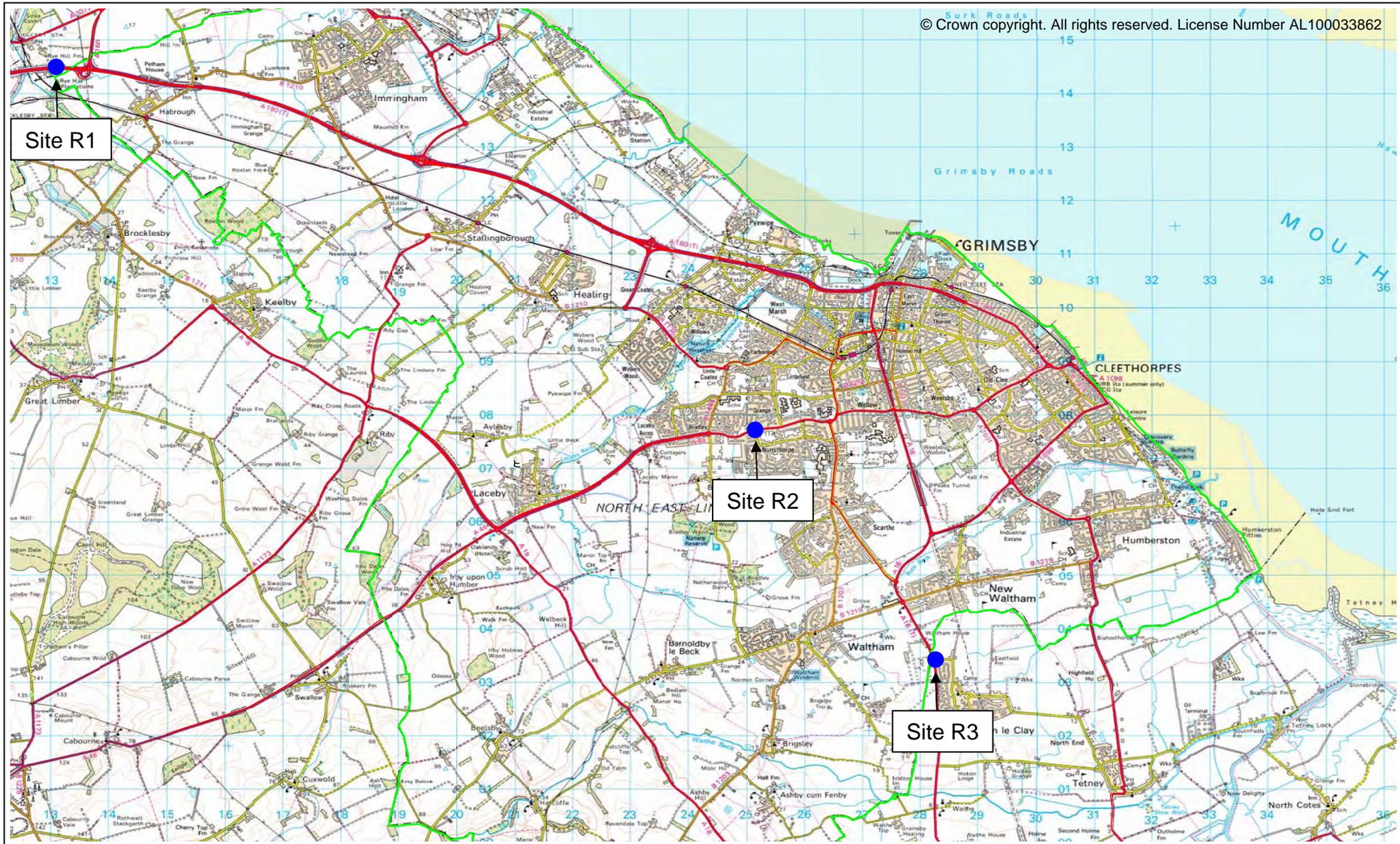
- survey route J1 – A1173, A160, A180 and A1098;
- survey route J2 – B1203, A16;
- survey route J3 – A16;
- survey route J4 – A46;
- survey route J5 – A1031, A46 and B1213;
- survey route J6 – B1210, A1136, B1444 and Bradley Road; and
- survey route J7 – Waltham Road and B1219.

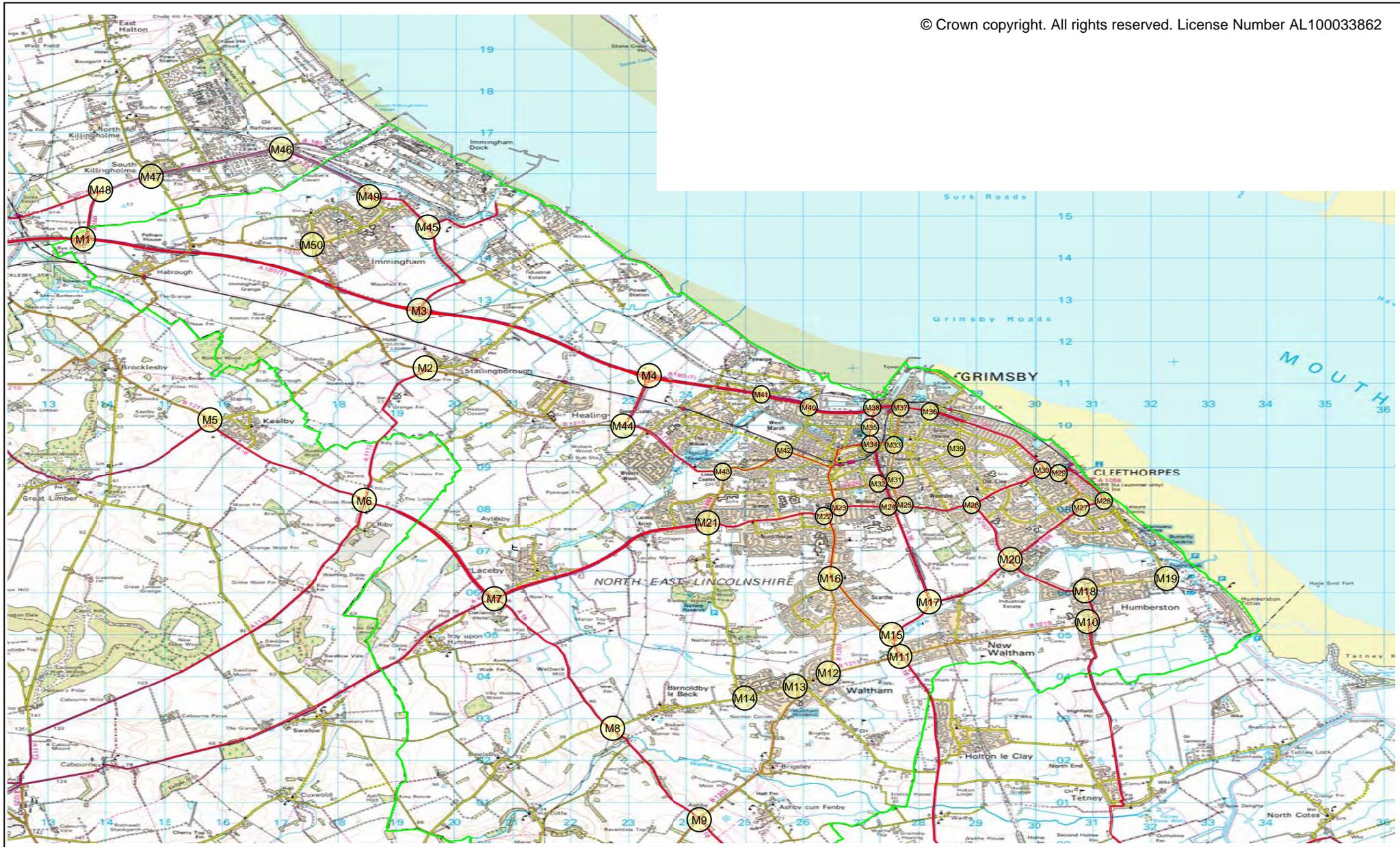
2.34 We anticipate that the proposed sample size of 8 runs per journey time route, in each direction, should be sufficient to achieve representative measurements. However, we cannot confirm

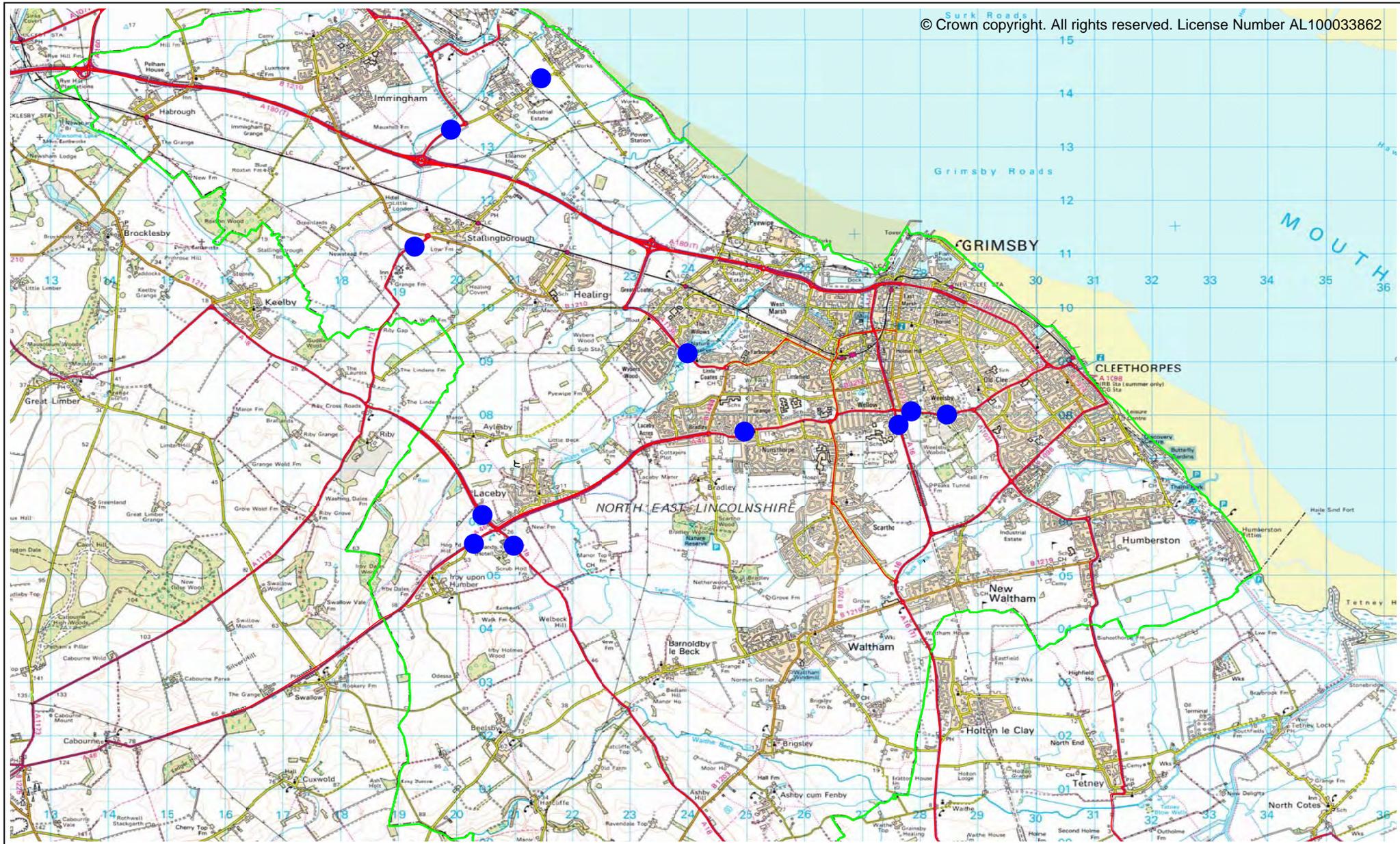
this until some runs have been undertaken. Once a number of route journey times have been collected, we will assess the reliability of the sample in accordance with DfT procedures. If necessary, we can then schedule further runs to improve the sample.

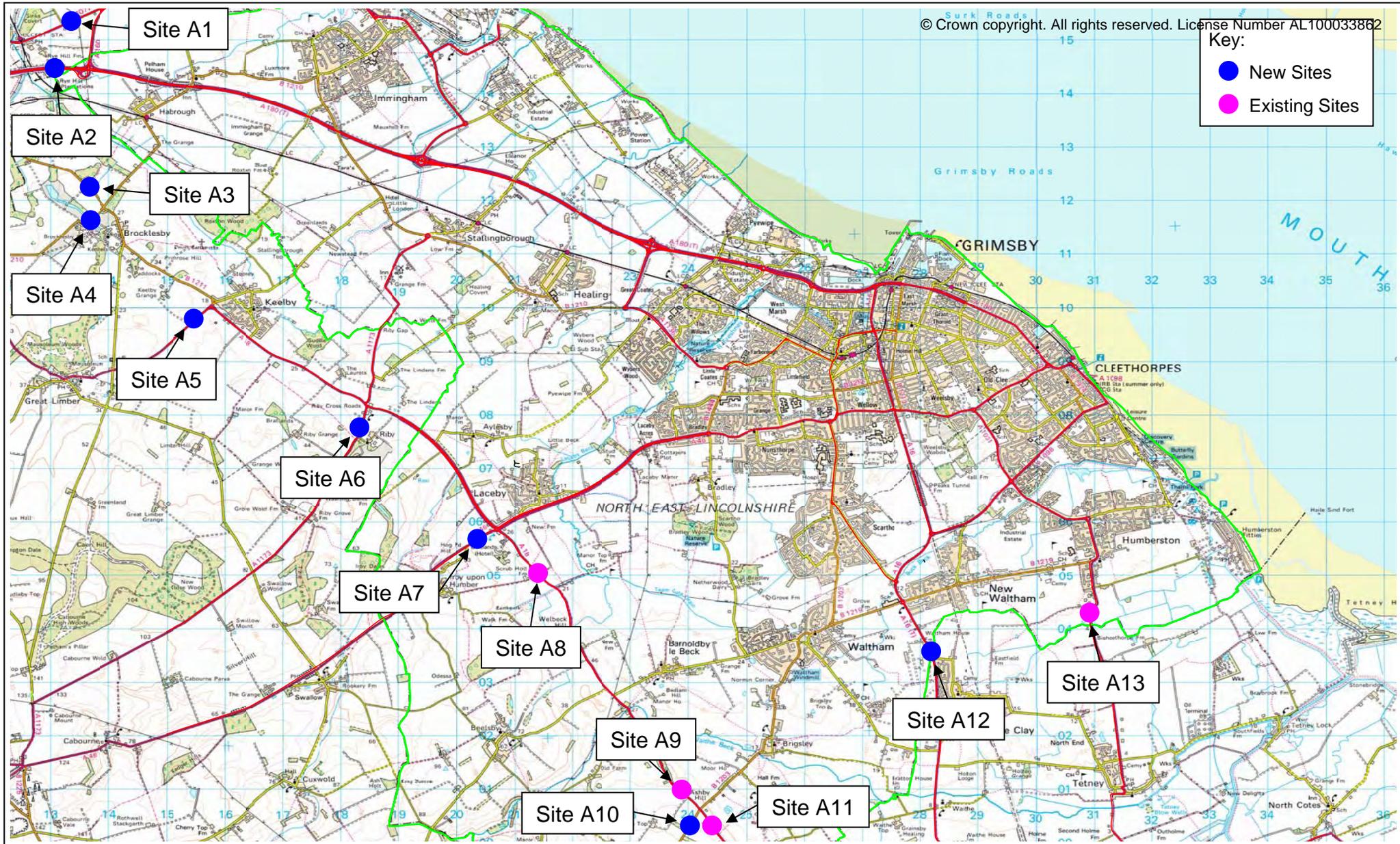
### **Road Junction Queue and Delay Measurements**

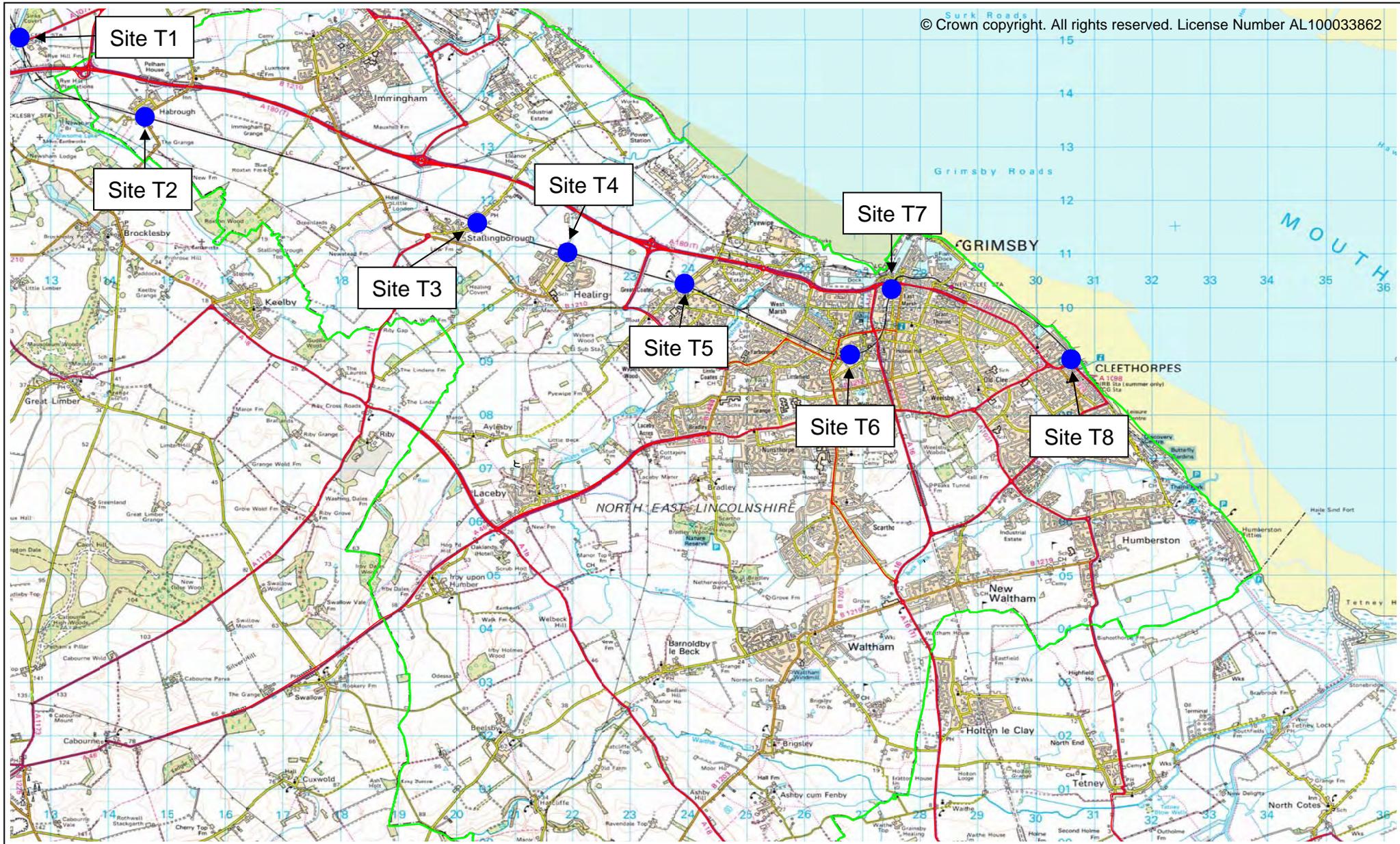
- 2.35 As part of the vehicle journey time surveys, we will monitor typical peak queues and delays at road junctions. However, for traffic model calibration we will also conduct queue length measurements on the approaches to the main junctions within the study area. These surveys will be undertaken at the same time and locations as the manual classified counts



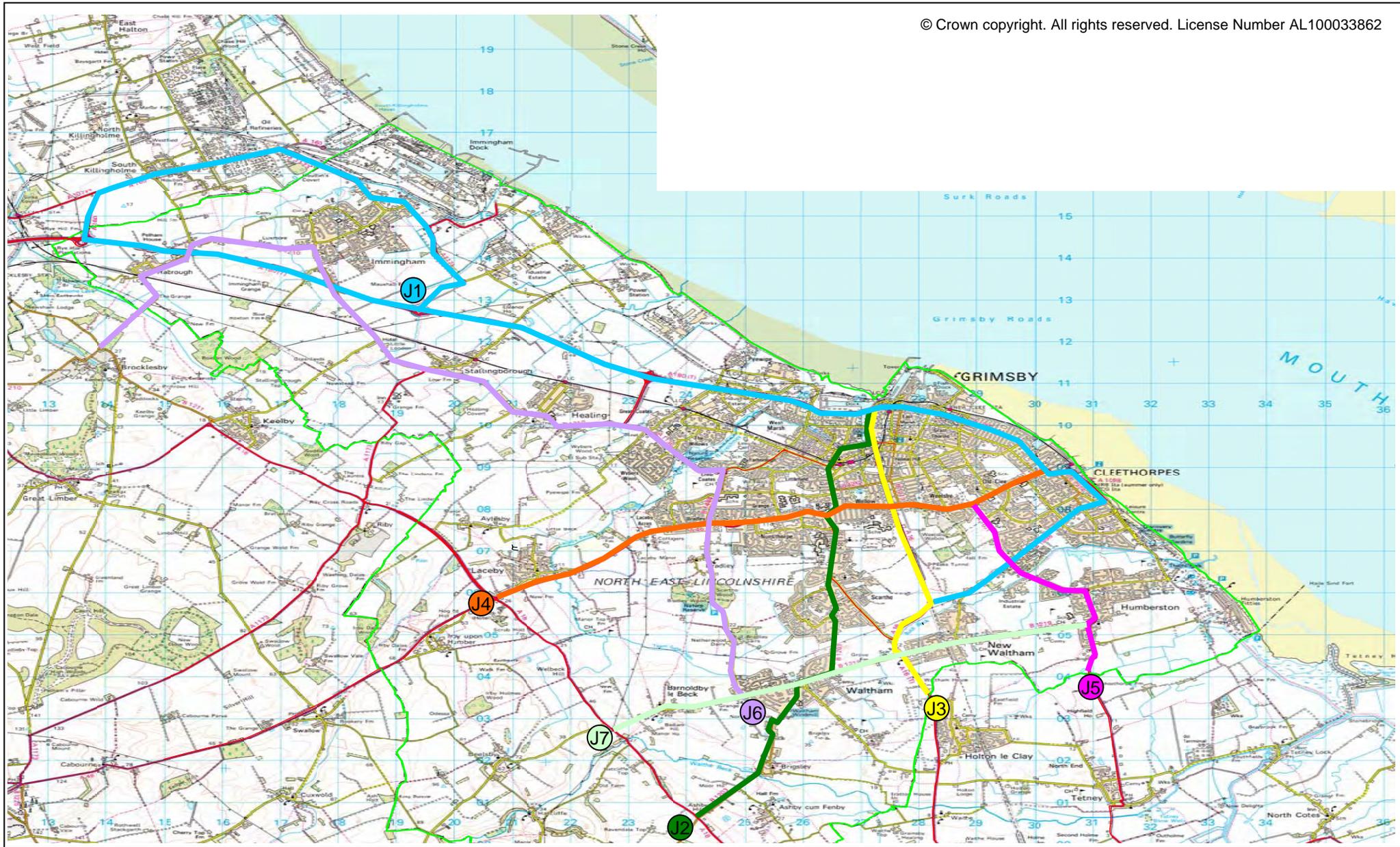












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