Lincoln Eastern Bypass

Route Appraisal & Justification Statement

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1 Introduction

1.1 Purpose of the Route Appraisal & Justification Statement

This Route Appraisal & Justification Statement has been prepared in support of a full planning application for the development of the Lincoln Eastern Bypass (LEB).

Consent for the LEB would allow the development of a new 7.5km north-south single carriageway road linking the existing Northern Relief Road, at the junction of the A15 and A158 Wragby Road in the north, to the A15 Sleaford Road to the south of Lincoln.

This statement accompanies the planning application and illustrates the process that has led to the formulation of the proposal. This statement justifies the need for the road, explains the evolution of the design option and summarises both the impact and public benefit associated with the proposal.

Following this introduction the document is structured as follows:

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2 Site Location & Scheme Description

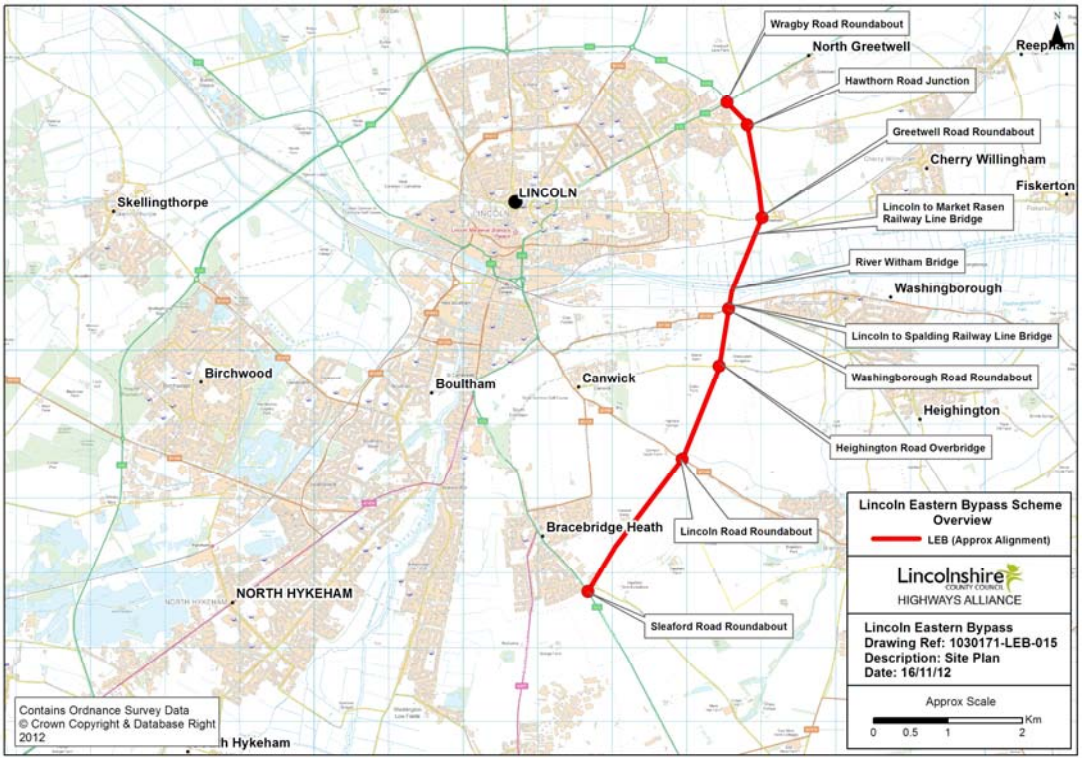
2.1 Introduction

This chapter explains the location of the LEB in the context of its surroundings and provides an overview of the scheme.

2.2 Site Location

The proposed scheme will be a single carriageway road through an area of predominantly arable farmland. The LEB will provide a new road linking the existing Northern Relief Road (A46) to the A15 in the south of Lincoln. It will also provide a crossing of the River Witham, Lincoln to Market Rasen railway line and the Lincoln to Spalding railway line. The scheme will be located to the east of the city of Lincoln and the villages of Canwick and Bracebridge Heath and to the west of the outlying villages of North Greetwell, Cherry Willingham, Washingborough, Heighington and Branston (see Figure 2-1).

Figure 2-1 – Lincoln Eastern Bypass Route



2.3 Scheme Description

The following section provides an overview of the proposed scheme and a broad description of the future-proofing measures that have been included within the scheme design. The following description relates to the following scheme drawings:

- 1030171-100-023D –Plan & Profile Section 1
- 1030171-100-024C –Plan & Profile Section 2

- 1030171-100-025B –Plan & Profile Section 3
- 1030171-100-026B –Plan & Profile Section 4
- 1030171-100-027B – Plan & Profile Section 5

2.3.1 Lincoln Eastern Bypass – Overview

The proposed LEB will provide a new 7.5km single carriageway relief road that will link the junction of the A15 and A158 Wragby Road to the A15 Sleaford Road. The new route will have a design speed of 100kph (with the understanding that there will be a 60mph speed limit) and a separate 3m wide combined cycle and pedestrian right of way (located on the western side of the carriageway) provided along the full length of the scheme, to link up with existing public rights of way (see Appendix A). The scheme will comprise of the following elements (north to south: starting from the Wragby Road Roundabout):

Wragby Road Roundabout to Greetwell Road (0-1,500m, Ref 1030171/100/023D):

1. *Wragby Road Roundabout:* From A158 Wragby Road the single carriageway layout follows the horizontal alignment of the northbound side of the A158, which allows the LEB to tie into the existing roundabout as a fourth arm. The diameter of the existing roundabout remains unaltered.

2. *Hawthorn Road Junction:* The western side (residential side) of Hawthorn Road will be stopped up and a turning head provided. A left in left out only junction with auxiliary diverge lane and tapered merging lane on the eastern side with the LEB will be added and a segregation island included to block right turns.

3. The existing footpath located to the north of Hawthorn Road will be stopped up and access provided to the LEB Non-Motorised Users (NMU) route on the western side of the LEB.

4. *Greetwell Road Footbridge:* A footbridge on the north side of the Greetwell Road Roundabout over the LEB will provide access to the LEB User NMU route and maintain the current NMU provision along Greetwell Road.

Greetwell Road Roundabout to Washingborough Road Roundabout (1,500m–3,000m, Ref 1030171/100/024C):

5. *Greetwell Road Roundabout*: A new four arm roundabout will provide a link from the LEB to Greetwell Road.

6. *Lincoln to Market Rasen Railway Underbridge:* The structure will carry the LEB over the Lincoln to Market Rasen railway line and the Viking Way, a nationally recognised long distance trail. A link will be provided to the Viking Way from the LEB NMU route

7. *Northbound overtaking lane provided between the River Witham Bridge and Greetwell Road Roundabout:* This will address the lack of overtaking opportunities for northbound traffic over the length of the LEB.

8. *River Witham Underbridge:* The River Witham Underbridge is the largest structure on the scheme and will cross the River Witham floodplain on an embankment, with a bridge travelling over the North Delph, River Witham, and South Delph.

9. *Lincoln to Spalding Railway Overbridge:* To the south of the river, the bypass will cross under the Lincoln to Spalding railway line.

10. *South Delph Footbridge:* The footbridge will cross the South Delph watercourse away from the northbound carriageway and provide access to the existing Sustrans cycleway/footway that runs parallel to the River Witham.

Washingborough Road Roundabout to 1500m south of Heighington Overbridge (3,000m–4,500m, Ref 1030171/100/025C):

11. *Washingborough Road Roundabout:* The LEB joins the B1190 Washingborough Road at a new four arm roundabout.

12. A climbing lane has been provided on the southbound exit from Washingborough Road roundabout with an 8% gradient.

13. *Heighington Road Overbridge:* The LEB will pass under Heighington Road through a new overbridge, with only NMU access to Heighington Road.

4,500m–6,000m (Ref 1030171/100/026C):

14. *Lincoln Road Roundabout:* A new four arm roundabout will be constructed where the LEB crosses the B1188 Lincoln Road.

15. *Lincoln Road Subway:* An underpass is proposed for non-motorised users to cross the LEB at Lincoln Road.

6,000m–7,500m (Ref 1030171/100/027C):

16. *Bloxholm Lane Footbridge*: A new footbridge will be provided over the LEB at Bloxholm Lane.

17. *Sleaford Road Roundabout:* A new four arm roundabout will be constructed to join the LEB with the A15 Sleaford Road and the realigned Bloxholm Lane.

2.3.2 *Lincoln Eastern Bypass – Future Proofing*

LCC aims to ensure that, if required, the scheme can be upgraded in the most cost effective manner with minimum disruption. As a result, the LEB has been designed to incorporate a number of future proofing design elements (at a relatively small cost) that offer best value for the single carriageway scheme design and minimises disruption for any future upgrades or scheme changes. The scheme design process

identified a number of elements where it would be beneficial to build in future proofing measures and these have been included within the design; they are as follows:

- *Greetwell Road Roundabout/Washingborough Road Roundabout/Lincoln Road Rounabout/Sleaford Road Roundabout:* All roundabouts are larger than required for a standard single carriageway design to allow the carriageway to be widened with minimum disruption, if required in the future.

- *The western arm of Greetwell Road Roundabout will have provision for the proposed Greetwell Road improvement scheme to accommodate development in the area.*

- *Greetwell Road Footbridge:* It is proposed to build the footbridge with a longer span than required for the designed carriageway width to allow any future widening of the LEB to be accommodated without having to rebuild the footbridge.

- *Lincoln to Market Rasen Railway Underbridge:* The underbridge design contains a wider northbound verge that will allow for the longer sightline for future widening of the LEB, albeit with an acceptable departure from current standards.

- *Heighington Road Overbridge:* The bridge has been designed to accommodate a widened LEB carriageway.

- *Lincoln to Spalding Railway Overbridge:* The overbridge design contains a two span box structure to allow for and simplify any future widening of the carriageway.

- *Bloxholm Lane Footbridge:* It is proposed to build the footbridge with a longer span than required for the designed carriageway width to allow for any future widening of the LEB.

- *The Lincoln Road Subway:* It is proposed to build the subway wider than required for the designed carriageway to accommodate any future widening of the carriageway.

- *The drainage (including catchment ponds) has been designed to allow for future widening of the carriageway.*

- *The carriageway crossfalls are traditionally designed to have a 'crown' in the middle, i.e. each lane falls away from the centreline. In the case of this scheme, the carriageway is designed to fall to the outside edge of the road.*

- *The large cutting south of the Washingborough Road Roundabout has been designed so that future widening can be completed within the proposed landtake.*

3 Identification of Need

3.1 Introduction

This chapter identifies the LEB scheme as a long term aspiration that is intrinsic to delivering local policy and strategy objectives. It also highlights the current transport related problems and issues within Lincoln and the role of the LEB in addressing these problems.

3.2 Policy and Strategy

This section sets out the central role of the LEB as identified within the Lincoln Transport Strategy (LTS) and the Central Lincolnshire Core Strategy.

3.2.1 Lincoln Transport Strategy

In 2004, Lincolnshire County Council (LCC) and its partners (City of Lincoln, North Kesteven and West Lindsay District Councils) commissioned the Lincoln Transport Strategy (LTS) to build a framework for the prioritisation of transport improvements in and around the Lincoln Policy Area (LPA, see Appendix B) up to 2026. The strategy has been reviewed and updated in 2008 and 2010 to ensure that it remains relevant and current to the LPA. The development of the strategy involved identifying the key transport issues affecting the Lincoln area, generating a number of strategic objectives, and identifying a range of transport interventions that would address the problems identified.

The existing transport issues and forecast problems were formulated through a combination of extensive consultation and from technical outputs from the Greater Lincoln Traffic Model (GLTM). The process highlighted that the majority of issues and problems identified: centred on congestion, lack of route choice, high volumes of through traffic and poor air quality within the LPA.

The strategy identified 18 potential transport interventions. These were further refined through evaluating each against the strategic objectives, their ability to address the identified transport challenges, cost and public acceptability. This resulted in a prioritised list of potential options to address the full range of transport issues in the Lincoln area. The LEB was identified as the priority scheme as by removing traffic from central Lincoln it will enable many of the overall aims and objectives set out within the LTS (see Table 3-1) to be achieved. It will act as a catalyst for other traffic and transport improvements within Lincoln through the removing unnecessary traffic from the city and enabling the benefits to be ‘locked in’.

Appendix C also provides further information on the stages, methods and processes used in the development of the Lincoln Transport Strategy and of the LEB.

Table 3-1 – Lincoln Transport Strategy Objectives

Lincoln Transport Strategy – Strategy Objectives	
SO1	To assist the sustainable economic growth of Lincolnshire through infrastructure

Lincoln Transport Strategy – Strategy Objectives	
	improvements to the following: - The Strategic Road Network & Non-Strategic Road Network
SO2	To remove strategic road-based freight from Lincoln and other adversely affected communities through: - Encouraging the use of alternative modes - Improving links to the Primary / Trans-European Road Network
SO3	To ensure that the transport infrastructure meets the needs of existing and proposed developments especially: - In the regeneration priorities in the Lincoln Policy Area - Including minimising congestion through the promotion of walking, cycling and public transport - Managing parking
SO4	To reduce the number and severity of road traffic accidents by reducing the potential for conflict between different modes and improving the facilities for convenient and safe alternatives.
SO5	To maximise accessibility and reduce peripherality by improving the range of travel options especially for those without access to the private car.
SO6	To increase Public Transport usage by improving: - Reliability, frequency and journey time of bus services.
SO7	To improve overall air and noise quality within the study area, especially in the Air Quality Management Area in Lincoln by the removal of unnecessary traffic by: - Removing through traffic - Reducing local journeys in Community Travel Zones - Other traffic management measures
SO8	Protect and enhance the built environment by reducing the adverse impacts from traffic, through improvements to the transport infrastructure.
SO9	Improve the attractiveness and liveability of central Lincoln for residents, workers and visitors by creating a safe, attractive and accessible environment for pedestrians.
SO10	To support the effective implementation and delivery of both the emerging Sub-Regional Strategy and the new Growth Point agenda of the Lincoln Policy Area.

3.2.2 Central Lincolnshire Core Strategy

The City of Lincoln, North Kesteven District and West Lindsey District Councils in partnership with LCC, have joined together to prepare a joint development plan (Core Strategy) for their area, which is collectively known as Central Lincolnshire.

The Draft Core Strategy will guide all new development and future planning applications in Central Lincolnshire up to 2031[1]. The strategy sets out a clear vision for Central Lincolnshire and contains planning policies to be applied to new development. The draft Core Strategy identifies a target of 42,800 dwellings and 210 ha of employment land to be built in Central Lincolnshire by 2031, of this 18,800 dwellings and 140ha is identified to be built in and adjacent to the Lincoln Policy Area.

The Central Lincolnshire Joint Planning Unit (CLJPU) recognises that this growth will have a significant impact on the transport network. As such the CLJPU has identified that the LEB is a fundamental infrastructure improvement that will facilitate the implementation of the Core Strategy.

3.3 Transport Problems & Issues

3.3.1 Existing

Lincoln suffers from a number of transport related problems and issues that have a significant impact on journey reliability, journey times and network reliability throughout the city. These, in turn, have a negative impact on the wider Lincoln economy and act as a restraint to regeneration and the city's development aspirations. A number of the problems are long-standing and, as discussed, these were identified and investigated as part of the development of the LTS.

Lincoln's city centre currently suffers from high levels of congestion from local and strategic traffic movements (see LEB Transport Assessment) which impacts on the quality of life for local residents, acts as a constraint to the economy and reduces the attractiveness of the city for visitors and investors. Traffic currently using the city centre generates congestion, impacts on air and noise quality, reduces the quality of life for residents, and makes access to jobs and facilities in the city centre more difficult for its residents and those who live nearby.

A lack of route choice has long been identified as a problem for north-south movements. A number of key strategic north-south routes converge on the city centre and with few viable alternative routes, this results in significant levels of strategic traffic being channelled through the centre of Lincoln.

In addition, the lack of alternative river crossings means that strategic traffic, including large numbers of long distance HGVs again are forced to converge on the A15 within the city centre. This intrusion of strategic traffic has been identified as a key constraint to Lincoln's continued success and a key driver for the promotion of the Lincoln Transport Strategy, including the LEB.

[1] Relevant policies are summarised in the Planning Statement submitted with this application.

In addition to the issues described above, the primary transport problems and challenges that were identified within the LTS are detailed within Table 3-2.

Table 3-2 – Key Transport Problems and Issues Identified in the LTS

Area	Identified Transport Problems & Issues
Highways & Infrastructure	Lack of suitable route choice for transport to the south & east of the study area
	High volumes of HGVs and through traffic in the city centre because of lack of alternative routes
	Congestion in the city centre and on radial routes leads to unreliable journey times and delays
	Over-dependence on the private car across Lincoln
	Waterways form a natural constraint with few crossing points
	Railways create a constraint, particularly the two level crossings in the city centre
	Buildings and developments create a built constraint to infrastructure improvements throughout the city.
Walking & Cycling	Lack of provision of cycling paths
	Security concerns associated with cycle routes
	Inadequate and unsafe cycle parking
	Hills make cycling in some areas difficult
	Busy roads with narrow footways make pedestrian routes unattractive
	Pedestrian severance between residential areas and the city centre
Environment	The historic 'uphill' area of the city centre has many historic buildings and narrow streets
	High noise levels on some strategic routes
	Poor air quality in the city centre
Safety	High accident occurrence in several areas over recent years due to unsuitable traffic levels
	Susceptibility of cyclists and pedestrians to accidents in the city centre
Parking	Parking mainly centres in the lower part of the city centre
Public Transport	Railway capacity underused, especially by commuters
	Limited local railway stations in the Lincoln area
	Poor quality trains and services
	No direct trains to London
	Congestion leads to reduced levels of bus service
	Low frequency of bus services on Sunday and in the evenings
	Poor quality bus station, with difficult pedestrian access
	Low proportion of low-floor buses
	Lack of cross-city services
	Low and declining bus patronage

3.3.2 Future

A number of the transport problems and challenges facing Lincoln are expected to increase over the mid to long term, which will place further stress on the highway network and likely have a significant impact on the local economy and Lincoln's development aspirations.

Traffic levels are forecast to continue to grow[2] within the Lincoln Area, heightened by population growth, and this will lead to increased problems and pressure on the highway network. It is important to stress that much of the network already operates above capacity during peak periods, resulting in little scope for increased demand to be accommodated on the existing network. A continued lack of route choice will also exacerbate the problems on existing routes.

It is also important to note that significant housing and economic development is targeted for the Lincoln area as in July 2008, Lincoln was afforded Growth Point status by the Government. Regional and Local targets are for an additional 42,800 dwellings and 210ha of employment land within the Central Lincolnshire area by 2031 of which the North East and South East Quadrant development sites and the Western Gateway Corridor located to the east and west of Lincoln are key to the delivery of these growth aspirations. These urban extensions have the potential to accommodate a significant level of development within the Lincoln area and the implementation of the Transport Strategy (including LEB) will be necessary to facilitate and support their delivery in a safe and acceptable manner.

The additional development will place further pressure on the existing transport infrastructure and exacerbate the problems and challenges detailed earlier. An increase in travel demands, particularly at peak periods, is likely to result in increased congestion on the network, longer peak periods, and increased suppressed demand. The off-peak network still has significant available capacity, but will become increasingly congested as traffic levels rise and the peaks spread. Failure to provide appropriate infrastructure will mean that Lincoln will not meet the growth or economic targets promoted in regional and local plans.

3.4 LEB Statement of Need

As described, the LEB forms an intrinsic part of the LTS and is a key intervention that will help achieve the transport aims and objectives identified in the Strategy as well as the development aspirations of LCC. The LEB is considered to be necessary to help alleviate the problems caused by congestion and support the delivery of national and local policy agendas identified for the Lincoln area up to 2031.

Without the addition of the LEB, the existing problems are forecast to increase and the challenges currently facing Lincoln will be exacerbated. As described in Section 3.3.2 the traffic flows are predicted to increase and by 2032 (the LEB Design Year)

[2] based on TEMPRO growth, please see the technical appendices of the Transport Assessment

the additional stress on the network will result in slower average speeds and longer journey times across the Lincoln Policy Area.

The predicted increase in traffic flows would have a detrimental impact on all users of the network. Public Transport would experience the same increase in journey times as private car users, impacting on the efficiency and reliability of services. It is also likely that pedestrians and cyclists would also suffer through increased levels of severance, impacting on the attractiveness of cycling and walking within and around Lincoln.

It is important to note that the LTS includes a large number of sustainable transport measures designed to improve conditions in the city and to assist businesses with their economic growth strategies. The LEB will be fundamental in the successful delivery of the other measures outlined by the LTS by removing the extraneous traffic from the centre and creating the conditions necessary for their implementation. Together these measures will help to mitigate the impact of the predicted increase in traffic flows and allow LCC and its partners to 'lock in the benefits' of the LEB. It is also important to note that the delivery of the wider measures is a key requirement specified by DfT as part of the funding conditions for the scheme and as such LCC and its partners are committed to their implementation.

The forecast future conditions would also have a detrimental impact on the growth strategy for Lincoln and specifically for the Growth Point agenda in the Lincoln Policy Area. The LEB is a key infrastructure development that will facilitate the growth aspirations and the economic development of Lincoln and the Lincoln Policy area.

It is important to stress that any deterioration of conditions in the City Centre would have a detrimental impact on local businesses and the amenity of users of the public realm, so that, for example, the experience of visitors would be worsened. This worsening would reduce the ability of Lincoln to attract investment from the business community and detract from Lincoln's setting as a tourist destination. Any impact on this sector would have serious implications for the local and regional economy.

3.5 Summary

The LEB scheme forms an intrinsic part of the LTS which is fundamental in facilitating Lincoln's continued economic development. The scheme will act as a catalyst for the further development and implementation of a number of wider initiatives and schemes (as detailed within the LTS) as well as providing the necessary infrastructure to help deal with the transport problems detailed above. As such the scheme is an important part of the Central Lincolnshire Core Strategy and has three clear objectives, they are as follows:

- **Objective 1:** To support the delivery of sustainable economic growth and the Growth Point agenda within the LPA through the provision of reliable and efficient transport infrastructure.

- **Objective 2:** To improve the attractiveness and liveability of central Lincoln for residents, workers and visitors by creating a safe, attractive and accessible environment through the removal of strategic through traffic (particularly HGVs).

- **Objective 3:** To reduce congestion, carbon emissions, improve air and noise quality within the LPA, especially in the Air Quality Management Area in central Lincoln, by the removal of strategic through traffic (particularly HGVs).

The scheme will have an important impact on Lincoln and will achieve the objectives listed above by:

- Facilitating sustainable development by improving access to potential growth areas and underpinning the LTS, which will deliver more sustainable and reliable transport options in the area.

- The scheme is forecast to remove up to 26% of traffic from key routes in the city centre (including HGV traffic) and allow LCC and its partners to 'lock in' benefits for sustainable transport and the environment in the city.

- The scheme will remove up to 26% of traffic from city centre (including HGV traffic) and analysis concludes that there will be benefits to air quality within central Lincoln.

4 Design Evolution

4.1 Introduction

Having established the need for the LEB as detailed previously, this chapter describes how the scheme design has evolved, summarising the various design stages and decisions. It provides an overview of the key decisions taken to date, but concentrates on the period during which the scheme gained DfT Programme Entry status (Feb 2011–Aug 2012) as all design decisions made prior to this were justified during the 2010 dual carriageway scheme planning application.

4.2 Overview of the Design Process

The LEB has a long history, but the current proposals are the result of a staged process to develop the future facing LTS for the Lincoln area, in addition to constraints on funding. As described in Section 3.2.1, the LTS resulted in the formulation and appraisal of a number of transport schemes of which the LEB was identified as a fundamental infrastructure improvement. A full description of the formulation of the LTS and the LEB can be found in Appendix C. It is important to note that to date and in line with best practice, the LEB has been through a thorough design process, which has included the following stages:

1. Policy and Strategy review
2. Initial Feasibility
3. Preparation of Objectives
4. Outline Design
5. Public Consultation
6. Design Review and Value Engineering Assessment
7. Revised Design

4.2.1 Document Review

During the design process for the scheme due regard has been given to relevant guidance and design standards, including those prescribed in the Design Manual for Roads and Bridges (DMRB).

4.2.2 LEB Design and Public Consultation

The LEB scheme and design have also been subject to extensive stakeholder consultation including the public consultation exercise in 2008 that looked at the route options for the dual carriageway design. It also includes the key stakeholder consultation exercise in 2011 which consulted on the changes to the scheme design and ensuring the LEB remained relevant to the economic regeneration plans of key stakeholders.

The findings of the public and stakeholder consultation exercises can be found within the Statement of Community Involvement document which has been submitted alongside this document.

4.3 Summary of the Design Process

The section above has provided an overview of the steps taken to date, a summary of the pertinent design stages undertaken and subsequent design outcomes is provided in Table 4-1 below.

Table 4-1 – Summary of LEB Scheme Design Process

Scheme Evolution/ Design Stage	Summary of Key Scheme Design Considerations and Outcomes
Stage 1 Scheme Assessment (Dec 2007)	**Summary:** The LEB was initially granted planning permission April 2005 for a route between A158 Wragby Road and the A15 Sleaford Road. However this corridor was revisited in light of Lincoln being granted growth point status and. The assessment identified five potential broad corridors for the LEB.
	Outcome: The assessment highlighted that two corridors (Blue A & Brown A – see Appendix D) would provided the most robust economic case and were considered the most feasible/ deliverable.
Stage 2 Scheme Assessment	**Summary:** A second assessment investigated potential route options (X, Y, Z) within the preferred corridors. Each of the route options under investigation was consistent with the extant route between the A158 Wragby Road and B1190 Washingborough Road (northern section), but varied in alignment from Washingborough Road southwards. Routes X, Y and Z are illustrated in Appendix E.
	Outcome: The assessment concluded that the three route options under investigation were robust schemes and should be progressed to the public consultation stage of the scheme development process. Each route option offered High Value for Money and provided other significant benefits when appraised against the Government's 5 key National Transport Objectives.
Public Consultation (Feb 2008)	**Summary:** Public consultation was undertaken to engage elected members, selected stakeholders and the wider public to gauge opinion on the three alternative routes (see Statement of Community Involvement). Feedback from the public consultation was used to inform the decision on route selection.
	Outcome: The public consultation results showed that Route Z had the greatest support. When considered against regional housing targets, Lincoln's new Growth Point status and LCC's aspirations for future growth as one of the Eastern Sub-areas Principal Urban Areas, the requirement for additional housing allocations needed to be considered as part of the scheme development process. In this instance Route Z, which is the furthest option to the east, was viewed as the preferred route option. This was endorsed by the County Council's partners and the Environment Agency prior to a Preferred Route Announcement being made in November 2008.
MSBC & Planning Permission (Aug 2009 & Nov 2009)	**Summary:** A scheme design (based on the consultation work) was generated for the MSBC and planning application.
	Outcome: The scheme taken forward at MSBC/ Planning stage was a 7.85km dual carriageway with a 70mph speed limit, linking the existing Northern Relief Road at the junction of the A15 and A158 Wragby Road in the north to the A15 Sleaford Road in the south. A separate 3.0m wide combined cycle and pedestrian right of way provided along the full length of the scheme to link up with existing public rights of way. The MSBC was submitted in 2009 and the scheme was granted planning permission in 2010.
DfT Expression of Interest & Development Pool Process	**Summary:** As a result of the Coalition Spending Review the dual carriageway LEB was not taken forward to Programme Entry. DfT announced that funding would be available through the development pool process for schemes that looked to revise the total cost required from DfT. As a result the LEB design was revised to

Scheme Evolution/ Design Stage	Summary of Key Scheme Design Considerations and Outcomes
(Feb 2011)	reduce the overall cost and a number of options were evaluated.
	Outcome: A revised proposal was put forward that included reducing the LEB design to a single carriageway scheme. It was identified that this would offer significant cost savings without impacting on the ability to deliver the overall scheme objectives. In addition, the EoI (Expression of Interest) also identified a number of areas where the scheme had been further altered from the initial programme entry scheme design to further reduce the overall costs, these were: • The treatment of side roads and radial routes which will cross the route were reconsidered with regard to the size and type of junctions and crossings provided along the route. The decision was also taken to keep the Wragby Road Roundabout at its existing diameter. • The Greetwell Road Junction improvement has been omitted from the scope of works. • A reduction in design speed (i.e. stopping site distance and horizontal radius) in order to reduce the earthworks costs associated with the dual carriageway scheme design.
Value Engineering (Mar 2011)	**Summary:** Following the submission of the EoI and approval from DfT to prepare a best and final bid business case, an exercise was undertaken to assess all possible changes in scope and value engineering options in order to develop the most effective solution in relation to the overall scheme objectives, the wider aims of the LTS and the value for money objectives. The exercise considered: i) a partial dual carriageway, ii) removing the proposed NMU route; iii) reducing/removing lighting across the length of the route; iv) reducing the length of the route, v) single carriageway with future proofed structures for dualling in the future; and vi) single carriageway with single carriageway structures.
	Outcome: An assessment was undertaken for these options but all except vi) were discarded on the basis of feasibility, value for money, or contribution to scheme objectives. Option vi) was taken forward as the revised LEB scheme that would form the Best & Final Bid.
Stakeholder Consultation (June – Aug 2011)	**Summary:** As part of the Best and Final Bid process a consultation exercise was undertaken with the specific aim of ensuring that the revised scheme was relevant to the economic regeneration plans of key stakeholders.
	Outcome: The scheme was supported by all key stakeholders and there were no changes to the scheme design following the stakeholder consultation.
LEB Design Revision – Best & Final Bid (Sept 2011)	**Summary:** The design was revised as per the value engineering options identified at the Expression of Interest and Value Engineering stages for the Best and Final Bid Submission.
	Outcome: The LEB scheme included the following changes to that proposed within the Major Scheme Business Case at Programme Entry. • 7.5km single carriageway within redline planning boundary to reduced design speed (85kph). • Hawthorn Road junction to be reduced to a left in left out junction with auxiliary diverge lane and tapered merging lane (this removes the need for a bridge and associated earthworks). • Single carriageway bridge over the Lincoln to Market Rasen railway line • Single carriageway viaduct over the River Witham • Single carriageway bridge under the Lincoln to Spalding railway line • Climbing lane introduced on southbound exit from Washingborough roundabout • 8% gradient introduced within climbing lane on southbound exit from Washingborough roundabout to minimise depth of the cutting. • Reduced width on Heighington Road Overbridge.

Scheme Evolution/ Design Stage	Summary of Key Scheme Design Considerations and Outcomes
LEB Design Revision – Single Carriageway Planning Application (Aug 2012)	**Summary:** The BaFB scheme was successful and achieved Programme Entry status, following which a review of the design was undertaken to ensure that it remained robust. Given that dualling of LEB remains a long term aspiration of LCC, the design was revised to incorporate further future proofing measures. This would ensure that, as and when required, the scheme can be upgraded in the most cost effective manner with minimum disruption.
	Outcome: The following elements were incorporated into the single carriageway scheme design: • Vertical Alignment revised to allow a revised design speed of 100kph (60mph speed limit) to be incorporated (at minimum increase to the scheme cost). • Northbound overtaking lane introduced between River Witham Bridge and Greetwell Road Roundabout. • NMU route moved to the main carriageway verge. • Link to Viking Way revised to permit satisfactory safety fencing layout. • Link to the South Delph Footbridge revised to permit satisfactory safety layout. • Greetwell Footbridge and Bloxholm Lane Footbridge expanded to dual carriageway width. • Greetwell Road Roundabout and Lincoln Road Roundabout revised to dual carriageway size (inscribed circle diameter increased to 80m & 90m respectively).

4.4 Key Design Decisions & Design Rationale – Scheme Programme Entry

As shown in Table 4-1 above, there have been a number of stages of the design process when a key design decision has been necessary. The section below describes the rationale behind the key design decisions made during the preparation of the scheme Best & Final Bid (BaFB) and following the scheme being granted Programme Entry status. All design decisions made prior to this were justified during the dual carriageway scheme planning application and have not been detailed below.

Table 4-2 – Scheme Programme Entry Key Design Decisions & Rationale

Ref	Design Decision	Rationale
Route & Layout	To reduce the main carriageway to a single carriageway way road.	DfT advised that funding would not be provided for a dual carriageway scheme and as part of the value engineering process the scheme was redesigned to a single carriageway to reduce the overall scheme cost. The delivery of the successful Best & Final Bid Business Case demonstrated that the single carriageway scheme would still deliver stated scheme objectives. The single carriageway design also includes future proofing measures to allow the LEB to be upgraded with minimum disruption and cost.
	To introduce a northbound overtaking lane between River Witham Bridge and Greetwell Road Roundabout.	Following a review of the design it was decided that an overtaking lane was required to ensure that there are overtaking opportunities along the northern sections of the route.
	To remove the Greetwell Road Improvement Scheme from the LEB scheme	LCC decided as part of the value engineering process that the scheme should no longer form part of the LEB scheme to reduce the overall scheme cost.

Ref	Design Decision	Rationale
	To introduce a climbing lane from Washingborough Road Roundabout on southbound route	In line with national standards the gradient of the route south of the roundabout justifies the inclusion of a climbing lane.
Junction	**Hawthorn Road:** To provide a left in/left out junction on the eastern side of the bypass and stop up the western side	The left in/left out junction was proposed as part of the value engineering process to remove the need for an underbridge and associated earthworks.
	Greetwell Road/Washingborough/ Lincoln Road/Sleaford Road roundabouts: To incorporate larger roundabouts into scheme design	The roundabouts are larger than for a standard single carriageway design to provide additional capacity and allow the carriageway to be widened with minimum disruption and in the most cost effective way.
Structures	**Greetwell Road Footbridge:** The structure will be built to a dual carriageway width.	This will ensure that the structure is future proofed and any expansion of the LEB can be completed with minimum disruption and in the most cost effective manner.
	Single Carriageway River Witham Underbridge	A single carriageway structure remains most cost effective solution.
	Lincoln to Spalding Railway Overbridge	The bridge carries the proposed carriageway under the Lincoln to Spalding rail line. It was decided that due to complexities and cost in constructing under this rail route that the structure be future proofed by including a two span box structure.
	Heighington Road Overbridge	The bridge has been designed to accommodate a widened LEB carriageway.
	Lincoln Road Subway: To design the structure to accommodate any widening of the LEB.	It was decided that providing a single carriageway structure would offer little benefit as the cost saving for this would be minimal compared with the cost of future widening of the carriageway.
	Bloxham Lane Footbridge: To design the structure to accommodate a dual carriageway in future, as necessary.	This will ensure that the structure is future proofed and any expansion of the LEB can be completed with minimum disruption and in the most cost effective manner.

4.5 Summary

The LEB has been through a thorough design process and the scheme design has evolved over a significant period of time. The process also demonstrates that public and stakeholder consultation has played an important role in influencing the scheme's design. The design decisions and the rationale behind them are clearly set out and together this demonstrates the thorough approach that has been applied in developing the LEB within the constraints noted previously. Specifically the process demonstrates that:

- The current route and corridor remains the most appropriate for the single carriageway scheme and for achieving the stated scheme objectives.
- The single carriageway scheme has achieved Programme Entry Status and DfT funding has been approved/ granted.
- The change to the single carriageway scheme will still deliver the scheme objectives.

- Despite the reduced funding the scheme design has been future proofed to allow the LEB to be upgraded in the future.

- The change in scheme design was supported by all key stakeholders during the stakeholder consultation process and there were no changes to the scheme design following this process.

5 Review of Alternative Options

5.1 Introduction

This chapter describes the alternative options and transport interventions considered and the process that led to the formulation of the LEB single carriageway scheme. It provides an overview of the key design alternatives considered through the design process.

5.2 Consideration of alternatives

As described in Section 3.2.1, the current LEB scheme proposal is the result of a staged process to develop LTS. This process defined the key transport challenges facing the Lincoln area and identified and appraised all possible interventions needed to improve transport and travel within and through Lincoln.

5.2.1 Assessing the alternatives

The initial stages to develop the LTS identified a number of strategic objectives that tackled issues connected to the public transport network, local and strategic highway network, sustainable transport, safety, air quality and the environment and economic growth. The process also assessed all existing transport issues and forecast problems that affected the Lincoln Policy Area across a number of transport modes. These were formulated through a combination of extensive consultation and technical outputs from the Lincoln traffic model. The process highlighted that the majority of issues and problems identified, centred on congestion, lack of route choice, high volumes of strategic traffic and poor air quality.

The next stage of developing the strategy involved the identification, evaluation and classification of potential transport interventions. The initial options were developed through liaison with key stakeholders, the technical analysis of key issues and the consideration of 'historic' ideas. The result of this was identification of 18 potential transport interventions. These were further refined through evaluating each against the strategic objectives, their ability to address the identified transport challenges, cost and public acceptability. The results of the evaluation placed the LEB in primary position in terms of score based on contribution towards the strategic objectives, the transport problems and issues and national transport objectives. The appraisal also resulted in a prioritised list of potential options to be included within the LTS. These included the LEB, Quality Bus Corridors, Lincoln East West Link, Lincoln Southern Bypass, Park & Ride and a City Centre Parking Strategy.

To further refine and develop the potential interventions, a consultation exercise was undertaken for the emerging LTS. A leaflet was distributed to a sample of households who were asked to prioritise a range of transport interventions which resulted in the following prioritised list:

1. A Lincoln Eastern Bypass

2. Improved pedestrian and cycle network

3. Improved City Centre parking
4. High Quality bus services
5. The provision of Park & Ride
6. A new bus station
7. A Lincoln Southern Bypass

The consultation exercise identified the LEB as a key short term improvement. Further option testing was carried out using the Lincoln traffic model to test options against their ability to solve key problems associated with high levels of traffic within Lincoln city centre and also contribute to the overall strategic objectives. These included testing the quality bus corridors option, park and ride, Lincoln Southern Bypass (LSB) and the LEB as they were assessed as likely have the most significant impact in solving the key problems and achieving the overall objectives. The other options explored were considered to not have the same impact due to their scale or would likely achieve fewer of the overall objectives.

Based on the remaining four schemes, a total of 10 different scenarios were tested using the Lincoln model. This assessed their economic impact and benefit to cost ratio, as well as each scheme's impact on journey times and traffic flows. The results of the assessment revealed that, in isolation, the QBCs and Park & Ride schemes and LSB had a minimal or lesser impact. However, where these initiatives were implemented alongside the LEB the improvement to journey times and traffic flows was significant.

5.2.2 Outcome

The appraisal and identification of infrastructure improvements and transport interventions demonstrated that the LEB is an important part of the LTS and a priority for Lincoln. The process demonstrated that the scheme is integral to the work of addressing the transport challenges facing Lincoln and is fundamental to achieving the LTS's strategic objectives. It is important to emphasise that the process of developing the LTS demonstrated that the other transport interventions would not have the same impact without the implementation of the LEB. It also showed the importance of the LEB in addressing the existing and future transport challenges facing Lincoln and the Lincoln Policy Area (further details on the development of the LTS and the assessment of alternative options can be found in Appendix D).

5.2.3 Consideration of Alternatives – Programme Entry (Scheme Funding Bid)

As discussed in Section 4, the result of the 2010 Coalition Spending Review meant that the dual carriageway LEB was not taken forward to Programme Entry. However, DfT announced that funding would be available through the development pool process for schemes that looked to revise the total cost required from DfT. As a

result, a value engineering process was undertaken to look for opportunities to reduce the overall scheme cost of the LEB.

The exercise looked to assess all possible changes in scope and all potential value engineering options in order to develop the most effective solution. Specifically, the exercise looked at changes to highway design, earthworks, structures, drainage, lighting, construction and environmental measures. It evaluated each option in relation to the impact on overall scheme objectives, the wider aims of the LTS, the value for money objectives and whether it was achievable. The exercise resulted in considering the following options:

i. A partial dual carriageway,

ii. Removing the proposed NMU route;

iii. Reducing/removing lighting along the length of the route;

iv. Reducing the length of the route,

v. Single carriageway with future proofed structures; and

vi. Single carriageway with single carriageway structures.

An assessment was undertaken for these options but all except ‘v’ were discarded on the basis of feasibility, value for money, or contribution to scheme objectives. Option ‘v’ was taken forward as the revised LEB scheme for Programme Entry and for this planning application.

5.3 Summary

This chapter has summarised the alternative schemes considered alongside the development of the LEB scheme proposal. It demonstrates the relationship of the LEB and the LTS and explains the consideration of alternatives at the DfT programme entry stage. The process has demonstrated the importance of the LEB and the process which has resulted in the single carriageway design being promoted as the option to be taken forward to Programme Entry and for a new planning application.

6 Impact Summary

6.1 Introduction

This chapter summarises the various transport and environmental impacts of the single carriageway scheme as summarised in the single carriageway Environmental Impact Assessment (EIA) and Transport Assessment (TA).

6.2 Transport Impact Assessment

As part of the planning application a TA has been completed to assess the impact of the single carriageway scheme on traffic across the LPA. The methodology used is detailed in the Transport Assessment, however, in summary:

- The LEB scheme is a long term aspiration that is intrinsic to delivering local policy and strategy objectives. As such local authorities have been able to establish a clear set of objectives for the LEB which the TA shows the scheme will meet.
- The LEB conforms with the objectives and aspirations of national planning guidance. Furthermore, it is specifically identified in Local Policy documents as a key scheme that will; support the delivery of sustainable economic growth; improve the attractiveness and liveability of central Lincoln and reduce congestion, carbon emissions, improve air and noise quality within the Lincoln.
- Traffic levels in Lincoln have an adverse impact on public transport operations and the attractiveness of the area for pedestrians and cyclists.
- A robust assessment of road traffic accidents has undertaken and concludes that;
    - There would be significant accident benefits across the study area with the COBA appraisal **identifying up to £39m of accident benefits over a 60 period** and;
    - With the forecast reduction in HGV flow and strategic traffic in and around Lincoln city centre onto more appropriate routes i.e. the LEB, the assessment highlighted that **pedestrian severance and the accident record of a number of road links within the area would likely be improved**.
    - The analysis of links adjacent to the proposed scheme has revealed no significant safety issues or trends which would call for further study or require any additional mitigation measures over and above the design proposals.
- The scheme has been designed with due consideration of relevant standards (e.g. DMRB) and has received wide ranging support from both public and

stakeholder consultation exercises. It has also been designed so that in the future it can be upgraded to a dual carriageway route (it is noted planning consent already exists for a dual carriageway LEB).

- The scheme is forecast to remove up to 26% of traffic from key routes in the city centre. Specifically the LEB will reduce traffic flows on existing key city centre routes, including the A15 Broadgate, B1273 Brayford Way and A57 Wigford Way. It will also reduce flows on the existing A46 Western Bypass.

- The inclusion of the LEB also has an effect on strategic traffic moving between areas to the far north of Lincoln and the far south of Lincoln.

- By 2032, the impact of the major developments located at the northern and southern end of the LEB impacts on the volume of north south traffic movements.

- The impact the LEB is expected to have at nine existing junctions on the highway network (as identified by the Local Highway Authority as needing consideration) has been assessed. The assessment shows that, with the LEB, general traffic flows will increase compared to the DM at 2 of the 9 assessed junctions based on flows from the VISUM model. These are Junction 1b (the A16/A46/A158 roundabout) and Junction 2 (B130/Greetwell Road mini - dumbbell roundabout).

- Queues have been assessed for these 2 junctions, the queue assessment from VISUM shows that in the AM the queues are worst on the northern approach to Junction 1b. However, it should be noted that:

    - There are already significant queues on this arm at present.

    - There are queues in the DM.

    - The DS includes major developments forecast for eastern Lincoln.

- Furthermore, queues at Junction 2 are not significant with or without the scheme, the extra flows are therefore not expected to manifest in long queuing. There are also no significant changes in queuing with the LEB scheme at these junctions in the PM.

- The five new roundabouts on the LEB have been modelled using two methods of ARCADY analysis. This has been done for 2017, 2025 and 2032. The first method of analysis shows that all junctions will operate in the AM and PM in all assessment years. The second (more robust) method shows them working in 2017 and 2025 AM and PM and 2032 PM (save for one junction). In 2032 AM the second method shows some capacity issues on some of these junctions. By 2032 the SEQ and NEQ developments are assumed to be in place.

In conclusion; overall, there are no transport related reasons why planning approval for this scheme should not be granted.

6.3 Environmental Assessment (Soils & Geology)

An assessment of the existing baseline conditions in relation to geology and soils (including made ground and potentially contaminated land) has been completed as part of the EIA. The assessment focused on land immediately adjacent to, or within the footprint of the Proposed Scheme. In addition reference was also made to landfill sites and other higher risk sites within a further 100m of the LEB to ensure that potential contaminant linkages associated with the Proposed Scheme were assessed.

The impact assessment demonstrates that no cumulative impacts on soils and geology are considered likely during construction of the scheme or its operation. The assessment outlines that the Proposed Scheme will obscure part of the rock outcrop at Greetwell Hollow Quarry SSSI and this is considered to be a negative residual impact and which cannot be mitigated. However, currently access to the rock outcrop is poor and construction of improved access (as a result of the LEB) is likely to provide benefits to those wishing to study the geological formations.

The assessment also identified that potential impacts could occur through disturbance of made ground or contaminated ground or encountering mine workings or landslips. It is anticipated that these can be mitigated at the detailed design or construction stage. It is important to note that appropriate assessment and implementation of any necessary mitigation measures will be required in order to achieve no residual impact. However, the treatment of any contaminated ground encountered is likely to result in a beneficial impact.

6.4 Environmental Assessment (Landscape and Visual Amenity)

The Landscape and Visual Amenity analysis has assessed the impacts of the Proposed Scheme on the existing landscape character and sensitive visual receptors. The study area used within the assessment was defined as the area through which the existing landscape character may change or be influenced as a direct result of construction and operation of the Proposed Scheme.

The assessment of landscape effects concluded that, whilst taking proposed mitigation measures into account the majority of the scheme could be accommodated within the wider landscape effectively. At a local level the residual impact of the Proposed Scheme within the Witham Valley complex which accounts for approximately a quarter of the scheme's extent, would be significant. This arises as a result of the degree to which the prominent embankments and bridge structures, which by their very nature are difficult to effectively mitigate, would modify the local landform, landscape patterns and perception of the Valley to the east of the City of Lincoln.

The Visual Effects were assessed as ranging between neutral and moderate and adverse, although with the incorporation of the proposed mitigation measures the

majority will be no greater than slight and adverse and the resulting residual impacts are therefore not considered significant.

6.5 Environmental Assessment (Noise)

The assessment has focused on two aspects of traffic related noise; the magnitude of increase or decrease in noise levels which is predicted to result from the implementation of the Proposed Scheme; and changes in the percentage of the population that would experience noise nuisance as a result of the Proposed Scheme. Specifically the assessment has focused on the following:

- The evaluation of the potential noise and vibration impacts at sensitive receptors during the construction of the LEB.
- The evaluation of potential operational noise and vibration impacts at sensitive receptors following the opening of the LEB.

The assessment has indicated that with the implementation of appropriate mitigation measures the noise impact during construction would be negligible. In addition the traffic noise impact of the scheme is anticipated to be negligible for the majority of potentially sensitive receptors within the study area; however 181 dwellings are predicted to be exposed to major adverse impacts as a result of the proposed scheme. It is important to note that LNS will be applied at specific areas along the proposed scheme in order to reduce the number of dwellings exposed to a major adverse impact.

6.6 Environmental Assessment (Air Quality)

The assessment of the potential impacts of the Proposed Scheme on air quality has involved the following:

- An evaluation of the potential impacts associated with dust generated during earthworks, construction activities and trackout, on sensitive receptors located in the vicinity of the working areas, as well as along roads used during the construction period for the Proposed Scheme;
- An evaluation of the potential impact of additional traffic emissions associated with construction vehicles;
- An evaluation of the potential impact on local air quality due to changes in traffic-related emissions associated with predicted changes in vehicle flows, speed and any variations in traffic composition on roads within the local road network as a result of the opening of the Proposed Scheme to use; and
- An evaluation of the anticipated effect of the Proposed Scheme on carbon-related emissions, oxides of nitrogen (NOx) and particulate matter (PM10) at the regional level.

The assessment has indicated that with appropriate mitigation measures implemented the dust nuisance during construction would be slight adverse.

The assessment has also indicated that the change of magnitude in ambient air concentrations associated with the implementation of the Proposed Scheme is negligible to small. The overall impact from the Proposed Scheme on air quality is slight beneficial to negligible for the two pollutants of health concern.

6.7 Environmental Assessment (Cultural Heritage)

The assessment of the potential impacts on both known and potential cultural heritage assets has also been completed as part of the EIA. Where impacts on known or potential interests have been identified, relevant archaeological and cultural heritage mitigation strategies have been proposed.

The impact analysis indicates that with the implementation of the outlined mitigation the significance of effects upon buried remains is neutral to slight. In addition the landscaping and planting intended to soften the appearance of the road will not significantly change the impact rating on Greetwell Medieval Village since the impact on the setting of the monument remains. The impact rating on the setting will, therefore, be minor and the significance of effects will be slight. The survey of the barrow cemeteries will also not completely mitigate against the impact on these monuments therefore the impact rating following mitigation will be minor with a significance of effects rating of slight.

The analysis also demonstrates that the impact on the setting of All Saints Church is expected to be minor given that the relationship between the city and the cathedral and its wider post-medieval landscape will be obscured. The impact upon Sheepwash Grange; Manor Farm, farm buildings; Monument to Thomas Winn; Monument To Thomas Straw; Canwick Heath Farm; Halfway House and Foreman's House and Workers' Cottages will, also be minor to negligible with a significance of effect of slight to neutral.

The assessment points out that although the completed scheme will still also be visible on the approach to Greetwell Lodge, Greetwell Hall, Ashfield House, Glebe Farmhouse and Branston Heath Farmhouse the impact has been assessed as minor to negligible with a significance of effect of slight to neutral. Again, the completed scheme will still remain visible in long distance views to and from the Cathedral, Lincoln Castle and the Bishop's Palace. It will also introduce new and permanent infrastructure into an existing rural landscape, this impact has, therefore, been assessed as minor following mitigation.

It is also important to note that although the landscape survey aims to mitigate the impact on the historic landscape, the Proposed Scheme will still have an adverse effect. Planting and landscaping will go some way to reducing the visual and noise impacts on the wider setting but will not be able totally screen this, therefore this impact following mitigation is, therefore, moderate.

6.8 Environmental Assessment (Nature Conservation)

The assessment identifies that the construction of the Proposed Scheme is likely to have a negative impact upon ecological resources within Greetwell Hollow Quarry,

Greetwell Wood SNCI; the River Witham Corridor LWS and Willingham Fen West LWS. However it is important to stress that with appropriate mitigation, the residual impacts could be reduced to negligible at these sites. The residual impact at all other sites has been assessed as negligible.

The Proposed Scheme also has the potential to have an impact upon legally protected species. However, the residual effects of the scheme are likely to be negligible, with the exception of bats and great crested newts where additional surveys will likely be required and detailed mitigation needed to be agreed with Natural England.

6.9 Environmental Assessment (Drainage & Water Environment)

The assessment concluded that, with the inclusion of the proposed design and mitigation measures, impacts on the water quality, geomorphology, hydrology and flood risk of surface waters and on the water quality, flows and levels of groundwaters would be no greater than slight at specific locations and would be slight overall.

6.10 Environmental Assessment (Flooding)

As part of the EIA the risk of flooding from all sources has been assessed (including the impact of climate change) and has utilised information from the Lincoln Eastern Bypass Flood Risk Assessment produced in 2009 and through consultation with the Environment Agency.

The assessment demonstrates that the main source of flood risk in the Lincoln area is fluvial and this is currently well managed. The assessment also shows that flood risk from other sources is not considered to be significant at this site and will not be worsened by the proposed road. Flood risk will also be mitigated through the use of Sustainable Drainage Systems (SuDS) in the form of attenuation ponds. These will attenuate flows from the new road and discharge at the existing greenfield runoff rate to ensure that flooding is not increased elsewhere.

The assessment concludes that provided the recommended mitigation measures are implemented, the development will be safe from flooding without increasing the risk of flooding elsewhere.

6.11 Environmental Assessment (Interactions & Cumulative Impacts)

No significant cumulative impacts are anticipated for the scheme, provided that all the environmental commitments detailed in Chapter 16 of the ES are followed.

6.12 Summary

The impact analysis demonstrates the following:

- Overall, there are no transport related reasons why planning approval for this scheme should not be granted.

- The visual impact of the scheme has been assessed as ranging from neutral to moderate and adverse. However with the incorporation of the proposed

mitigation measures the majority will be no greater than slight and adverse. The resulting residual impacts are therefore not considered significant.

- The assessment has indicated that with the implementation of appropriate mitigation measures the noise impact during construction would be negligible and the traffic noise impact of the scheme is anticipated to be negligible for the majority of potentially sensitive receptors within the study area.
- The overall impact from the Proposed Scheme on air quality is slight beneficial to negligible for the two pollutants of health concern.
- The assessment concluded that, with the inclusion of the proposed design and mitigation measures, impacts on the water quality, geomorphology, hydrology and flood risk of surface waters and on the water quality, flows and levels of groundwaters would be no greater than slight at specific locations and would be slight overall.
- The assessment concludes that provided the recommended mitigation measures are implemented, the development will be safe from flooding without increasing the risk of flooding elsewhere.

7 Benefit Summary

7.1 Introduction

This chapter sets out the primary benefits of the scheme and the wider transport, social and environmental benefits.

7.2 Primary Benefits

The transport, social, economic and environmental benefits of the scheme are substantial. Specifically the scheme impact assessment has demonstrated that the LEB will achieve its stated objectives, namely:

- **Objective 1:** To support the delivery of sustainable economic growth and the Growth Point agenda within the LPA through the provision of reliable and efficient transport infrastructure.
    - *The scheme will facilitate sustainable development by improving access to potential growth areas and underpinning the LTS, which will deliver more sustainable and reliable transport options in the area.*
    - *The LEB conforms with the objectives and aspirations of national planning guidance. Furthermore, it is specifically identified in Local Policy documents as a key scheme that will; support the delivery of sustainable economic growth; improve the attractiveness and liveability of central Lincoln and reduce congestion, carbon emissions, improve air and noise quality within the Lincoln*.

- **Objective 2:** To improve the attractiveness and liveability of central Lincoln for residents, workers and visitors by creating a safe, attractive and accessible environment through the removal of strategic through traffic (particularly HGVs).
    - *The scheme is forecast to remove up to 26% of traffic from key routes in the city centre which will also allow LCC and its partners to 'lock in' benefits for sustainable transport and the environment in the city.*
    - *Specifically the LEB will reduce traffic flows on existing key city centre routes, including the A15 Broadgate, B1273 Brayford Way and A57 Wigford Way. It will also reduce flows on the existing A46 Western Bypass.*

- **Objective 3:** To reduce congestion, carbon emissions, improve air and noise quality within the Lincoln Policy Area, especially in the Air Quality Management Area in central Lincoln, by the removal of strategic through traffic (particularly HGVs).

- *The scheme is forecast to remove up to 26% of traffic from city centre and analysis concludes that there will be benefits to air quality within central Lincoln.*

7.3 Additional Benefits

The process of developing the LTS identified a number of key transport interventions that would look to achieve the strategic objectives set out within the strategy and address the significant transport challenges facing Lincoln. As described in this document a key part of the strategy is the LEB, as its introduction will be a catalyst for the implementation of a series of other measures that would also address the stated objectives and challenges.

The removal of through traffic from Lincoln will allow LCC to introduce further traffic management measures and infrastructure improvements that would improve the environment along the roads relieved by the new bypass, through improving accessibility and reducing community severance. The removal of strategic traffic will provide the opportunity to reallocate road space within central Lincoln and utilise this road space for the benefit of all types of user making Lincoln a more vibrant and accessible city centre for residents, visitors and businesses.

Specifically the LTS includes measures to extend and enhance pedestrian areas and priorities, improve the cycle network, introduce Quality Bus Corridors and close the High Street level crossing to traffic. In addition traffic management measures are proposed in Lincoln's historic core, which is also known locally as the 'Uphill area' of the city centre. Increased restrictions for traffic in the area surrounding the Cathedral and Bailgate would ensure that the city's historic buildings, particularly the Cathedral, are protected from the negative environmental impacts of traffic. This would protect and enhance the tourism economy and when combined with other city centre measures would result in significant improvements to the public realm.

This combination of interventions will result in significant benefits for all users and fundamentally change and improve the public realm within the city centre. They provide the opportunity to reclaim the city centre for the benefit of the public realm and also facilitate the introduction of improved public transport infrastructure and facilities for non motorised users, thus increasing accessibility and options to travel

The delivery of the Lincoln Transport Strategy is split over shorter term timescales (up to 2016) and longer measures (up to 2026 and beyond). Delivering the Strategy within the identified timeframes will be challenging and subject to funding issues outside the direct control of LCC. However, the County Council and its partner authorities are committed to achieving the outcomes identified.

8 Summary and Conclusions

Lincoln suffers from a number of transport related problems and issues that have a significant impact on journey reliability, journey times and network reliability throughout the city. Key challenges include:

- High levels of congestion from local and strategic traffic movements within the centre of Lincoln
- Traffic currently using the city centre generates congestion, impacts on air and noise quality, reduces the quality of life for residents, and makes access to jobs and facilities in the city centre more difficult for its residents and those who live nearby.
- A lack of route choice for north-south movements resulting in strategic traffic being channelled through the centre of Lincoln.
- There is a lack of alternative river crossings meaning that strategic traffic, including HGVs again are forced to converge on the A15 within the city centre.

These problems have a negative impact on the wider Lincoln economy and act as a restraint to regeneration and the city's development aspirations. The problems are forecast to increase and will place further stress on the highway network and likely have a significant impact on the local economy and Lincoln's development aspirations. Failure to provide appropriate infrastructure will mean that Lincoln will not meet the growth or economic targets promoted in regional and local plans.

This report demonstrates that the LEB forms a fundamental part of the LTS which is essential in dealing with Lincoln's transport challenges and facilitating its continued economic development. The scheme is also an important part of the Central Lincolnshire Core Strategy and will act as a catalyst for the implementation of a number of wider initiatives and schemes.

This document also demonstrates that the LEB has been through a thorough design process and the scheme design has evolved over a significant period of time. It also explains the reasons and rationale for the change to a single carriageway design and how the design has been carefully considered and future proofed to ensure it can be efficiently adapted to cope with the future growth of Lincoln.

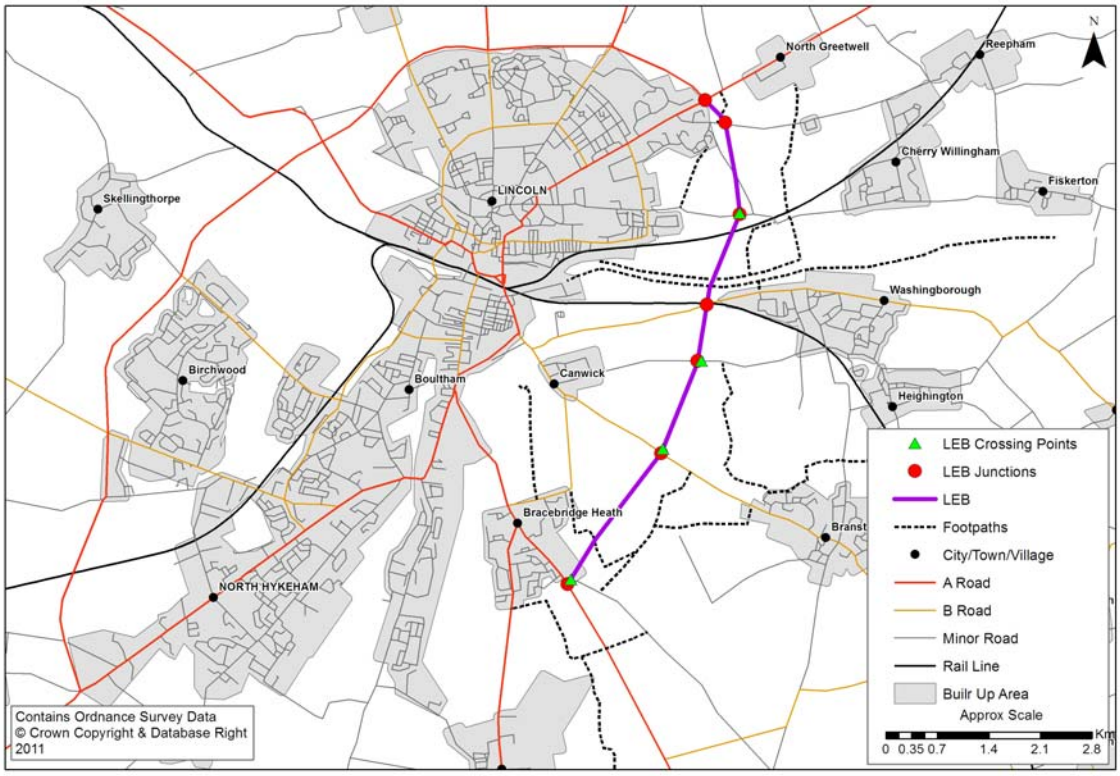
Specifically this report shows that:

- The current route remains the most appropriate for the single carriageway scheme.
- The single carriageway scheme has achieved Programme Entry Status and DfT funding has been approved.

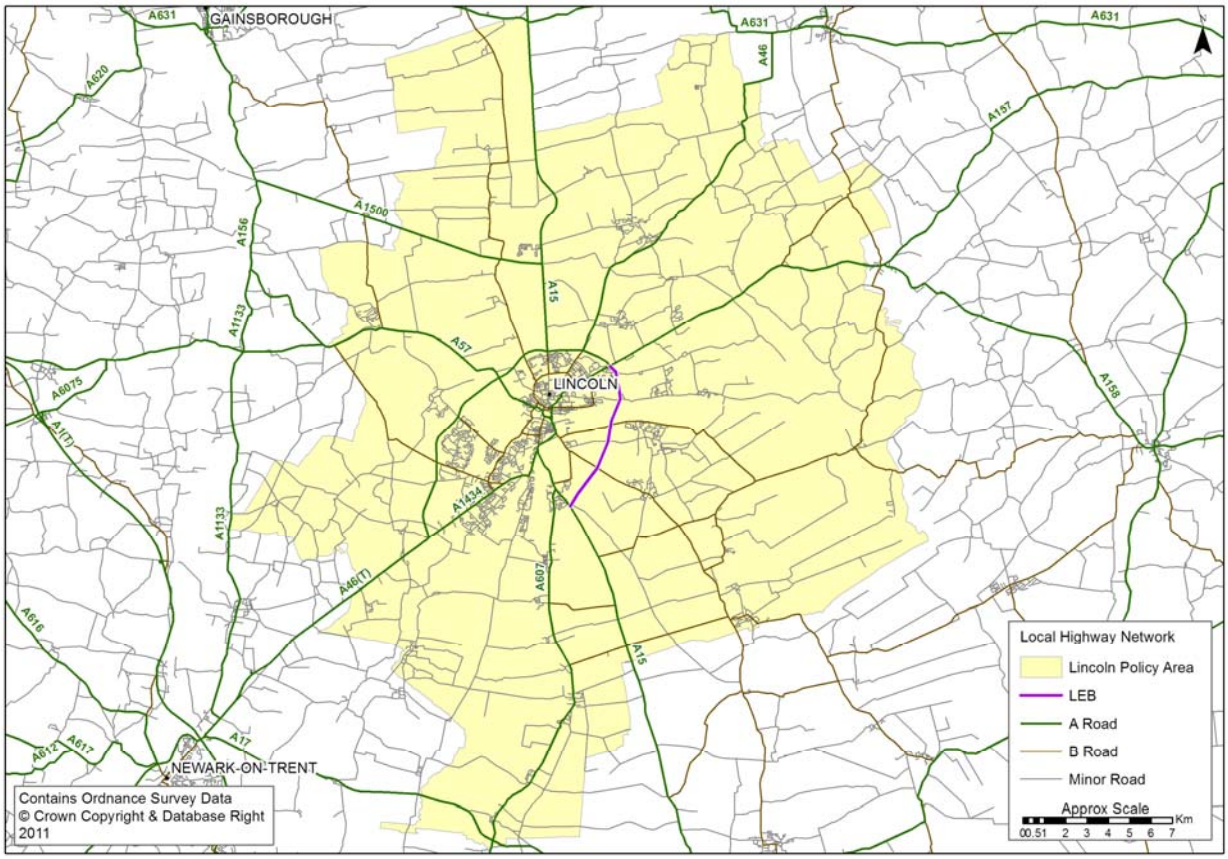
- The scheme design has been future proofed to allow the LEB to be upgraded in the future.
- The change in scheme design has the support of key stakeholders.
- The EIA and TA show how the single carriageway scheme will deliver the following scheme objectives:
    - **Objective 1:** To support the delivery of sustainable economic growth and the Growth Point agenda within the LPA through the provision of reliable and efficient transport infrastructure.
    - **Objective 2:** To improve the attractiveness and liveability of central Lincoln for residents, workers and visitors by creating a safe, attractive and accessible environment through the removal of strategic through traffic (particularly HGVs).
    - **Objective 3:** To reduce congestion, carbon emissions, improve air and noise quality within the Lincoln Policy Area, especially in the Air Quality Management Area in central Lincoln, by the removal of strategic through traffic (particularly HGVs).

We have used our reasonable endeavours to provide information that is correct and accurate and have discussed above the reasonable conclusions that can be reached on the basis of the information available. Having issued the range of conclusions it is for the client to decide how to proceed with this project

Appendix A: Existing Public Rights of Way



Appendix B: Lincoln Policy Area



Appendix C: Lincoln Transport Strategy Development Overview

8.1 Introduction

This document presents the stages, methods and processes used in the assessment and development of a range of transport scheme interventions for Lincoln that formed part of the development of the Lincoln Transport Strategy. The development of the Lincoln Transport Strategy looked to define the key transport challenges facing the Lincoln area and the possible interventions required to improve transport and travel within Lincoln. Specifically this resulted in the formulation, evaluation and appraisal of a range of potential transport schemes and interventions including the Lincoln Eastern Bypass Scheme.

The initial process identified and assessed all the current transport issues affecting Lincoln and evaluated the potential forecast transport challenges also covering the Lincoln Policy Area. This process utilised a range of consultation methods to help collate the key issues affecting the area from public meetings and events to focussed workshops with key stakeholders. It is important to note that the process outlined within this document took place over a number of years and formed part of a structured and linked process. This document presents the steps taken and the key components of the LTS, including how the appraisal of the transport interventions has been undertaken. An overview of the key core stages are outlined below and discussed in detail within the remainder of this document.

The Lincoln Transport Strategy Overview – presents the LTS process and key components in its development.

LTS Phase 1 (2004) – identifies the strategy objectives and the process used to identify existing and future problems and issues.

LTS Phase 2 (2004) – introduces a wide range of improvement schemes across a range of modes with appraisal methods.

LTS Phase 3 (2005) – discusses the development of the overall vision and adoption of the LTS.

LTS Update (2007) – provides details on the update to the LTS and reasons behind.

Further Option Testing – presents the processes used to compare various scheme options.

8.2 The Lincoln Transport Strategy Overview

In 2004 Lincolnshire County Council and its partners (City of Lincoln, North Kesteven and West Lindsay District Councils) commissioned the Lincoln Transport Strategy. A partnership approach was taken to look to build a framework for the prioritisation of transport improvements in and around the Lincoln Policy area up to 2026.

LTS Strategy Overview	LTS Phase 1 (2004)	LTS Phase 2 (2004)	LTS Phase 3 (2005)	LTS Update (2007)	Further Testing

Designed to be a 'live' strategy, the LTS is a multi modal transport study which was developed using a 'problem and policy' approach. It was appraised using WebTAG and included the consideration of a broad range of modal solutions. The study area for the strategy covered the Local Policy Area as set out in the Lincolnshire Structure Plan (2004).

Output	o A clear process for the development of the Lincolnshire Transport Strategy based on DfT best practice guidance.

8.3 LTS Phase 1 (2004)

Phase 1 of the LTS, incorporated two key stages, formulating the *Strategy Objectives* and outlining the key *Problems and Issues*. Specifically this process involved determining the overriding fundamental strategy objectives (SOs).

LTS Strategy Overview	LTS Phase 1 (2004)	LTS Phase 2 (2004)	LTS Phase 3 (2005)	LTS Update (2007)	Further Testing

8.3.1 Strategic Objectives

The process of identifying the strategic objectives (SOs) involved undertaking five key stages, these were:

- *Policy Review* – Composed of integral National, Regional and Local documents.
- *Grouping* – Assimilation of consistent polices using LTP objectives.
- *Formulation* – Consist objectives used to form LTS objectives.
- *Testing* – LTS objectives tested for suitability by steering group.
- *Confirmation* – Finalised LTS objectives confirmed by four Authorities.

As a result of this process, a total of nine SOs were identified (see below) all of which resulted from the identification of a number of different transport challenges facing Lincoln.

Local Transport Strategy – Strategy Objectives	
SO1	To assist the sustainable economic growth of Lincolnshire through infrastructure improvements to the following: - The Strategic Road Network - Non-Strategic Road Network
SO2	To remove strategic road-based freight from Lincoln and other adversely affected communities through: - Encouraging the use of alternative modes - Improving links to the Primary / Trans-European Road Network
SO3	To ensure that the transport infrastructure meets the needs of existing and proposed developments especially: - In the regeneration priorities in the Lincoln Policy Area - Including minimising congestion through the promotion of walking, cycling and public transport - Managing parking
SO4	To reduce the number and severity of road traffic accidents by reducing the potential for conflict between different modes and improving the facilities for convenient and safe alternatives.
SO5	To maximise accessibility and reduce peripherality by improving the range of travel options especially for those without access to the private car.
SO6	To increase Public Transport usage by improving: - Reliability, frequency and journey time of bus services.
SO7	To improve overall air and noise quality within the study area, especially in the Air Quality Management Area in Lincoln by the removal of unnecessary traffic by: - Removing through traffic - Reducing local journeys in Community Travel Zones - Other traffic management measures
SO8	Protect and enhance the built environment by reducing the adverse impacts from traffic, through improvements to the transport infrastructure.
SO9	Improve the attractiveness and liveability of central Lincoln for residents, workers and visitors by creating a safe, attractive and accessible environment for pedestrians.
SO10*	To support the effective implementation and delivery of both the emerging Sub-Regional Strategy and the new Growth Point agenda of the Lincoln Policy Area.

*SO10 was added in 2007 following review.

8.3.2 Problems and Issues

Following the identification of the strategic objectives for the LTS, existing and potential future issues were explored and identified. This process included both detailed technical analysis and extensive consultation, with the Lincoln Saturn Model used alongside census analysis and traffic data to inform and identify technical issues. Public consultation via the means of a random questionnaire distributed to 10,000 households and stakeholder workshops formed the more qualitative nature of the data collection. The existing and future issues were set out under the following broad headings:

- Buses
- Cycling
- Environmental Constraints
- Equestrians
- Highways and Traffic Issues
- Land Use and Regeneration
- Parking
- Pedestrians
- Rail Network
- Safety

Following these broad headings a more detailed understanding was developed, this process identified that a lack of route choice, congestion and high volumes of HGVs within the city centre were the significant problems that faced Lincoln and the Lincoln Policy Area. The process also identified the following issues:

- Lack of suitable route choice for transport to the south & east of the study area
- Waterways form a natural constraint with few crossing points
- Railways create a constraint, particularly the two level crossings in the city centre
- Buildings and developments create a built constraint to infrastructure improvements throughout the city
- The historic ‘uphill’ area of the city centre has many historic buildings and narrow streets
- High volumes of HGVs and through traffic in the city centre because of lack of alternative routes
- Congestion in the city centre and on radial routes leads to unreliable journey times and delays
- Over-dependence on the private car across Lincoln
- High accident occurrence in several areas over recent years due to unsuitable traffic levels
- Susceptibility of cyclists and pedestrians to accidents in the city centre

- Parking mainly centred in lower part of the city centre
- Railway capacity underused, especially by commuters
- Limited local railway stations in Lincoln
- Poor quality trains
- No direct trains to London
- Congestion leads to reduced levels of bus service
- Low frequency of bus services on Sunday and in the evenings
- Poor quality bus station
- Low proportion of low-floor buses
- Lack of cross-city services
- Low and declining bus patronage
- Lack of provision of cycling paths
- Security concerns associated with cycle routes
- Inadequate and unsafe cycle parking
- Hills make cycling in some areas difficult
- Busy roads with narrow footways make pedestrian routes unattractive
- Pedestrian severance between residential areas and the city centre
- High noise levels on some strategic routes
- Poor air quality in the city centre

It was noted that the majority of issues and problems identified lie around the need to improve the environment and to support improved transport infrastructure and modal choice. It also became clear during the process that these issues were focussed around central Lincoln and tended to be associated with high levels of traffic and the impact of strategic through traffic on the centre of the city. At the conclusion of this stage the SOs had been politically approved and accepted, and, a level of understanding from both technical and anecdotal evidence had provided a clear baseline of the problems and issues affecting Lincoln.

Output	o Ten robust and LTP aligned strategic objectives. o A comprehensive understanding of existing and future problems and issues based on local experts and public consultation.

8.4 LTS Phase 2 (2004)

LTS Phase 2 looked to identify a wide range of potential improvement schemes across a range of modes. The process also included a primary evaluation and appraisal of all of the identified options to help identify those with potential to be further developed.

8.4.1

8.4.2 *Option Identification, Evaluation and Classification*

In order to generate a series of initial options, a study team undertook an identification process that composed of technical analysis, consideration of historic ideas, discussions with technical experts at LCC and the District Councils and also liaison with key stakeholder groups. According with best practice guidance, options were drafted which sought to 'solve' or address the problems and issues previously identified. A total of 18 initial options were identified as a result of this process all of which are detailed below:

- City (urban area) Parking Strategy
- Lincoln Eastern Bypass
- Commuter Rail Network
- Lincoln Southern Bypass
- Dual A15 to A158 Local Highway Improvements (cumulative)
- Dual A46 existing Western Bypass
- Pedestrianisation
- Fully integrated Park & Ride
- Public Transport Interchange
- Improved bus services (frequency)
- Quality Bus Corridors within LPA
- Improved bus services (priorities)
- Redevelop Bus Station
- Improved Cycle Network
- Relocate Bus Station
- Level Crossing Improvements
- Traffic Management Measures (within the Uphill area of the City)

Monthly Steering group meetings were then set up to further assess the 'value' or relative strengths and weaknesses of these initial options. A final steering group options workshop was held in June 2004 which assessed in detail the various options using a standard proforma. This proforma rated the options against their contribution to SOs and their contribution to solving the identified problems. In addition to this, approximate levels of relative cost, timescale and public acceptability were also considered for each initial option.

Following this analysis, options were separated into those which were stand alone (deemed feasible and deliverable alone), those which are dependent (require

additional infrastructure in support) and those to be discounted (considered infeasible). The majority of options were classified as either stand alone or dependant and resulted in a total of 23 potential options.

- Business Travel Plans
- Lincoln Eastern Bypass
- City Centre Parking Strategy
- Lincoln Southern Bypass
- Commuter Rail Network
- Local Highway Improvements
- Dual Northern Relief Road
- Public Transport Interchange
- Dual Western Relief Road
- Quality Bus Corridors
- East-West Link Rail/Highway Grade Separation
- Fully Integrated Park & Ride
- Redevelop Bus Station
- High St Level Crossing Closure
- Relocate Bus Station
- Improved Cycle Network
- School Travel Plans
- Improved Pedestrian Facilities
- Uphill Traffic Management
- Increased Bus Service Frequency
- Western Gateway Link
- Increased Priorities for Bus Services

8.4.3 Option Development

Although the workshop was considered to be a useful exercise in weighing up and assessing the relative 'worth' of each option, further analysis was felt necessary. A robust method of analysis of the options' likely benefits and likely compatibility with other initiatives was undertaken.

8.4.4 Option Appraisal

This element of the option appraisal process involved assessing options based on their ability to accord with the Government's five key transport objectives. A high level appraisal was carried out using an Appraisal Summary Table with options scored against the following:

- Environment
- Safety
- Economy
- Accessibility
- Integration

8.4.5 *Option Appraisal Results*

The results of this scoring analysis placed the LEB in primary position in terms of a score based on contribution towards SOs, problems and issues and national transport objectives. The high score related to the options' ability to solve identified problems regarding high traffic levels within Lincoln town centre and contribution towards national priorities. The ranking of options resulted in a list of prioritised options based on various sub categories of highways, public transport, parking and sustainable modes as shown below.

Highways	Public Transport	Parking	Sustainable Modes
Lincoln Eastern Bypass	Quality Bus Corridors	Park & Ride	Improved Pedestrian Facilities
Lincoln Southern Bypass	High St Level Crossing Closure	City Centre Parking Strategy	Improved Cycling Facilities
East West Link	Public Transport Interchange	N/A	School Travel Plans
Uphill Traffic Management	N/A	N/A	Business Travel Plans

Output

- Monthly Steering group identified and scored 23 potential options.
- Options rated against SOs, ability to solve existing/future problems and contribute towards national priorities.
- LEB highly ranked amongst options.

8.5 LTS Phase 3 (2005)

Phase 3 looked at developing 'a vision' which was broken down into three LTP periods of short term, medium term, and longer term.

Furthermore, within these three timeframes options were split into various themes, these were: walking and cycling, city centre and high street, public transport, parking

and roads. At this stage it was also felt important to publish a version of the emerging LTS for the public through the medium of a consultation leaflet. The consultation leaflet was distributed randomly to households as with the initial problems and issues exercise. Respondents were invited to rate options in terms of their individual priority. The resulting list was as follows:

1. A Lincoln Eastern Bypass
2. Improved pedestrian and cycle network
3. Improved City Centre parking
4. High Quality bus services
5. The provision of Park & Ride
6. A new bus station
7. A Lincoln Southern Bypass

A partner workshop was also held following the consultation feedback. This set out a final set of priorities based on the identified timescales in terms of short term or longer term improvements. The LEB was cited as a key short term improvement. It was also realised at this stage that the LEB was a fundamental component of the realisation of other initiatives and could act as a catalyst for improvements. The LEB was seen as being of key significance to the overall benefit of the strategy and intrinsically linked to the delivery of other modal improvements.

Within the short term, the successful delivery of the LEB would seek to remove unnecessary traffic from Lincoln, support the delivery of Lincoln's Master Plan, and also 'free up' road space with the aim of developing QBCs and Park & Ride schemes.

Output	o LEB ranked highest priority through public consultation leaflet. o LTS Vision developed with LEB as key short term improvement. o Realisation LEB is fundamental in the successful delivery of other key options.

8.6 LTS Update (2007)

At this point a review of the original strategy was felt necessary as a result of political changes and a number of local development proposals.

During this stage, a further objective, S010 was added to reflect the changes in regional policy. Specifically Strategic Objective 10 looked to *'support the effective implementation and delivery of both the emerging Sub-Regional Strategy and the new Growth Point agenda of the Lincoln Policy Area'*. It was also at this stage that the Lincoln area achieved growth point status, and therefore it was appropriate that this be reflected within the strategy. Identification of further future issues or problems were also undertaken in light of the revised housing growth figures and the designation of growth point status. This process identified the following additional issues:

- Delays to buses caused by congestion
- Issues with concessionary bus fares
- Increasing development pressures
- Increased level crossing closures
- Poor city centre air quality

Following the 2007 update to the LTS, the LEB remained a key option and was recognised as being a significant intervention that would help the overall delivery of many components of the strategy. It was also identified as having significant potential to address the additional transport challenges identified as a result of Lincoln's growth point status.

Output	o Revised LTS in accordance with RSS policy and Growth point status. o LEB remains strong priority with additional future transport challenges identified.

8.7 Further Option Testing

Further option testing was carried out using the Lincoln Model to support the delivery and development of the LTS. The options testing process rated options against their ability to solve key problems associated with high levels of traffic within Lincoln town centre and also their contribution to achieving the overall strategic objectives.

LTS Strategy Overview	**LTS Phase 1 (2004)**	**LTS Phase 2 (2004)**	**LTS Phase 3 (2005)**	**LTS Update (2007)**	**Further Testing**

The options listed below were considered at this stage due to their likely impact on solving the key problems and achieving the overall objectives:

- Quality Bus Corridors (QBC)
- Park & Ride
- Lincoln Eastern Bypass (LEB)
- Lincoln Southern Bypass (LSB)

It was considered that the other solutions explored as part of the LTS would not have the same impact due to their scale and scale of impact and could not be considered as valid alternatives to the four options listed above. A description of the options considered in addition to the LEB can be found below:

- **Quality Bus Corridors -** A total of four strategic QBCs were identified within the Lincoln area. These are aimed in creating efficient bus travel into the main urban area.
- **Park & Ride -** Two Park & Ride sites were identified and stated as being of importance to improving accessibility to the Lincoln town centre. It is also recognised that these form a key part of the wider parking strategy for Lincoln.
- **Lincoln Southern Bypass -** This proposed bypass would form the complete orbital relief road around Lincoln. The proposal is prioritised as a longer term scheme between the A15 in the east and the A1434/A46 in the west.

Based on these schemes a total of 10 different scenarios were tested using the Lincoln Model to assess their economic impact and benefit to Cost Ratio (BCR). The test also included the scheme's impact on journey times and traffic flows.

8.7.1 Results

The results of this detailed assessment revealed that in isolation the QBCs and Park & Ride schemes had minimal impact. However, where these initiatives were implemented alongside the LEB the improvement to journey times and traffic flows was significant. The LSB results demonstrated that this was not an alternative to the LEB but when implemented alongside the LEB, the scheme demonstrated significant benefits.

Output	o LEB option fundamental to other priority schemes and seen as a catalyst to success. o Detailed testing of LEB option reveals significant journey time savings and traffic flow reduction within Lincoln town centre.

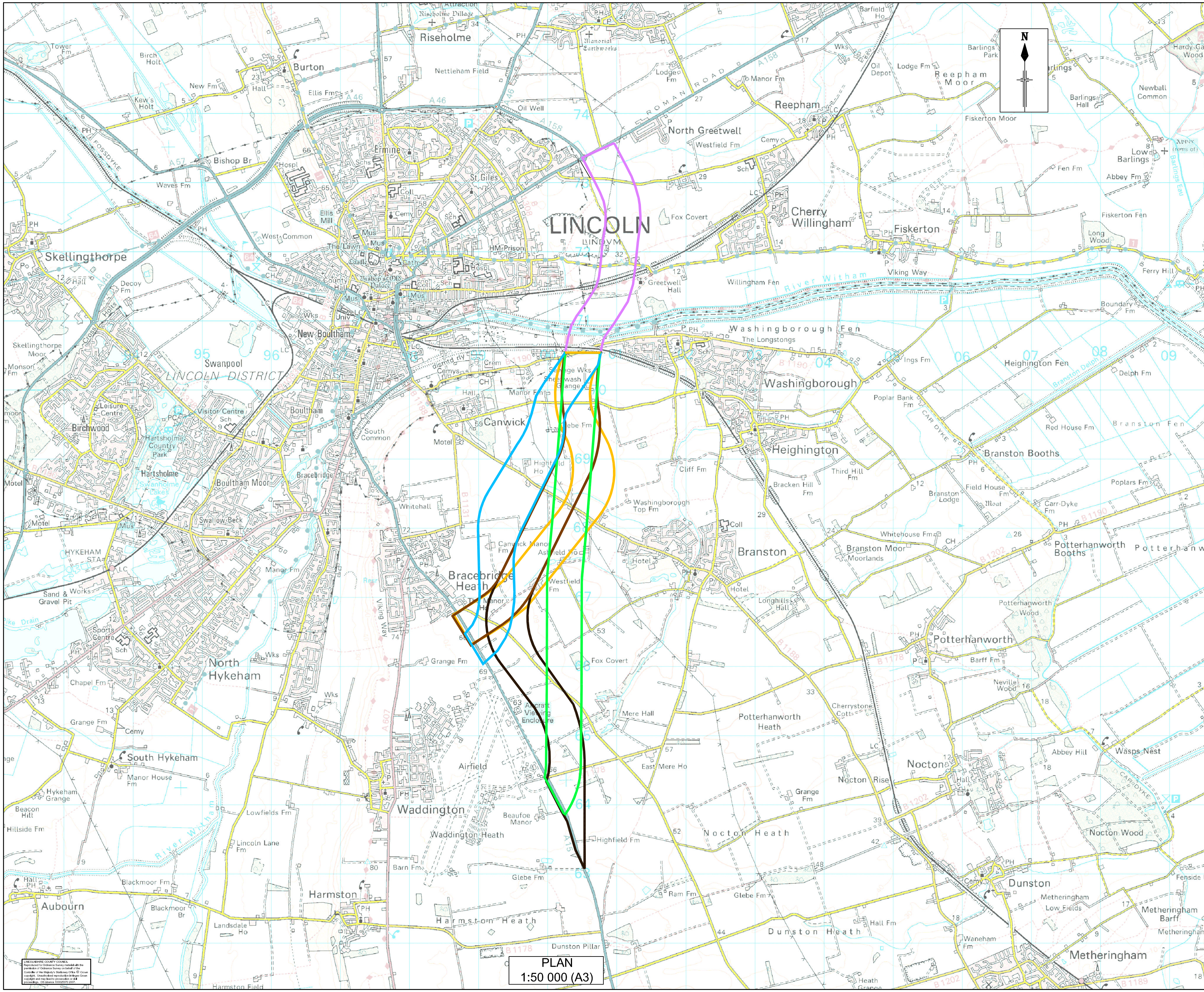
8.8 Conclusion

This document has detailed the processes involved in assessing a number of potential transport schemes. It has detailed the methods used to initially identify a wide range of transport problems and issues and potential interventions. Significantly the LTS process also demonstrates that all of the potential interventions were assessed based on their ability to contribute towards the identified future challenges such as high volumes of traffic and environmental sustainability.

The LEB has been identified throughout the process as a key element in development of the LTS and a key element of addressing the transport challenges facing Lincoln. The key elements and points of the LTS are as follows:

- Lincoln Transport Strategy has been developed and designed in accordance with DfT best practice guidance.
- Strategic Objectives have been developed aligned with Local Transport Plan and National priorities.
- Wide ranging public consultation and technical input has been used to identify existing and future issues and problems.
- Scheme options have been developed, ranked and assessed based on contribution towards objectives, issues and national priorities.
- Further economic and model testing of key options has revealed the LEB to be a fundamental component for the successful delivery of the LTS.
- The LEB will look to address the existing local pressures surrounding high traffic volumes within Lincoln centre and the impact of through traffic.
- The LEB represents a key transport intervention to address the future transport challenges that may face Lincoln as a result of its future growth aspirations.
- The LEB has also been identified as a catalyst for the introduction of further transport measures, its implementation alongside other transport interventions has the potential to realise wider benefits across the Lincoln Policy Area.

Appendix D: Corridor Options



KEY

Boundaries and Routeways

- Purple Corridor
- Blue Corridor
- Orange Corridor
- Green Corridor
- Brown A Corridor
- Brown B Corridor

Rev	Date	Description	Approved by
P0	FEB 08	FIRST ISSUE	ST

AMENDMENT DETAILS

Lincolnshire COUNTY COUNCIL - IN PARTNERSHIP - JACOBS

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Drawing No. **FIGURE 1.1**

Structure No.

Scheme: **Lincoln Eastern Bypass**

Description: **Stage 1 Corridor Options**

Scale:	Draughted by:	Checked by:	Approved by:	Approval Date:	Sheet Number:
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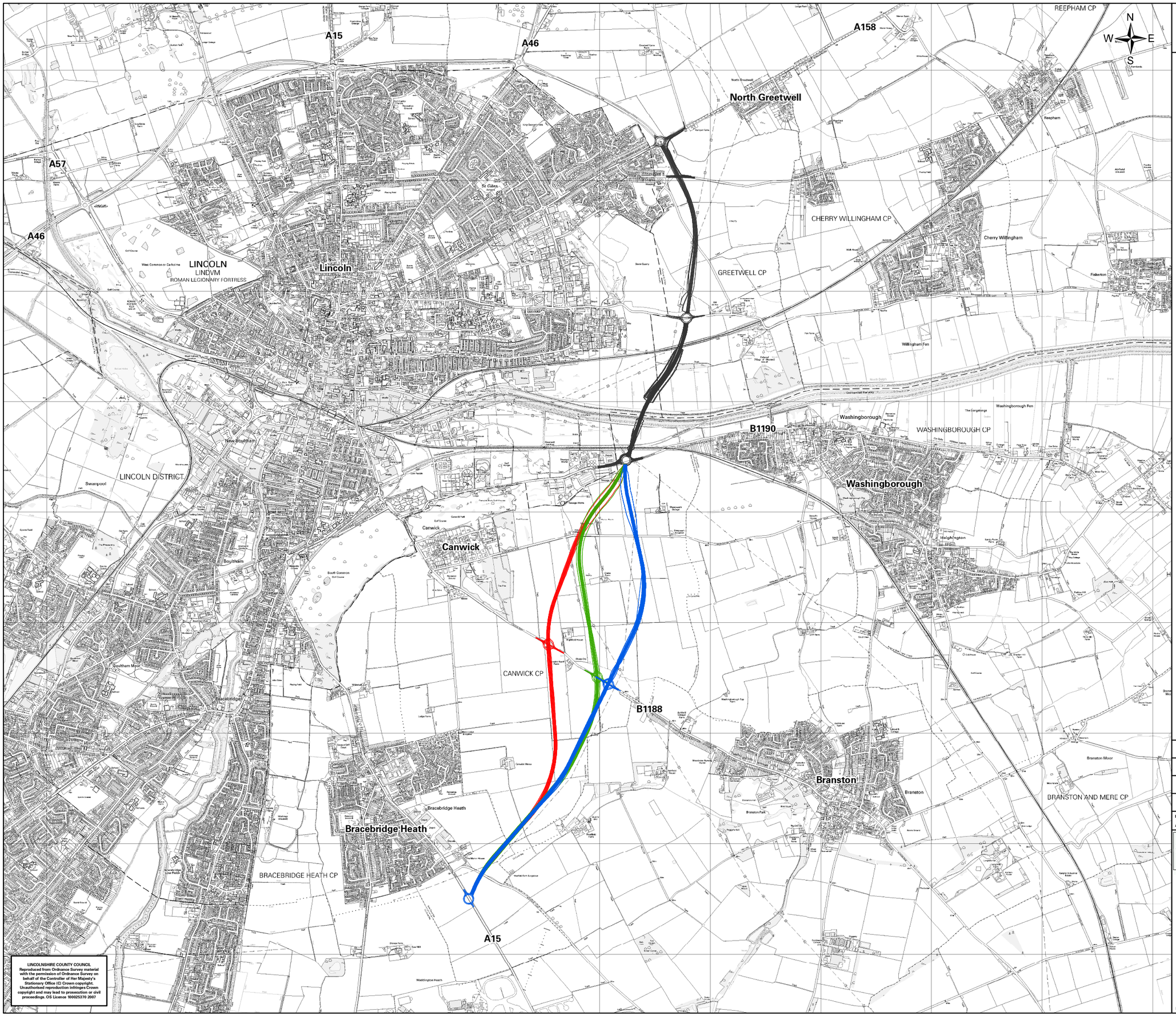
Appendix E: Route Options

Figure 2.1

KEY

- Northern Section of All Options
- Option X
- Option Y
- Option Z



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R0	JAN 08	FIRST ISSUE	SW

AMENDMENT DETAILS

Lincolnshire COUNTY COUNCIL
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Figure No.	FIGURE 2.1
Drawing No.	B0231400_S2_02_01
Structure No.	
Scheme:	Lincoln Eastern Bypass Stage 2 Environmental
Description:	Route Options

Scale:	Draughted by:	Checked by:	Approved by:	Approval Date:	Sheet Number:
1:32500(A3)	AD	SW	SW	JAN 08	