Lincolnshire County Council

LINCOLN SOUTHERN BYPASS

Environmental Constraints Report

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Lincolnshire County Council

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Lincolnshire County **Council**

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Environmental Constraints Report

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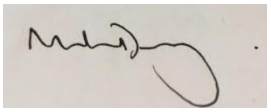
Signature				
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EXECUTIVE SUMMARY

This Environmental Constraints Report has been prepared on behalf of Lincolnshire County Council (LCC). The report refers to the Lincoln Southern Bypass (the proposed scheme) which will form part of the Lincoln Coastal Highway and link the Lincoln Eastern Bypass (when completed) with the existing A46 Western Bypass, creating a complete ring road around Lincoln. Further to public consultations LCC's Executive Committee made the decision, in April 2006, to endorse the Emerging Preferred Route, Route 2c, and therefore the Environmental Constraints Report will be tailored to this option.

This report is a high level review of the potential environmental constraints surrounding the proposed scheme. A desktop review of publicly available information was undertaken to gain the relevant environmental information. From this review a number of environmental constraints and sensitive receptors have been identified which will require further investigation as part of any outline business case or planning application. Furthermore, the report identifies potential environmental risks and additional data requirements.

The key findings that were identified from the Environmental Constraints Report are as follows:

- The proposed scheme is located approximately 1km south of an Air Quality Management Area (AQMA) in Lincoln City;
- The proposed scheme is not located within or in close proximity to any Noise Action Planning Impact Areas (NIA);
- There are 16 listed buildings within 1km of the proposed scheme, with the closest being approximately 275m to the north. There is one scheduled monument, approximately 2.2km away and three Grade II registered parks and gardens within 5km of the proposed scheme;
- The proposed scheme is not located within or in close proximity of any Areas of Outstanding Natural Beauty (AONBs) or green belt land; Swanholme Lakes Site of Special Scientific Interest (SSSI) and Local Nature Reserve (LNR) is located approximately 4km north of the proposed scheme. Whisby Nature Park LNR is the only identified statutory nature conservation site within 2km of the proposed scheme, located approximately 1.4km to the north west. A total of 15 Local Wildlife Sites (LWS), one Local Geological Site (LGS), two Sites of Nature Conservation interest (SNCIs) and one Lincolnshire Wildlife Trust (LWT) reserve are located within 2km of the proposed scheme;
- An area identified by the Environment Agency as being Flood zone 3 runs from north to south directly through the proposed scheme, located from the River Witham to the west towards South Hykeham. This designation identifies land which has an annual probability of 1 in 100 or greater of river flooding and, as such, a flood risk assessment will be required as part of any planning application. It is therefore recommended that the Environment Agency are consulted at an early stage in the design development, and it is possible that the development within the floodplain will need to be on viaduct to reduce the volume of lost flood storage. Hydraulic modelling of the River Witham and River Brant will identify the extent of which this likely to be required; and
- In addition to residential areas, there are various sensitive receptors within 1km of the proposed scheme which include three primary schools and various farms. There are also sustrans regional

and local cycle routes within 2km of the proposed scheme as well as walking footpaths and bridleways which cross the proposed scheme corridor which will be affected by construction and operation and will need to be diverted or closed accordingly.

1 INTRODUCTION

WSP has been appointed to prepare an Environmental Constraints Report of the Lincoln Southern Bypass (LSB) scheme (the proposed scheme) on behalf of Lincolnshire County Council (LCC). This report consists of a high-level review of the potential environmental constraints associated with the proposed scheme.

The report has been informed by publicly available desk based sources. In addition to this, a Preliminary Ecological Appraisal (PEA) has also been undertaken which involved an extended Phase 1 habitat survey on accessible areas of the route of the proposed scheme and an ecological desk study of the site, sourcing information from readily available sources and the relevant local authority's biological records. The PEA is presented as Appendix B.

The environmental chapters have been structured as follows:

- Existing information;
- Potential environmental risks; and
- Further information required to support any business case or planning application.

Further work will be required to provide a more comprehensive appraisal of the proposed scheme including the following:

- Identification of environmental receptors;
- Consultation with statutory bodies; and
- Assessment and appraisal of potential environmental effects of the proposed scheme.

1.1 PROJECT HISTORY AND UNDERSTANDING

The proposed scheme will form part of the Lincolnshire Coastal Highway and link the completed Lincoln Eastern Bypass (at the A15 Sleaford Road) with the existing A46 Western Bypass (at its junction with A1434 Newark Road), creating a complete ring road around Lincoln.

The LSB proposal has been subject of two consultations to seek the public's views on the selection of a Preferred Route. Public consultation 1 was held in October 2005 and presented the public with three alternative routes options, Routes' 2a, 2b, 2c.

Route 2c was selected in April 2006 taking into account the results of Public Consultation 1 and studies preceding it.

Following further route development, a second public consultation on the road was held in October 2006. In December 2006, after careful consideration, the County Council's Executive Committee made the decision to endorse the Emerging Preferred Route, Route 2c.

1.2 METHODOLOGY

A review of the following publicly available information was undertaken to inform this Environmental Constraints Report which included but was not limited to:

- Environment Agency (EA) local environmental information and maps (Date Accessed: January 2018);

- DEFRA's Multi-Agency Geographical Information Centre (MAGIC) website (Date Accessed: January 2018);
- Lincolnshire County Council website (Date Accessed: January 2018);
- British Geological Society (BGS) website (Date Accessed: January 2018);
- Historic England website, Historic listings map (Date Accessed: January 2018);
- DEFRA AQMAs (Date Accessed: January 2018); and
- DEFRA Noise Maps website (Date Accessed: January 2018).

For further details of the sources used, please refer to the footnotes throughout the document.

Environmental constraints have been mapped using ArcGIS mapping from available information, the output from which can be found as Figure 2 in Appendix A.

A high-level review of the environmental constraints, potential risks and likely information requirements to inform the next stages of the development of the proposed scheme has been undertaken for the following environmental topics:

- Air quality;
- Noise and vibration;
- Cultural heritage;
- Visual impact and landscape;
- Biodiversity;
- Water and flooding;
- Geology, soil and land contamination;
- Lighting; and
- Community and Local Infrastructure.

The above environmental topic areas have been selected as they are considered to be of particular relevance to the proposed scheme and have the potential to be important and significant environmental constraints which will need to be assessed further at the Outline Business Case (OBC) and planning application stages

A 1km study area around the proposed scheme boundary has been considered within this constraints report for all non-ecological constraints and a 2km buffer has been considered for designated ecological sites. A Scheduled Monument and three Registered Parks and Gardens which are situated outside the 1km study area have been considered also. The proposed scheme is shown in blue on Figure 1. This study area will provide a representative overview of the potential environmental issues given the information available. The proposed scheme boundary may change to reflect amendments in the proposed scheme's design and as further environmental information becomes available.

2 ENVIRONMENTAL CONSTRAINTS

2.1 AIR QUALITY

Existing Information

Given the urban edge context of the study area, which is principally rural immediately around the proposed scheme, the local air quality is likely to be predominately governed by road traffic. The City of Lincoln Council Air Quality Annual Status Report 2017[1] (Annual Status Report, 2017) specifies that there are two Air Quality Management Areas (AQMAs) in Lincoln. These are referenced as the Lincoln NO_2 AQMA and the Lincoln PM_{10} AQMA[2] which are located within and just surrounding the city centre as shown in Figure 2, Appendix A. The proposed scheme is not located within, adjacent to or in close proximity to an AQMA as it is situated 1km south of the closest AQMA.

The Air Quality Strategy (AQS)[3] for England, Scotland, Wales and Northern Ireland published in July 2007 (The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Vol 1), 2007), outlines the Government's policy on air quality. Where air quality objectives are not met by the local authority, the exceeding area will need to be monitored through the establishment of an AQMA. The pollutant declared for monitoring in the Lincoln NO_2 AQMA is nitrogen dioxide (NO_2), and the pollutant declared for monitoring in the Lincoln PM_{10} AQMA is particulate matter up to 10 micrometers in size. Table 1 is a reproduction table of AQMAs declared by the City of Lincoln in the Air Quality Annual Status Report, 2017.

Within the study area of 1km there are a number of air quality sensitive receptors including: residential properties, other air quality sensitive buildings such as schools, hospitals, public community buildings, and cultural heritage receptors which are described in their respective sections. The air quality sensitive receptors within 1km include residential properties, the closest of which to the proposed scheme are on Station Road in Waddington. Other sensitive receptors include:

- Activities Away centre – approximately 745m north west of where the proposed scheme ties in to the A46/ A1434 Newark Road;
- South Hykeham Village Hall – approximately 500m north east of the A1434 Newark Road end of the proposed scheme;
- Church of St Michael – approximately 340m north of the proposed scheme, in South Hykeham;

[1] Lincoln County Council website, Online at: https://www.lincoln.gov.uk/_resources/assets/attachment/full/0/53007.pdf, Accessed January 2018

[2] DEFRA website, Online at: https://uk-air.defra.gov.uk/aqma/maps, Accessed January 2018

[3] Government Website, Online at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69336/pb12654-air-quality-strategy-vol1-070712.pdf, Accessed January 2018

- South Hykeham Community Primary School – approximately 310m north of the proposed scheme in South Hykeham;
- Lincoln Lane Farm – approximately 760m south of the proposed scheme just east of the River Witham;
- Milking Hill Farm – approximately 400m south of the proposed scheme, west of Waddington;
- Lincolnshire Turf Farm – approximately 115m north east of the proposed scheme, north west of Waddington;
- St Michaels Church – approximately 895m south of the proposed scheme, in Waddington;
- All-Saints Community Primary School – approximately 890m south of the proposed scheme, in Waddington; and
- Waddington Village Hall – approximately 1km south of the proposed scheme, in Waddington.

Table 1: Declared AQMAs in Lincoln from the Air Quality Annual Report, 2017

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)		Action Plan (inc. date of publication)
						At Declaration	Now	
Lincoln NO_2 AQMA	01/12/2001	NO_2 Annual Mean	Lincoln	The area generally follows the major road network in the City Centre and arterial routes and is primarily due to road traffic emissions.	NO	56.7µg/m^3 at Diffusion Tube 3	49.1µg/m^3 at Diffusion Tube 3	City of Lincoln Council, Air Quality Action Plan (2006)
Lincoln NO_2 AQMA	03/02/2014	NO_2 1 Hour Mean	Lincoln	The area generally follows the major road network in the City Centre and arterial routes and is primarily due to road traffic emissions.	NO	3 hours >200µg/m^3 at Automatic Monitor LCR (2014) 71.0µg/m^3 at Diffusion Tube 3 (2014 annual mean)	0 hours >200µg/m^3 at Automatic Monitor LCR No diffusion tubes with an annual mean >60µg/m^3	City of Lincoln Council, Air Quality Action Plan (2006)
Lincoln PM_{10} AQMA	01/03/2008	PM_{10} Annual Mean	Lincoln	An area encompassing the whole Borough.	NO	36.0µg/m^3 at Automatic Monitor B (2006) - 60.9% data capture	26.9µg/m^3 at Automatic Monitor B	City of Lincoln Council, Air Quality Action Plan (2006)
Lincoln PM_{10} AQMA	01/03/2008	PM_{10} 24 Hour Mean	Lincoln	An area encompassing the whole Borough.	NO	57* 24-hour means >50µg/m3 at Automatic Monitor B (2006)	21 24-hour means >50µg/m3 at Automatic Monitor B	City of Lincoln Council, Air Quality Action Plan (2006)

The sensitive receptors mentioned above are based on an aerial mapping desk based search and therefore there may be receptors that have not been picked up in the absence of a site visit. An address layer mapping desk based search will be carried OBC stage of the project.

Potential Environmental Risks

The presence of a new bypass road in this area to the south of the AQMAs will most likely cause the traffic levels passing through the city centre, within the AQMAs, to decrease, leading to an improvement in air quality.

Conversely the new road will result in traffic where there was none before along the route of the proposed scheme potentially causing adverse impacts on air quality. The degree to which this is likely to be an issue upon Station Road (the nearest properties to the proposed scheme) in Waddington will be a factor of the flow and speed of traffic upon the proposed scheme and the distance the remaining properties are from the carriageway. Any deterioration in air quality in this area would be considered at planning application stage in conjunction with the improvements in air quality elsewhere.

During construction and operation associated dust and emissions have the potential to cause adverse impacts on nearby air quality sensitive receptors including adjacent properties and nature conservation sites. These adverse impacts may be the result of moving traffic closer to sensitive receptors or an increase in capacity leading to an increase in traffic.

Further Studies and Constraints

Current and projected traffic modelling (with and without the proposed scheme) will be required to support any business case and planning application to determine the extent of the air quality effects.

A 12-month monitoring period for NO_2 will be required in advance of any planning application. The monitoring locations should be agreed in advance with the local Environmental Health Officer.

A programme of diffusion tube monitoring should be informed by the strategic traffic model and agreed with Environmental Health Officers as appropriate. This air quality monitoring data will then be used to provide a detailed air quality assessment which will be required in support of any planning application.

Dust and particulate matter during construction will need to be managed appropriately.

2.2 NOISE AND VIBRATION

Existing Information

Similarly, to air quality, due to the urban edge and rural location of the proposed scheme and its surrounding environment, the noise environment is likely to be governed principally by road traffic.

The proposed scheme is not located within or in close proximity of any Noise Action Planning Important Areas (NIAs), which are areas subject to a Noise Action Plan as required by the Environmental Noise Directive transposed through The Environmental Noise (England)

Regulations, 2006[4]. The closest NIA is approximately 2.8km north (on A1434 Newark Road just south of Bracebridge) and the next closest is approximately 3.5km north (on the East Midlands railway, adjacent to Doddington Road)[5]. There are two NIAs on the A1434 Newark Road, south of Bracebridge, and two more where this road turns into the A15 South Park, indicating that this area of road is subject to high levels of noise based on noise mapping results, leading to the adoption of an Action Plan. The other set of NIAs as mentioned above is on the East Midlands railway line and will have a significant level of noise due to the railway to impose an Action Plan. These NIAs are the closest to the proposed scheme and therefore will need to be taken into account during any planning application assessment of construction and operational noise to identify whether the noise in these areas is exacerbated.

Noise sensitive receptors within 1km of the proposed scheme include residential properties the closest of which to the proposed scheme are on Station Road in Waddington and in South Hykeham.

Other sensitive receptors include:

- Activities Away centre – approximately 745m north west of the A1434 Newark Road link end of proposed scheme;
- South Hykeham Village Hall – approximately 500m north east of the A1434 Newark Road end of the proposed scheme;
- Church of St Michael – approximately 340m north of the proposed scheme, in South Hykeham;
- South Hykeham Community Primary School – approximately 310m north, in South Hykeham, of the proposed scheme;
- Lincoln Lane Farm – approximately 760m south of the proposed scheme just east of the River Witham;
- Milking Hill Farm – approximately 400m south of the proposed scheme, west of Waddington;
- Lincolnshire Turf Farm – approximately 115m north east of the proposed scheme, north west of Waddington;
- St Michaels Church – approximately 895m south of the proposed scheme, in Waddington;

[4] Data Government website, Online at: http://www.geostore.com/environment-agency/WebStore?xml=environment-agency/xml/ogcDataDownload.xml, Accessed January 2018

[5] Data Government website, Online at: https://data.gov.uk/data/map-preview?url=http%3A%2F%2Fenvironment.data.gov.uk%2Fds%2Fwms%3FSERVICE%3DWMS%26INTERFACE%3DENVIRONMENT--a0c730ad-1366-4d22-bb04-244e18f216b4%26request%3DGetCapabilities&n=55.8&w=-5.7&e=1.8&s=50.0, Accessed January 2018

- All-Saints Community Primary School – approximately 890m south of the proposed scheme, in Waddington; and
- Waddington Village Hall – approximately 1km south of the proposed scheme, in Waddington;

The sensitive receptors mentioned above are based on an aerial mapping desk based search and therefore there may be receptors that have not been identified in the absence of a site visit. An address layer mapping desk based search will be carried during the OBC stage of the project to include all such receptors within the air quality and noise modelling assessments.

Potential Environmental Risks

The proposed scheme is likely to lead to a change in traffic speed and flow, as mentioned above in the air quality section, which could include a decrease in traffic levels in Lincoln city and an increase in traffic along the proposed scheme corridor. This could lead to a change in noise levels and consequently an adverse noise impact within the study area of the proposed scheme, because it has not been subject to the level of traffic noise that it would be should the proposed scheme be built. The increased levels may negatively impact sensitive receptors which may require mitigation or compensation. These include residential areas and cultural heritage receptors closest to the proposed scheme.

The proposed scheme could also result in a potential beneficial noise impact within the city if traffic levels travelling through the city centre decreases.

The location of NIAs could change in response to the proposed scheme and may move further south to within the study area which will lead to greater adverse noise impacts on the surrounding sensitive receptors mentioned above.

Further Studies and Constraints

A detailed noise assessment will be required in support of any OBC and planning application.

Current and projected traffic modelling (with and without the proposed scheme) is likely to be required to support any business case and planning application to determine the extent of the air quality effects. This model will require:

- Mapping data to help construct a 3D computerised noise model;:
- Topography, including cutting and embankment details for all existing and future roads where appropriate; and
- The footprint and height of all buildings and any other structures that might screen or reflect noise which can usually be obtained from LiDAR data.
- Noise monitoring will be required prior to the submission of any planning application to inform the assessment of construction traffic noise, although we would recommend that, if possible, this is postponed until after the Lincoln Eastern Bypass has completed construction to ensure an accurate baseline.

2.3 CULTURAL HERITAGE

Existing Information

There are 16 Grade II and one Grade II* listed buildings within 1km of the proposed scheme, three of which are located towards the eastern end of the proposed scheme, near Bracebridge Heath, eight are within Waddington, three are near South Hykeham area, one of which is the

Grade II* listed building, and two are located west of the A46 and A1434 Newark Road. The following six listed buildings are within 0.5km of the proposed scheme[6] and are numbered as numbered in Figure 2 in Appendix A:

1. Church Farmhouse (Grade II) located approximately 385m north of the proposed scheme;
2. Church of St Michael (Grade II*) located approximately 340m north of the proposed scheme;
3. Gates and Walls at the manor House (Grade II) located approximately 340m north west of the proposed scheme;
4. Farm Buildings at the Manor House (Grade II) located approximately 395m north of the proposed scheme;
5. Manor House (Grade II) located approximately 495m south east of the proposed scheme; and
6. The Manor House (Grade II) located approximately 375m north-west of the proposed scheme.

There is one scheduled monument approximately 2.2km south west of the proposed scheme; Hall Close: a medieval and post-medieval hall complex south of Dovecote Lane, with dovecote, gardens, fishponds, churchyard and cultivation remains. This is unlikely to be a significant constraint to the development of the proposed scheme given the distance although impacts upon setting will need to be considered.

There are three Grade II registered parks and gardens within 5km the closest being Boultham Park which is approximately 3.3km north of the proposed scheme, the other two are Coleby Hall, approximately 3.7km south of the proposed scheme, and Hartsholme Park, approximately 4.4km north of the proposed scheme. None of these are considered to be a constraint to the development of the proposed scheme although, again, any potential impact of the proposed scheme on setting will need to be carefully considered.

No World Heritage Sites, conservation areas or Registered Battlefields have been identified within 5km of the proposed scheme.

Potential Environmental Risks

As stated above, none of the listed buildings, the scheduled monument or registered parks and gardens have the potential to be directly impacted by the proposed scheme. However, there could be adverse impacts from a change in setting or air, dust and noise pollution due to changes and increase in traffic levels of the proposed scheme.

The Gates and Walls at the Manor House Grade II listed building is located close to the A15 Sleaford Road which is where the proposed scheme will be connect to the existing highway

[6] MAGIC Website, Online at: http://magic.defra.gov.uk/MagicMap.aspx, Accessed January 2018

network, and therefore could experience an increase on construction traffic flow or temporary road diversions which could temporarily adversely affect the setting of the listed building. Furthermore, impacts during operation cannot currently be dismissed and there is the potential that this listed building as well as The Manor House and the Farm buildings at the Manor House listed buildings may have a permanently altered background view due to their close proximity to the proposed scheme. The design of the proposed scheme where the setting of the listed buildings could be affected will therefore need to be considered alongside its visual impact.

Further Studies and Constraints

It is recommended that a Desk Based Assessment, informed by the Historical Environment Record (HER), be undertaken at the OBC stage. The HER has a computerised database that provide access to comprehensive and dynamic resources relating to the archaeology and historic built environment of a defined geographic area7 and is a record of all known archaeology in Lincolnshire8 and will enable a clearer understanding of all the potential historical records within the study area.

Following the results of the extensive archaeological investigations along the route of the Lincoln Eastern Bypass, it is recommended that field surveys should be undertaken prior to the submission of any planning application for the proposed scheme to identify the likely extent of any buried archaeological remains. This would be informed by the Desk Based Assessment, and the interrogation of the Historic Environment Record mentioned above.

2.4 VISUAL IMPACT AND LANDSCAPE

Existing Information

The proposed scheme is located within the following National Character Areas (NCAs)[9]:

- Trent and Belvoir Vales, which is characterised by undulating, rural and predominately arable farmland centred on the River Trent; and
- Southern Lincolnshire Edge, an area of clear character defined by the dramatic limestone cliff to the west and the slope that drops gently to the edge of the fens in the east;

Trent and Belvoir Vales NCA has mainly fertile soils and good quality agricultural land and has supported a diversity of farming over a long period but, because of this, little semi-natural habitat remains.

The Southern Lincolnshire Edge NCA is primarily arable, with large geometric fields divided by limestone walls, with few trees or woodland. On the wetter, heavier clay soils to the east and

[7] Historic England website, Online at: https://historicengland.org.uk/advice/technical-advice/information-management/hers/, Accessed January 2018.

[8] Lincolnshire County Council website, Online at: https://www.lincolnshire.gov.uk/residents/environment-and-planning/conservation/historic-environment-record/36930.article, Accessed at: January 2018

[9] Natural England, Online at: http://publications.naturalengland.org.uk/publication/7030006?category=587130, Accessed January 2018

south-west, pasture is more prevalent; hedgerows are the predominant boundary and the landscape has a more intimate, enclosed feel, with more trees, woodland and parkland.

There is no Area of Outstanding Natural Beauty (AONB) within the study area, the closest area is Lincolnshire Wolds which is approximately 26km west of the proposed scheme and will not be impacted upon.

There is no green belt land or community forest land within the study area of the proposed scheme.

The proposed scheme crosses the River Witham to the east of South Hykeham and just after its confluence with the River Brant. There are various arable fields in this area also where visual or land loss impacts may occur.

Within the surrounding area of the proposed scheme there will be a number visual sensitive receptors which include:

- Residential dwellings and areas, refer to section 2.1 and 2.2;
- Non-residential buildings, refer to section 2.1 and 2.2;
- Cultural heritage assets, see section 2.3; and
- Publicly accessible areas, refer to section 2.8.

Potential Environmental Risks

There is a risk that both the construction and operation of the proposed scheme may reduce the visual amenity and lead to unacceptable visual intrusion of nearby visual sensitive receptors.

The surrounding area of the proposed scheme is relatively rural and therefore the addition of a new road may lead to visual impacts to many surrounding receptors because the area around the proposed scheme is less built up and therefore views may travel further. The view of the proposed scheme from Public Rights of Way (PRoW) will also be a consideration that will need to be considered in any planning application for the proposed scheme.

To reduce impacts during both construction and operation, existing natural screening should be retained where possible. Further, a landscape design showing trees to be retained and protected as well as any replacement or additional planting should be prepared as part of the proposed scheme development and design. A Landscaping Strategy is proposed to accompany the OBC to align landscape into the emerging design proposals.

It is not currently known whether the proposed scheme will have permanent lighting during operation and therefore in order to minimise the construction and operation phase impacts, a number of ‘best practice’ methods should be implemented. These include, conforming to principles within the Considerate Contractor Scheme to minimise the impacts of light pollution during construction, and use directional lighting, screening and the use of Light Emitting Diode or solar power lighting for night lighting where possible during operation to reduce the impacts on the surrounding visual amenity.

Further Studies and Constraints

A detailed landscape character assessment and visual impact assessment will need to be undertaken as part of the OBC application and in support of any planning application. This is likely to include photomontages and computer based modelling to identify a zone of theoretical visibility.

2.5 BIODIVERSITY

Existing Information

The proposed scheme is located within the Swanholme Lakes Local Nature Reserve (LNR) and Site of Special Scientific Interest (SSSI) Impact Risk Zone (IRZ), which is a buffer area designated by Natural England to make a rapid initial assessment of the potential risks posed by development proposals. They define zones around each ecologically designated site which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts. The SSSI IRZs can be used by planning authorities to consider whether a proposed development is likely to affect a SSSI and determine whether they will need to consult Natural England to seek advice on the nature of any potential SSSI impacts and how they might be avoided or mitigated

Whisby Nature Park LNR is the only identified statutory nature conservation site within 2km of the proposed scheme. It is located approximately 1.4km north west of the proposed scheme. There is one further LNR, Cross O'Cliff Orchard, outside 2km, approximately 2.5km north of the proposed scheme. Both LNRs are illustrated in Figure 2, Appendix A.

There are 19 non-statutory designations within 2km of the Scheme, the closest two, Waddington Grassland (Viking Way) LWS and River Witham, Bracebridge to South Hykeham LWS, are within the footprint of the proposed scheme. A full list of the non-designated sites is shown in the PEA (Appendix B).

Although there are no protected habitats or AWI woodland present within the Survey Area there are habitats present which may qualify a Habitat of Principal Importance (HPI), including rivers, ponds, hedgerows and arable field margins. No assessment has yet been carried out to see if these habitats meet the criteria to be classified as HPI in accordance with Section 41 of the NERC Act 2006. Under Section 40 of this legislation, every public body (including planning authorities) must, ' *in exercising its functions, have regard so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity'*.

The results of the desk study, Phase 1 Habitat Survey and protected species assessment highlighted the potential presence of several protected species or species of conservation concern within the Survey Area, or within the immediate surroundings of the Survey Area. These include bats, badger, otter, water vole, birds, reptiles and amphibians.

Potential ecological constraints for all the ecological receptors can be found in Table 6 of the PEA report, presented as Appendix B.

Potential Environmental Risk

The non-statutory designations that are within the footprint of the proposed scheme, as mentioned above, may result in direct loss of land and/or habitat degradation through indirect impacts of construction, such as increased sediment run-off and increases in noise and lighting.

No negative impacts are envisaged on Whisby Nature Park LNR, as this site is considered sufficiently distant from the proposed scheme and will therefore remain unaffected by it.

There are no negative impacts envisaged on all other non-statutory designated sites identified as they are considered sufficiently distant from the proposed scheme and will therefore remain unaffected by it.

The findings from the PEA, Appendix B, give a more detailed ecological assessment of any potential environmental risks and impacts on the surrounding ecology and biodiversity of the proposed scheme. These include the key ecological constraints and further survey requirements for all potential ecological receptors.

The tree and hedge lines are likely to support breeding birds and may potentially provide roosting sites for bats, with opportunities for badger sett construction along their base. Field drains provide potential habitat for water voles, whilst otter spraint was found adjacent to the River Witham. Evidence of roosting barn owls was also found near the river.

Other protected species that may be present within the Survey Area include common reptiles and great crested newt, although suitable habitat for both of these is very restricted within the Survey Area.

Further Studies and Constraints

Potential ecological constraints for which further surveys are required to ensure legal and planning policy compliance can be found in Table 6 of the PEA report in Appendix B.

Further surveys and/or mitigation may be required in order to quantify and reduce impacts on the non-statutory designated sites within the proposed scheme footprint.

Further survey work for bats, badger, otter, water vole, birds, reptiles and amphibians is recommended.

At this early stage in the design process avoidance and mitigation measures are mainly generic in nature, with no agreed enhancement measures but with any measures agreed in the future having to be in accordance with The National Planning Policy Framework (NPPF) 2012 (DCLG, 2012) and Policy LP21: Biodiversity and Geodiversity of the Central Lincolnshire Local Plan (adopted April 2017).

It is not currently known whether the proposed scheme will have permanent lighting during operation and therefore in order to minimise the construction and operation phase impacts, a number of ‘best practice’ methods should be implemented. These include, conforming to principles within the Considerate Contractor Scheme to minimise the impacts of light pollution during construction, and use directional lighting, screening and the use of Light Emitting Diode or solar power lighting for night lighting where possible during operation to reduce the impacts on the surrounding habitat.

2.6 WATER AND FLOODING

Existing Information

The River Witham runs directly through the proposed scheme corridor and a crossing of the Witham will be required just after the confluence of the River Brant and River Witham. The

Beck stream also flows approximately 500m north and parallel to the proposed scheme north of South Hykeham.

The flood probability map on the Environmental Agency (EA) website indicates that the proposed scheme is partially located within Flood Zone 3, which is shown in Figure 2 in Appendix A. Flood Zone 3 denotes that the proposed scheme will have a 1 in 100 or greater annual probability of river flooding and will require a flood risk assessment in support of any planning application[10].

There is a flood storage area which is immediately adjacent south of the proposed scheme within the Flood Zone 3 area. This is a natural or man-made area basin that will temporarily fill with water during periods of high river levels.

The proposed scheme corridor is partially within the Source Protection Zones (SPZs) Zone 3 and Zone 2 as illustrated in Figure 2, Appendix A. SPZs are defined around large and public potable groundwater abstraction sites and their purpose is to provide additional protection to safeguard drinking water quality through constraining the proximity of an activity that may impact upon a drinking water abstraction. Zone 2 is the outer protection zone and Zone 3 is the total catchment which is the total area needed to support the abstraction or discharge from the protected water sources[11].

Potential Environmental Risk

There is a high potential environmental risk of flooding both to and from the proposed scheme crossing though a Flood Zone 3 area. Further assessments will be required and potential mitigation or flood defences to reduce this risk will need to be included in further assessment work.

During construction, surface water runoff that may be contaminated could negatively affect the watercourses mentioned above, this will need assessing and compensating for if found to contaminate at high levels.

Further Studies and Constraints

As part of the proposed scheme will cross over a Flood Zone 3, a flood risk assessment will be required and it is recommended that the Environment Agency are consulted from the outset of the design of the proposed scheme, to contribute along with further assessments of the potential adverse impacts during construction as well as operation. It is possible that the proposed scheme will need to be on viaduct through this area to reduce the volume of lost flood storage. Hydraulic modelling of the River Witham and River Brant will identify the extent of which this likely to be required.

An assessment of runoff will be required to support any OBC and planning application. It is recommended that Sustainable Drainage Systems (SuDS) is incorporated into any emerging

[10] Government website/ Environment Agency, Online at: *https://flood-map-for-planning.service.gov.uk/summary/*. Accessed January 2018

[11] Government website/ Environment Agency, Online at: https://data.gov.uk/dataset/source-protection-zones-merged1, Accessed January 2018

drainage design and that opportunities for ecological mitigation and enhancement are included.

Infiltration, as a method of managing surface water runoff, is more problematical within SPZs and the Environment Agency should be consulted on any emerging drainage strategy. The nature of the SPZ and the nature of the runoff will be a factor in whether it is necessary to discharge highway runoff to surface water. This is likely to incur greater cost during construction and maintenance compared to infiltration.

2.7 GEOLOGY, SOILS AND LAND CONTAMINATION

Existing Information

There are six historic landfill sites north of the proposed scheme illustrated in Figure 2, Appendix A, all of which are over the 1km study area and therefore are not considered further in the Environment Constraints Report.

There were three significant pollution incidents north approximately 2km, two north and one south, from the proposed scheme. The first was in 2004 which was a sewage materials pollutant, located downstream of the proposed scheme and which had a significant impact to water only. The second was in 2007 and was an oils and fuel pollutant which had significant impact to water and minor impact to land. The third was in 2010 and it was an atmospheric pollutant which had significant impacts to air only. The EA does not give detail on the size or how the pollution incidents occurred and therefore these pollution events within 2km of the proposed scheme cannot be disregarded at this stage.

There are no coal mining reporting areas or major pollution incidents within 2km of the proposed scheme. A major pollution incident is defined by the EA as may have a persistent and extensive effects on the quality of the environment, major damage to the ecosystem, agriculture and/ or commerce, and it may have a serious impact upon man. Whereas a significant pollution incident is less severe that a major impact but may still have significant damage to the above receptors[12].

The British Geological Survey (BGS) website states that the predominant bedrock geology associated with the western side, near the A1434 Newark Road and South Hykeham, is Charmouth Mudstone Formation, which is dark grey laminated shales, and dark, pale and bluish grey mudstones; locally concretionary and tabular limestone beds and abundant argillaceous limestone and phosphatic nodules. The predominant geology associated with the eastern side of the proposed scheme near A15 Sleaford Road is Upper (dominated by high-energy ooidal and shell fragmented grainstones) and Lower Lincolnshire Limestone Member (dominated by low-energy calcilutite, and peloidal wackestone and packstone)[13].

[12] Environment Agency, Online at: http://maps.environment-agency.gov.uk, Accessed January 2018

[13] British Geological Society website, Online at: http://mapapps.bgs.ac.uk/geologyofbritain/home.html. Accessed January 2018

The EA mapping indicates that the area, where the proposed scheme is located, is both a surface water and groundwater Nitrate Vulnerable Zone

The western side of the proposed scheme's underlying bedrock is classified as a designated Secondary B aquifer and the EA mapping shows areas of minor groundwater vulnerability. The eastern side of the proposed scheme is largely classified as major groundwater vulnerability, and the underlying bedrock is designated as a Principle Aquifer[14].

The agricultural land within the proposed route corridor is predominately Grade 3 meaning it is of good to moderate quality. The proposed route corridor is also within small areas of Grade 2, good quality and Grade 4, poor quality.

Potential Environmental Risk

There is the potential that there will be loss of agricultural land, either temporarily or permanently, as much of the land within the study area is arable farmland.

There is also a risk of enabling mobilisation of existing ground contamination during construction and operation.

Further Studies and Constraints

Further study of the geology and potential impacts and risk will be required to identify the likely presence or absence of contaminated land and therefore the potential impacts during the construction phase. A ground investigation will be required to establish if there are any potential environmental constraints such as contaminated land.

2.8 COMMUNITY AND LOCAL INFRASTRUCTURE

Existing Information

As part of any OBC application it will be necessary to consider the social distributional impact of air quality and noise. This is intended to ensure that more deprived groups are not adversely affected to the benefit of less deprived groups. This section has also considered Public rights of way (PRoW) and Sustrans routes as sensitive receptors which may be impacted by the proposed scheme.

The proposed scheme is within the North Kesteven District of Lincolnshire which has a population of 109,906 people (Office for National Statistics midyear population estimate 2013). Almost 40% of North Kesteven's residents live in communities in the Lincoln fringe and the area immediately surrounding Lincoln City, including North Hykeham, and about 15% live in Sleaford. The remaining 45% live half in 57 communities with fewer than 1000 people and the other half live in communities with over 1000 people[15]. The population of North Kesteven is split 49% male and 51% female (2011 Census).

[14] Defra MAGIC mapping website, available online at: http://magic.defra.gov.uk/MagicMap.aspx. Accessed January 2018

[15] North Kesteven District Council website, Online at: https://www.n-kesteven.gov.uk/your-council/facts-and-figures-about-the-council/information-on-the-district/, Accessed January 2018

North Kesteven is ranked 270 out of 326 local authorities in England and therefore shows low deprivation. The most deprived areas in North Kesteven are concentrated in a few wards to the east of the district (Billinghay and Kyme) and in the Sleaford area (Sleaford Castle and Sleaford Holdingham). The least deprived Lower Super Output Area (LSOA) is part of Ashby de la Launde and Cranwell Ward and is 32,450 out of 32,482 in England (where 1 is the least deprived)[16].

Overall, life expectancy is increasing in North Kesteven and it is above the English average when compared to other districts in England. 81% of people living in the district do not have a disability or long-term health problem and 11% said that their health limits them 'a little' and 8% said 'a lot'. Overall in terms of general health the Census 2011 figures show that 82% of people view their health as 'very good' or 'good' whilst 14% said they are of 'fair health' and 5% said they are of 'bad' or 'very bad' health (ONS, 2011).

North Kesteven covers an area of 356 square miles of which 95% is classified as green space including agricultural land and open space. The overall natural environmental score, a subjective theme which can be assessed in terms of AONB, green space, green belt and heritage coast alongside tranquillity and weather, for North Kesteven is higher than most other districts areas, which is due to the rural tranquillity and good air quality.

Sensitive receptors

Sensitive receptors within 1km of the proposed scheme corridor are identified below. Sensitive receptors are important to note because they will be subject to specific assessment as part of any air quality and noise assessment undertaken in support of any planning application.

There is one GP Practice within 1km of the proposed scheme corridor, Dr Lj Broughton and Partners, Waddington approximately 0.9km south of the proposed scheme in Waddington.

There are three primary schools within the study area of 1km:

- The South Hykeham Community Primary School, approximately 310m north of the proposed scheme;
- All-Saints Community Primary School, approximately 890m south of the proposed scheme; and
- Waddington Redwood Primary School, approximately 960m south of the proposed scheme.

Other sensitive receptors within the study area include various farms:

- Lincoln Lane Farm – approximately 760m south of the proposed scheme just east of the River Witham;

[16] Research North Kesteven, *The State of the District, North Kesteven,* August 2014

- Milking Hill Farm – approximately 400m south of the proposed scheme, west of Waddington;
- Lincolnshire Turf Farm – approximately 115m north east of the proposed scheme, north west of Waddington;

There are six PRoW within the 1km study area illustrated in Figure 2, Appendix A; three paths cross the proposed scheme and would need to be diverted during construction and operation.

There is a Sustrans Regional cycle route along the A1434 Newark road which crosses the junction where the proposed scheme will begin and link to the A46 Lincoln Western Bypass. There are two Sustrans Local cycle routes within the 1km study area, one along the A607 Grantham Road where it crosses the proposed scheme, and the other east of Bloxholm Lane[17] which is approximately 270m east of the proposed scheme.

Potential Environmental Risk

There is potential for the development to cause disruption to the access of the PRoWs which cross the proposed scheme boundary during construction and potentially operation.

During construction motorised users may experience delays due to diversions and road closures.

The residential properties that are in close proximity to the proposed scheme boundary may potentially experience noise and vibration and negative visual instruction.

Access to the South Hykeham Community Primary School may be restricted due to its close proximity to the proposed scheme.

There are likely to be temporary and potentially permanent disruptions, closures and diversions to the Sustrans cycle routes that are within close proximity to the proposed scheme, during construction and operation, in particular those that cross it.

Further Studies and Constraints

It is recommended that the rights of way officer is contacted to confirm the PRoW and to discuss the potential impacts that the proposed scheme may cause to the various PRoWs which cross it and a suitable solution for diversions, as appropriate, is identified.

Further study of the proposed scheme's impacts on the local communities will need to be undertaken as part of any OBC and planning application. This is likely to include an assessment on the length of any diversion of a PRoW and any impact upon non-motorised users.

2.9 SUMMARY OF POTENTIAL ENVIRONMENTAL EFFECTS

Table 2 presents a summary of the main environmental effects associated with the development of the proposed scheme along with recommendations for additional studies that will be required or are recommended to further identify environmental constraints.

[17] MAGIC Website, Online at: http://magic.defra.gov.uk/MagicMap.aspx, Accessed January 2018

Table 2: Potential environmental effects associated with the proposed scheme and recommendations for additional surveys, assessments and consultation

Environmental Topic	Potential Environmental Effects	Recommendations for additional surveys, assessments and consultation
Air Quality	Potential air quality effects during construction of the proposed scheme may include: • An increase in the level of NO_2 due to the movements of construction vehicles using the local road network; • An increase in dust deposition at the closest residential receptors. • During the operation of the proposed scheme: • The proposed scheme will result in a change in traffic flow and speed which could cause adverse impacts on air quality due to the pollutants released by vehicles on the road. There may be beneficial effects from a reduction in flow in AQMAs.	The following are recommended: • An address layer mapping desk based search will need to be undertaken during the Outline Business stage (OBC) of the project to identify sensitive receptors; • Scheme specific air quality monitoring data will be required for up to 12 months in support of any planning application. A programme of diffusion tube monitoring should be informed by the strategic traffic model and agreed with Environmental Health Officers as appropriate; • Once air quality monitoring data is available, a detailed air quality assessment will be required in support of any planning application; and • Dust and particulate matter during construction will need to be adequately addressed and managed.
Noise	Potential noise effects of the proposed scheme may include: • A disturbance to nearby receptors during construction works; and • The redistribution of traffic on the road network may result in both positive and negative changes in road traffic noise.	Potential next steps are likely to include: • An address layer mapping desk based search will need to be carried during the Outline Business stage (OBC) of the project to identify potential sensitive receptors; • A detailed noise assessment will be required in support of any OBC and planning application; and • Noise monitoring will be required in the vicinity of the proposed scheme to inform the construction noise assessment.

Environmental Topic	Potential Environmental Effects	Recommendations for additional surveys, assessments and consultation
Cultural Heritage	Potential effects upon cultural heritage from the proposed scheme may include: • There is a risk of a loss of heritage value/ setting of nearby heritage assets; and • Changes in landscape due to the proposed scheme may affect the setting of listed buildings;	Potential next steps may include: • Information regarding locally designated assets, potential archaeological sites and finds, historic buildings and historic landscapes and buried historic assets will be required from the HER; and • Identifying archaeological remains that are present to inform both the programme for construction and budget.
Visual Impact and Landscape	Potential visual impact and landscape effects of the proposed scheme may include: • Change in views of users from PRoW and nearby dwellings; • There is the risk of construction causing visual intrusion into the landscape; and • Potential lighting impacts during construction and operation on surrounding visual amenity.	Potential next steps may include: • A detailed landscape and visual impact assessment will be required in support of any planning application and OBC application. • Conforming to principles within the Considerate Contractor Scheme to minimise the impacts of light pollution during construction.
Biodiversity	Potential biodiversity effects during construction of the proposed scheme may include: • Non-statutory designations that are within the footprint of the proposed scheme, may result in direct loss and/or habitat degradation through indirect impacts of construction; • Potential presence of protected species or species of conservation concern within the survey area or its immediate surroundings; and • Potential lighting impacts during construction and operation on surrounding biodiversity. •	Potential next steps may include: • Further survey work for bats, badger, otter, water vole, birds, reptiles and amphibians is recommended. • Further surveys and/or mitigation may be required in order to quantify and reduce impacts on the non-statutory designated sites within the proposed scheme footprint. • Conforming to principles within the Considerate Contractor Scheme to minimise the impacts of light pollution during construction

Environmental Topic	Potential Environmental Effects	Recommendations for additional surveys, assessments and consultation
Water and Flooding	Potential water and flooding effects of the proposed scheme may include: • Disrupting natural water flows; • Groundwater contamination affecting sensitive receptors; • Potential of a 1 in 100-year flooding event which could result in the displacement of flood water and effect flooding downstream; and • Increasing risk of surface water flooding.	Potential next steps may include: • A detailed flood risk assessment will be required in support of any planning application, and it is recommended that, due to the degree of construction within the active flood plain, that early engagement with the EA is undertaken; and • An assessment of runoff will be required to support any OBC and planning application. It is recommended that SuDS is incorporated into any emerging drainage design and that opportunities for ecological mitigation and enhancement are included. • Consulting the Environment Agency on any emerging drainage strategy. The nature of the SPZ and the nature of the runoff will be a factor in whether it is necessary to discharge highway runoff to surface water. This is likely to incur greater cost during construction and maintenance compared to infiltration. • Hydraulic modelling of the River Witham and River Brant will identify the extent of which it is likely that a viaduct through the Flood Zone 3 area will be required to reduce the volume of lost flood storage.
Geology, Soils and Land Contamination	Potential geology, soil and land contamination effects of the proposed scheme may include: • There is a risk of enabling mobilisation of existing ground contamination; and • Potential loss of agricultural land.	Potential next steps may include: • Further study of the geology and soil environment will need to be undertaken; and • A ground investigation will be required to establish if there are any potential environmental constraints such as contaminated land.

Environmental Topic	Potential Environmental Effects	Recommendations for additional surveys, assessments and consultation
Lighting	It is not currently known whether the proposed scheme will have permanent lighting along the entire route or at junctions.	A number of 'best practice' methods should be implemented and the lighting design should be informed by the ecological constraints and the visual impact assessment.
Community and Local Infrastructure	Potential risks to community and local infrastructure from the proposed scheme may include: • Closure and/ or alterations in PRoW/loss of access; • Reduced residential amenity due to construction works which in turn may affect health and wellbeing of nearby residents; and • Disruption during construction to sensitive receptors (such as schools), recreational areas and Sustrans cycle trails.	Potential next steps may include: • Further study of the proposed scheme's impacts on the local community will need to be undertaken as part of any Social-Distributional Impact assessment that will accompany any OBC application; • The emerging design will need to incorporate suitable PRoW diversions at both the construction and operational stages; and • Assessment on the length of potential diversions of a PRoW and any impact upon non-motorised users

3 CONCLUSIONS

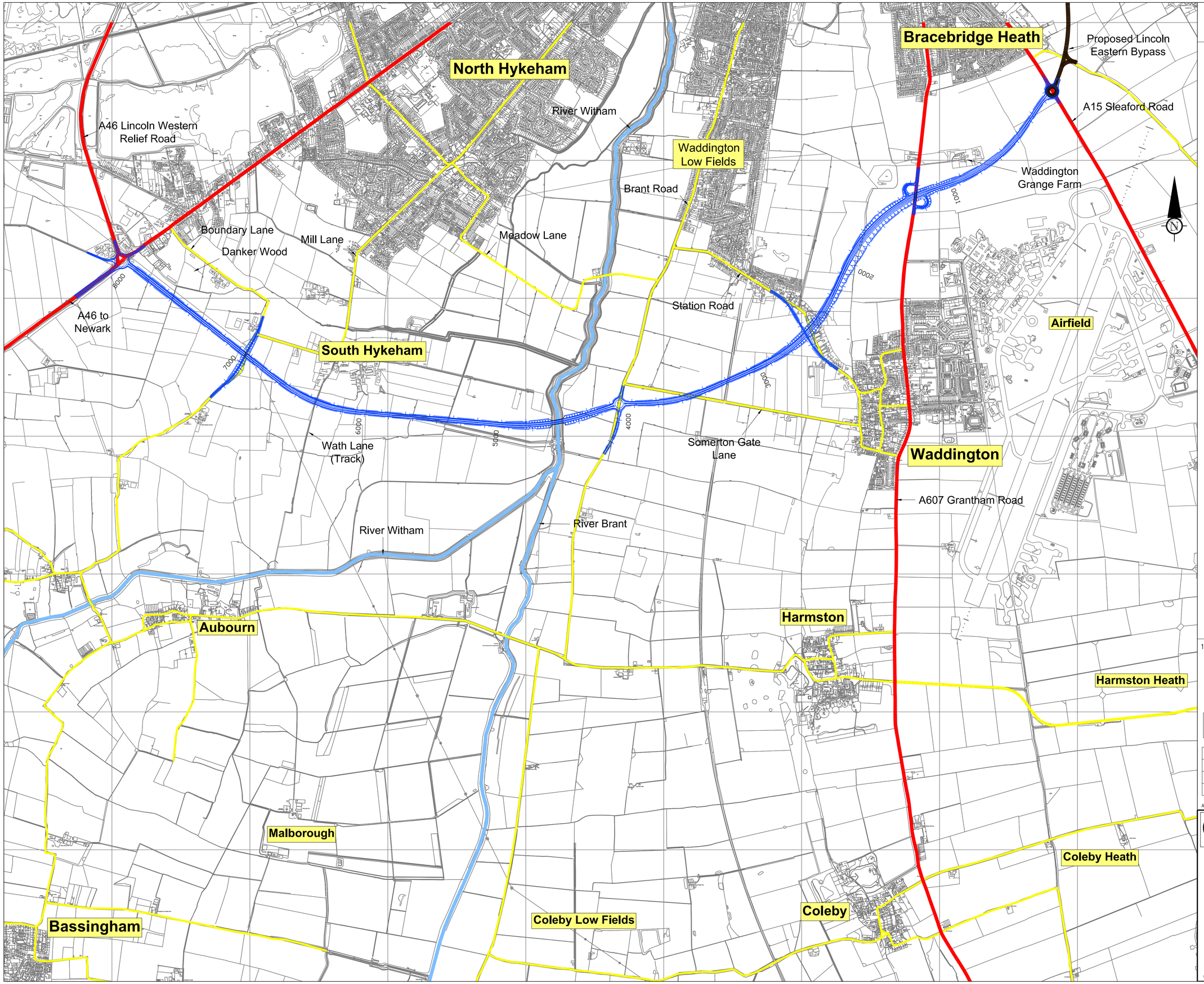
At this stage it has been identified that the proposed scheme has the potential to result in a number of environmental effects. The potential environmental effects that have been highlighted in this report and are associated with the proposed scheme are summarised in Table 2. Recommendations on the key next steps and further information that will be required to assess the environmental issues are also summarised in Table 2.

The environmental issues that have been highlighted will need to be addressed before finalising the proposed scheme design at the planning application stage. The potential actions that need to be undertaken to mitigate the risk of each impact have been briefly suggested, these will need to be updated accordingly once the detailed assessments are undertaken. Key considerations should be given to the local air quality, local noise, flood risk areas, cultural heritage sites, residential properties and local community schools that are in close proximity within the study area.

It should be noted that there is limited detail in regard to the proposed scheme at this early stage, therefore this preliminary report aims to highlight the initial constraints identified together with any further information that may be required to produce a more detailed assessment of the potential impacts the proposed scheme may have.

4 APPENDIX A

Figure 1: Lincoln Southern Bypass, preferred route (2006)



T/0012417/B/100/039

NOTES

1. The route shown is conceptual and shown for information only. No Preferred Route has been selected at this stage.
2. The route alignment junction layouts may be adjusted during the highway design process.

1:12,500 Scale Bar

0 100 200 300 400 500
SCALE

Rev:	Date:	Description:	Approved by:

AMENDMENT DETAILS

Certificate No. FS20735

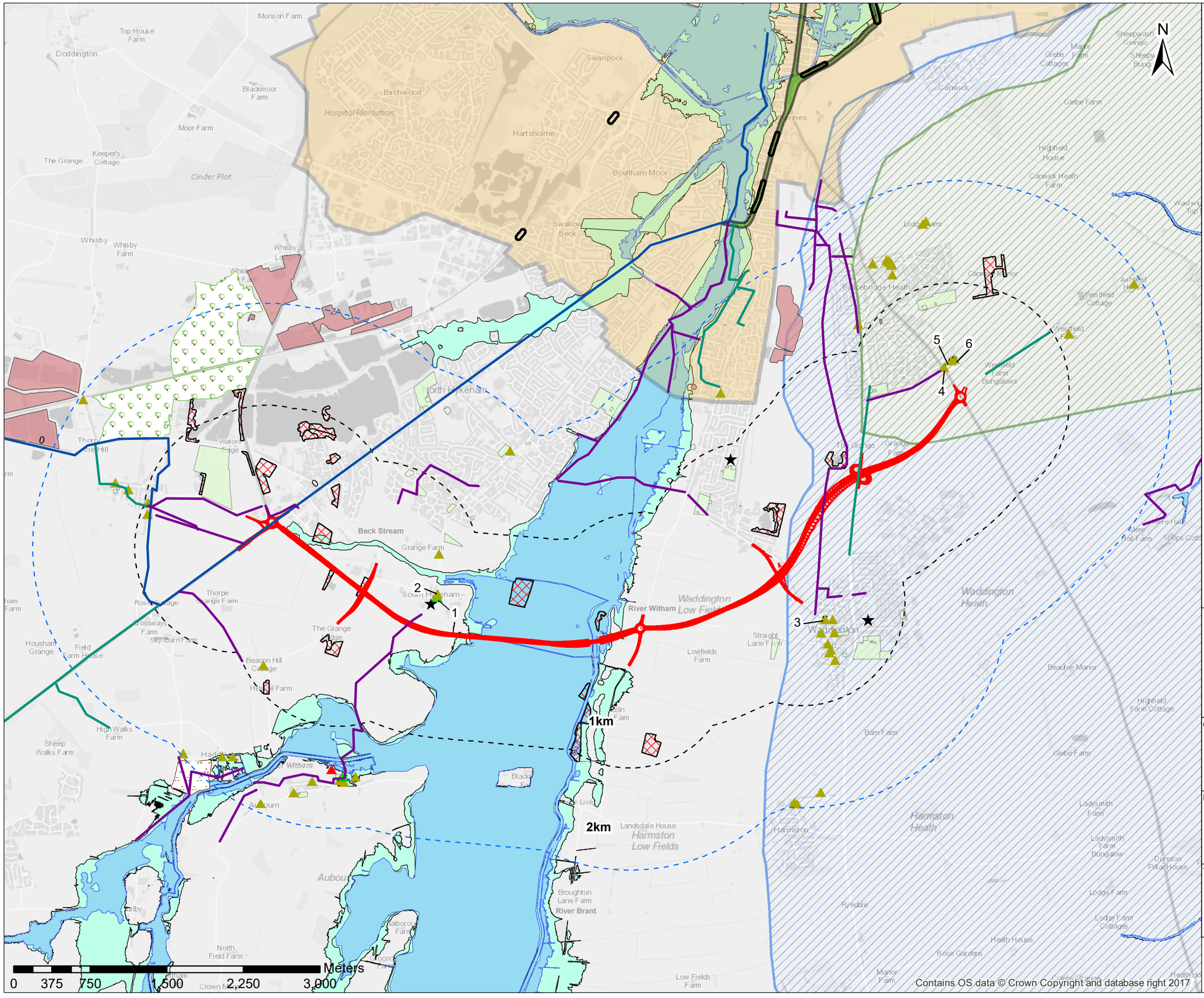
Lincolnshire COUNTY COUNCIL - IN PARTNERSHIP - JACOBS

TECHNICAL SERVICES PARTNERSHIP
WITHAM PARK HOUSE, WITHAM PARK, WATERSIDE SOUTH
LINCOLN LN5 7JN
Customer Service Centre : (01522) 782070
Head of Design and Construction : Y.H.Kong, B.Sc., C.Eng., M.I.C.E., M.I.H.T.

Drawing No. T/0012417/B/100/039
Structure No.
Rd No. Parish :
Scheme: LINCOLN SOUTHERN BYPASS
Description: PREFERRED ROUTE

Scale:	Draughted by:	Approved by:	Approval Date:	Sheet Number:
1:12,500 @ A1	SB	KO	March 07	1

Figure 2: Environmental Constraints within 1km and 2km buffers



Key

- 1km Buffer
- 2km Buffer
- LSB
- Subtrans Local Cycle Route
- Subtrans Regional Cycle Route
- Public Right of Way Footpaths
- DEFRA Noise Action Planning Important Area (NIA)
- National Forest Inventory, Decidious Woodland
- Scheduled Monument
- Local Nature Reserve
- OS Green Space Site (OS Open Data)
- Floodzone 2
- Floodzone 3
- Historic Landfill Sites
- Lincoln NO2 AQMA
- Lincoln PM10 AQMA
- Schools

Listed Buildings

Grade

I II* II

1	CHURCH FARMHOUSE
2	CHURCH OF ST MICHAEL
3	FARM BUILDINGS AT THE MANOR HOUSE
4	GATES AND WALLS AT THE MANOR HOUSE
5	MANOR HOUSE
6	THE MANOR HOUSE

Source Protection Zones

- Zone II - Outer Protection Zone
- Zone III - Total Catchment

wsp

Client: Lincolnshire County Council

Project: **LINCOLN SOUTHERN BYPASS**

Title: **FIGURE 2 ENVIRONMENTAL CONSTRAINTS**

Drawing Number:	Figure 2	Drawn:	LH
Date:	15/03/2018	Checked:	CM
Scale:	1:35,000	Approved:	BL

5 APPENDIX B

Preliminary Ecological Appraisal report

N

LEGEND:

150m buffer

Phase 1 habitat classifications

A1.1.1 - Broadleaved woodland - semi-natural

A1.1.2 - Broadleaved woodland - plantation

B4 - Improved grassland

B6 - Poor semi-improved grassland

G1 - Standing water

J1.1 - Cultivated/disturbed land - arable

J1.2 - Cultivated/disturbed land - amenity grassland

G2 - Running water

J2.1.2 - Intact hedge - species-poor

J2.3.2 - Hedge with trees - species-poor

J2.4 - Fence

A2.2 - Scrub - scattered

A3.1 - Broadleaved Parkland/scattered trees

Target Note

100 0 100 200 300 m

STATUS:

FOR INFORMATION ONLY

wsp

Three White Rose Office Park,
Millshaw Park Lane, Leeds LS11 0DL.
Tel: T +44 (0) 113 395 6200
www.wsp.com

CLIENT:

LINCOLNSHIRE COUNTY COUNCIL

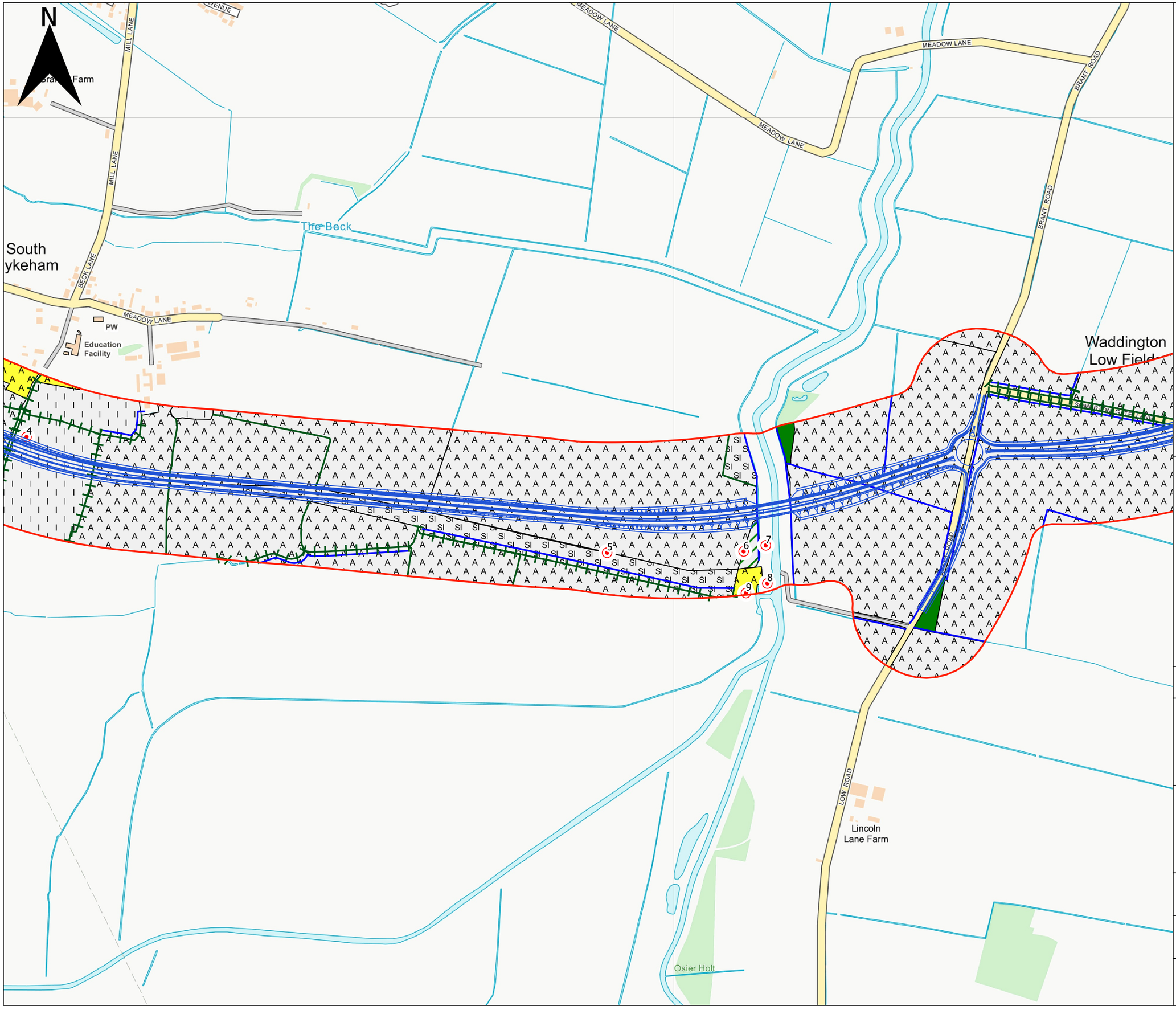
PROJECT:

LINCOLN SOUTHERN BYPASS

TITLE:

Phase 1 habitat map

SCALE @A3:	CHECKED:	APPROVED:
1:8,000	PH	BB
QGIS FILE:	DRAWN:	DATE:
	15/01/18	06/04/18
PROJECT No:	DRAWING No:	REV:
70038233	Page 1 of 4	0.1



LEGEND:

- 150m buffer

Phase 1 habitat classifications

- A1.1.1 - Broadleaved woodland - semi-natural
- A1.1.2 - Broadleaved woodland - plantation
- B4 - Improved grassland
- B6 - Poor semi-improved grassland
- G1 - Standing water
- J1.1 - Cultivated/disturbed land - arable
- J1.2 - Cultivated/disturbed land - amenity grassland
- G2 - Running water
- J2.1.2 - Intact hedge - species-poor
- J2.3.2 - Hedge with trees - species-poor
- J2.4 - Fence
- A2.2 - Scrub - scattered
- A3.1 - Broadleaved Parkland/scattered trees
- Target Note

100 0 100 200 300 m

STATUS:

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CLIENT:

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PROJECT:

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TITLE:

Phase 1 habitat map

SCALE @A3:	CHECKED:	APPROVED:
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	15/01/18	06/04/18
PROJECT No:	DRAWING No:	REV:
70038233	Page 2 of 4	0.1

N

LEGEND:

150m buffer

Phase 1 habitat classifications

A1.1.1 - Broadleaved woodland - semi-natural

A1.1.2 - Broadleaved woodland - plantation

B4 - Improved grassland

B6 - Poor semi-improved grassland

G1 - Standing water

J1.1 - Cultivated/disturbed land - arable

J1.2 - Cultivated/disturbed land - amenity grassland

G2 - Running water

J2.1.2 - Intact hedge - species-poor

J2.3.2 - Hedge with trees - species-poor

J2.4 - Fence

A2.2 - Scrub - scattered

A3.1 - Broadleaved Parkland/scattered trees

Target Note

100 0 100 200 300 m

STATUS:

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PROJECT:

LINCOLN SOUTHERN BYPASS

TITLE:

Phase 1 habitat map

SCALE @A3:	CHECKED:	APPROVED:
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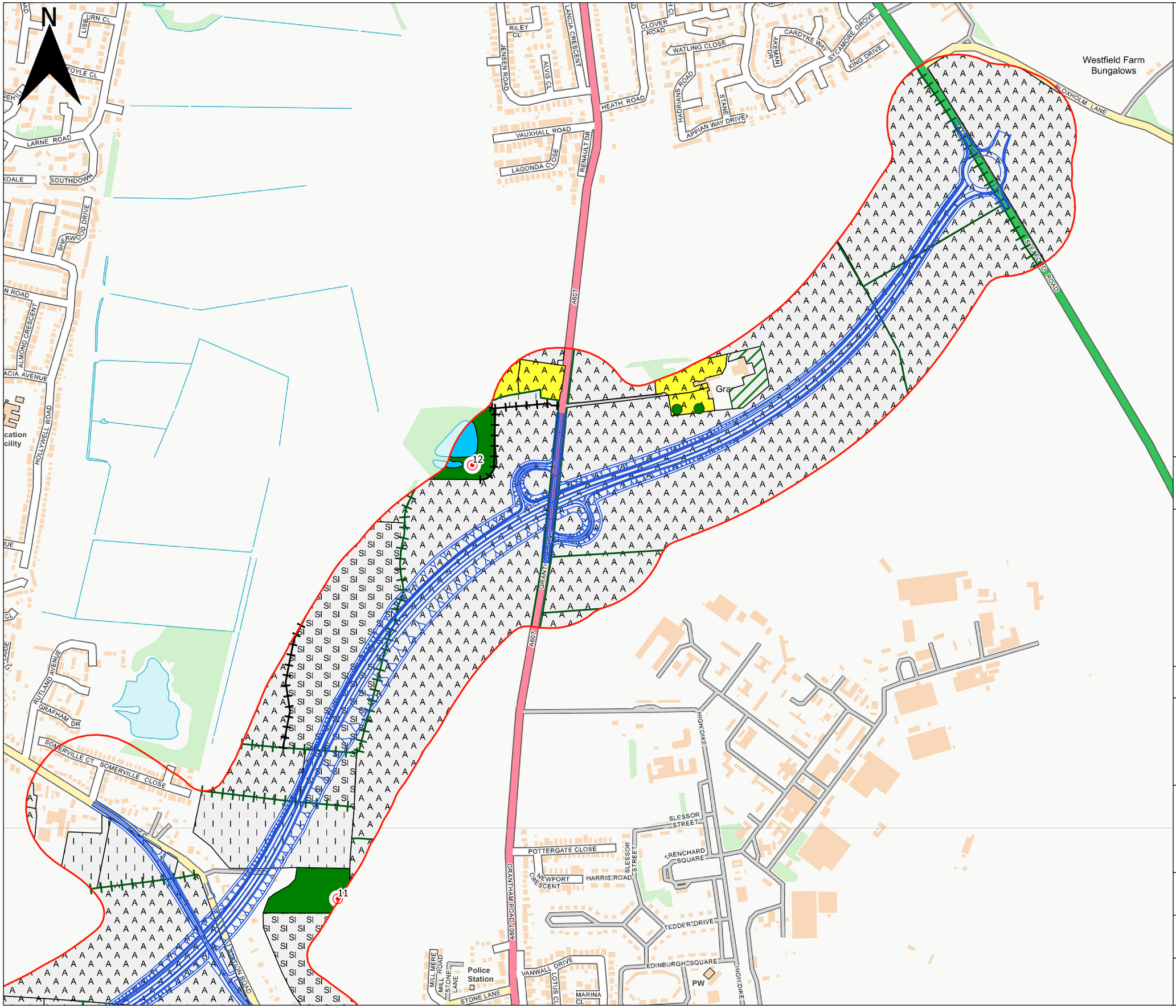
QGIS FILE:	DRAWN: 15/01/18	DATE: 06/04/18
PROJECT No: 70038233	DRAWING No: Page 3 of 4	REV: 0.1



STATUS:

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CLIENT: LINCOLNSHIRE COUNTY COUNCIL

PROJECT: LINCOLN SOUTHERN BYPASS

TITLE: Phase 1 habitat map

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QGIS FILE:	DRAWN: 15/01/18	DATE: 06/04/18
PROJECT No: 70038233	DRAWING No: Page 4 of 4	REV: 0.1

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