

A1 ELKESLEY JUNCTION IMPROVEMENTS

Stage 2 Scheme Assessment Report

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1 Introduction

1.1 Background

1.1.1 History of the project

- 1.1.1.1 The village of Elkesley is located approximately 10km south-east of Worksop in the District of Bassetlaw in Nottinghamshire. It is situated alongside the A1 and is only accessible via the trunk road. A Scheme Identification Study carried out by PLaN in 2002 established the need for a grade separated junction at Elkesley. The proposals have been developed with the key objective to improve access and the free-flow of traffic on the A1 by the provision of a grade separated junction or link road to serve the village of Elkesley and thereby improve vehicular access arrangements for the local communities.
- 1.1.1.2 Options were developed and assessed culminating in a Public Consultation in 2005. A preferred solution was developed but announcement of a Preferred Route was deferred in October 2006 because the cost would have been over the limit for local schemes. Further investigations were carried out to explore the feasibility of lower cost options, but these proved to be unsatisfactory. Therefore the favoured option at the Public Consultation was developed and presented in the form of two versions at a follow up exhibition in February 2008. This exhibition was used to gather public feedback on the designs resulting from the process.

1.1.2 The need for the proposed works

- 1.1.2.1 The original stated objective for the scheme is:

To increase safety and the free-flow of traffic on the A1 by the provision of a grade separated junction to serve the village of Elkesley and thereby improve vehicular access arrangements for the local communities.

-
- 1.1.2.2 Over the past 40 years, the volume of traffic using the A1 has increased significantly. The route now carries around 40,000 vehicles per day, 28% of them being heavy good vehicles. At Elkesley, the layout of the junctions creates hazards, and there is no specific provision for pedestrians, cyclists or horse riders to cross the A1. Journeys to and from Elkesley rely on right turning and U-turning movements through gaps in the central reserve, and the layout requires traffic accessing the local road network to use a short section of the A1.
- 1.1.2.3 Whilst the accident record is better than average for the class of road following the introduction of a 50mph speed limit and other safety improvements in 1997, local users are concerned about safety. The proposed improvements will allow local users access to the local road network without using the trunk road. The existing 50mph speed restriction covering some 2.2miles of the A1 is an anomaly on the route. The proposals will allow the national speed limit to be reintroduced over a mile of the A1 (subject to detail design) and will reduce journey times on the trunk road.

1.2 Early Rejected Options

1.2.1 Brough Lane to B6387 Link Road

Figure A1

- 1.2.1.1 This option proposed a link road from Brough Lane in the south east corner of the village to the B6387. However this option was rejected as it would have directed heavy traffic that uses the junction at Coalpit Lane through the centre of the village and down Brough Lane.

1.2.2 Grade Separated Junction at Jockey Lane

Figure A2

- 1.2.2.1 This option involved a bridge at Jockey Lane with a link road along the alignment of Cross Lane (Sandy Lane) with a curve through onto Coalpit Lane and then on into the village. This option was rejected for a number of reasons:
- Properties on Jockey Lane would be directly affected by high bridge approach embankments
 - Woodland on Cross Lane (Sandy Lane) would be adversely affected
 - High construction cost and extensive earthworks

1.2.3 Grade Separated Junction Parallel to Jockey Lane

Figure A3

- 1.2.3.1 This option proposed a link road parallel to Jockey Lane and Cross Lane (Sandy Lane) passing over the A1 some 150m south of the existing Jockey Lane junction. This was rejected for a number of reasons:
- High construction cost
 - Extensive land take

1.3 Options Presented at the 2005 Public Consultation

1.3.1 Option A

Figure A4

- 1.3.1.1 Option A proposed a new grade separated junction northwest of Elkesley with links to the southbound carriageway of the A1, Jockey Lane and Coalpit Lane. The slip roads linking Coalpit Lane with the northbound A1 would be improved, and the central reserve gaps would be closed. A second phase of works would involve closing the Twyford Lane access to the village and replacing the two-way slip road to and from the northbound A1 at Twyford Bridge junction with a new slip road farther east. This would give Elkesley a high-standard all-movements junction with the A1, remove all through traffic from the village, and improve the operation of the Twyford Bridge junction.

1.3.2 Option B

Figure A5

- 1.3.2.1 Instead of a new A1 junction, Option B proposed linking Elkesley via Twyford Lane to the A1 at the A1/B6387 Twyford Bridge junction and replacing the Twyford Bridge slip-road as under Option A. A roundabout would be built on the B6387 where the new link road and slip road met. The Twyford Lane junction with the A1 would be closed, and the other junctions at Elkesley and Jockey Lane junction converted to a 'left-on/left-off' arrangement with all central reserve gaps closed. This option would route some traffic through Elkesley and restrict the use of Jockey Lane. An environmental weight limit could be introduced through the village to prevent access by HGVs, although this would involve them in U-turn movements at neighbouring junctions.

1.4 Scheme Development since Public Consultation

1.4.1 2006 Scheme Layout

Figure A6

- 1.4.1.1 The consultation revealed broad support for improving the Elkesley junctions, with Option A favoured by the majority of respondents. Option B was widely thought unsuitable because it required traffic to pass through the village, in particular the narrow Twyford Lane. It was therefore not developed any further. Although Option A was broadly supported, many people felt that the bridge and approach road would be too close to the village, which would harm visual amenity and expose Coalpit Lane residents to traffic intrusion. Some people also noted that HGV traffic travelling between the northbound A1 and the timber yard would still need to use Coalpit Lane with its residential frontages. The Option A design was therefore improved by moving it westwards and introducing a new slip road to remove A1 northbound traffic from Coalpit Lane.

1.4.2 Alternative Smaller Scale Proposal (2007)

Figure A7

1.4.2.1 In 2005 the Highways Agency had stated that a number of options had been rejected because they exceeded the normal cost limit for 'smaller scale' local trunk road improvements. Developing the exhibited Option A to meet the majority view expressed through the public consultation led to that option also exceeding that limit. Larger schemes can be taken forward, but are likely to require to wait longer for funding because they are entered into a larger pool of transport schemes regionally. A different and simpler scheme was developed based on the idea that because the numbers of vehicles using the new junction would be relatively low, it might be possible to reduce the amount of new infrastructure by making more use of the existing junctions. That work showed that although it would be possible to develop a simple bridge scheme to allow local road network and full A1 access at lower cost – within the limit for 'smaller scale' schemes – this would be less than fully satisfactory in engineering terms and would leave Coalpit Lane residents significantly exposed to traffic intrusion.

1.4.3 The Current Options

1.4.3.1 In the summer of 2007 all the scheme options were reviewed. It was clear that the identified requirements could only be sufficiently met through a scheme based on the 2006 development of the original Option A. In light of this finding and the priority attached to improving the Elkesley junctions, and after discussions with the local highway authority and the Department for Transport, it was agreed that such a scheme could be taken forward as a 'smaller scale' local scheme, on an exceptional basis notwithstanding its greater cost. Two versions of a scheme based on the 2005 Option A (Phase 1) were presented early in 2008. They are similar to one another but differ in how they provide for movements to and from the northbound A1. Version 1 is very similar to Option A, moved farther westwards, whereas Version 2 incorporates the new on/off slip road for northbound traffic which was a feature of the 2006 scheme. Version 2 would remove HGV traffic from Coalpit Lane, but it would be likely to increase the total flows of vehicles along Coalpit Lane because all traffic between the village and A1 northbound would be directed along Coalpit Lane and the new bridge approach road.

1.4.3.2 Following an exhibition in February 2008 and discussions with Nottinghamshire County Council, the local highway authority, Version 1 has been modified to allow for the diversion of the residential part of Coalpit Lane to a new alignment to the north. This revised scheme, which reflects views expressed by residents and has the support of the county council, will allow the residential part of Coalpit Lane to be converted to a cul-de-sac and forms the Preferred Route for the Elkesley Junctions Improvement.

1.4.4 Twyford Bridge Junction

1.4.4.1 Improvements to the Twyford Bridge junction present differing engineering and other challenges to those at Elkesley, and additionally may depend on developments planned locally. To avoid further delay to the Elkesley Junctions Improvement, any works to Twyford Bridge junction will be considered separately. Until Twyford Bridge junction is improved, the 50mph. speed limit on that section of the A1 will be retained.

1.4.5 Lay-bys

- 1.4.5.1 Junction improvements at Elkesley will mean that the existing lay-bys in the area will have to be closed. A number of lay-bys have also been lost in the area due to the junction improvements at Five Lanes End (Apleyhead). Previously the Elkesley scheme has included replacement lay-bys. In the February 2008 exhibition lay-bys were shown for both northbound and southbound in the area around Tea Table and Cocked Hat plantations. However these have been removed from the scheme pending a fuller analysis of the need for them and the best sites for them.

2 Existing Conditions

2.1 Locality

2.1.1.1 Elkesley lies along the A1, midway between the A1/A57 Five Lanes End (Apleyhead) Junction east of Worksop and the A1/A57 Markham Moor Junction south of Retford. The village of Elkesley is adjacent to the A1 and can only be accessed from the trunk road. Gamston Airfield is on the opposite side of the A1 from which light aircraft operate. The section of the airfield adjacent to the A1 is in industrial use the key operation being warehousing.

2.2 Existing Highway Network

2.2.1 Main Carriageway

2.2.1.1 The existing A1 past Elkesley is an all purpose, two-lane dual carriageway with a 50 mile per hour (mph) speed limit enforced with safety cameras.

2.2.2 Side Roads

2.2.2.1 Jockey Lane – this is a narrow lane that eventually leads to Retford.

2.2.2.2 Cross Lane (Sandy Lane) – This is a Byway and runs between the A1 and Coalpit Lane. It appears to be little used by the public and is prone to fly tipping. It is used by landowners to access adjacent fields.

2.2.2.3 Coalpit Lane – This lane runs westwards from the village and narrows to a single lane beyond the village. The key use for this lane is access to Plevin’s timber processing yard.

2.2.2.4 High Street – This is the main street through the village and the spur onto the A1 forms the main access to the village.

2.2.2.5 Twyford Lane – This is a continuation of High Street and links to the A1 at the eastern end of the village. It is narrow and has a tight ‘S’ bend.

2.2.2.6 Brough Lane – This is a lane running around the south of the village, part Byway and part National Trail

2.2.3 Junctions

2.2.3.1 There are three key junctions on the section of A1 under consideration, Jockey Lane, High Street and Twyford Lane. All are at-grade with the A1 with gaps in the central reserve at Jockey Lane and High Street allowing all-movements. The junction at Twyford lane is left in and left out only onto and off the A1 northbound carriageway.

2.3 Engineering Standards of Existing Trunk Road

2.3.1 Horizontal Alignment

2.3.1.1 The majority of the A1 main carriageway under consideration appears to have been built in conjunction with Gamston Airfield in 1942. Therefore the alignment standards are appropriate to that time and are below the current desirable minimum standards for derestricted rural all purpose roads. The horizontal curvature tends to be around 1 design step below desirable minimum geometric design standard and therefore adequate for modern traffic.

2.3.2 Vertical Alignment

2.3.2.1 The vertical alignment is also lower than desirable minimum standard for a de-restricted road. The vertical curvature is up to 2 steps below desirable minimum geometric design standard. Gradients are less than 4%.

2.3.3 Junctions

Jockey Lane

2.3.3.1 This is an all-movements at-grade junction with the A1. Opposite is Cross Lane (Sandy Lane) and in essence forms a cross roads, however Cross Lane (Sandy Lane) is little used. On the southbound carriageway there is an 80m long auxiliary lane exit leading to a 25m kerb radius onto Jockey Lane. Coming from Jockey Lane onto the A1 southbound there is a 30m kerb radius leading to a 120m long auxiliary lane. For right turns from the A1 northbound there is a 185m long offside auxiliary lane leading to an 18m long by 11m wide gap in the central reserve. Right turns from Jockey Lane or Cross Lane (Sandy Lane) are made through the same gap. There are no acceleration or deceleration lanes or tapers for Cross Lane (Sandy Lane), just 4m kerb radii directly to the nearside edge of the nearside lane on the main carriageway.

High Street

2.3.3.2 This is an all-movement at grade junction that is the main access to the village. Left turns from the A1 northbound are via a 180m long auxiliary lane (with some 60m hatched out with road markings) and a 15m kerb radius onto High Street. Left turns from High Street onto the A1 northbound are via an 18m kerb radius and a 110m long taper. Right turns from the A1 southbound are made along a 180m long offside auxiliary lane and through a 9m long by 13m wide gap in the central reserve. Right turns from the village onto the A1 southbound are made by making a 'U' turn from the northbound carriageway. Traffic making this manoeuvre turns left from High Street onto an offside auxiliary lane that runs for some 225m to a gap in the widened central reserve. The width of the central reserve is some 24m, the 'U' Turn lane is approximately 7m wide, the exit being directly onto the southbound carriageway.

Twyford Lane

2.3.3.3 This junction is at the south end of the village and provides for limited movements. These are left from the A1 and left onto the A1 only. The exit from the A1 northbound is via a 110m long auxiliary lane and a 30m kerb radius onto Twyford Lane. The left turn onto the northbound carriageway is via a 7m kerb radius only with no taper.

2.4 Lay-bys

2.4.1 Northbound

2.4.1.1 There is a large lay-by on the northbound carriageway some 290m north of the existing High Street junction. The layout is not to a recognised standard. It has been formed from a section of redundant carriageway and is approximately 10m wide (including a 2m segregation island) and 250m long including a 60m long exit taper from and an 80m entry taper onto the main carriageway. The layout provides two-lanes of parking with a wide through lane. It can accommodate around 15 Heavy Goods Vehicles (HGV) at a time including those parked on the tapers. Pavement condition of the lay-by is good with a metalled surface. The segregation island is formed with high containment kerbs.

2.4.2 Southbound

2.4.2.1 There is an existing lay-by located around 100m south of the existing High Street junction. This is also a non-standard layout being only 2.5m wide without a segregation island. It is around 70m in length with a 30m entry taper and a 25m exit taper.

2.5 Traffic Flows and Accident Record

2.5.1 Traffic Flows

2.5.1.1 Traffic assessment is discussed in detail in Section 6. 2007 traffic flows that form the basis of the traffic assessment are shown on Figure C1 in Appendix C. Traffic flows on the A1 are around 30,000 vehicles (2 way 12 hour) with significantly lower flows on the connecting side roads:

- Jockey Lane – 866 vehicles (2way 12 hour)
- High Street link to A1 – 1289 vehicles (2 way 12 hour)
- Twyford Lane – 281 vehicles (2 way 12 hour)

2.5.2 Accident Record

2.5.2.1 Accident data for the period from 2002 to 2007 was obtained for the study highway network. For the period under review, a total of 14 accidents and 23 casualties of varying severities were recorded. A breakdown of the accident history is shown in the following tables.

Table 2.1: Number of Accidents by Severity

Year	Fatal	Serious	Slight	Total by Year
2002	0	0	2	2
2003	0	0	3	3
2004	0	0	0	0
2005	0	0	2	2
2006	0	2	5	7
Aug-07	0	0	0	0
Total by Severity	0	2	12	14

Table 2.2: Number of Casualties by Severity

Year	Fatal	Serious	Slight	Total by Year
2002	0	0	2	2
2003	0	0	4	4
2004	0	0	0	0
2005	0	0	6	6
2006	0	2	9	11
Aug-07	0	0	0	0
Total by Severity	0	2	21	23

2.5.2.2 According to the accident data, 5 slight accidents were due to turning movements at junctions and central reserve gaps along the A1 study section. These accidents resulted in 8 slight casualties. All 14 accidents occurred on the A1 trunk road.

3 Description of Scheme Options

3.1 Description of Options

3.1.1 Version 1

Figure A8

- 3.1.1.1 The proposed bridge over the A1 would be located some 400m north west of the existing High Street junction on the main carriageway. This carries a new link road from Coalpit Lane to a new roundabout on the northern side of the A1. From this roundabout a new link road to Jockey Lane is proposed together with a slip road onto the southbound A1 carriageway. The northbound carriageway of the A1 connects directly with Coalpit Lane adjacent to the existing High Street junction.

3.1.2 Version 1 (modified)

Figure A9

- 3.1.2.1 Version 1 (modified) has been introduced following representations from residents and discussions with Nottinghamshire County Council, who will part-fund the additional works to divert a length of Coalpit Lane. Version 1 (modified) is similar to Version 1. In this case the link from Coalpit Lane over the A1 has been moved northwest to more closely follow the existing hedge line. The other key difference is that in this option a new section of carriageway is proposed bypassing Coalpit Lane and linking directly to High Street.

3.1.3 Version 2

Figure A10

- 3.1.3.1 The proposed bridge over the A1 would be located some 400m north west of the existing High Street junction on the main carriageway. This carries a new link road from Coalpit Lane to a new roundabout on the northern side of the A1. From this roundabout a new link road to Jockey is proposed together with a slip road onto the southbound A1. On the south side of the A1 a further roundabout would form a junction with a similar two way slip road connecting to the northbound A1.

3.2 Cost Estimates

3.2.1 Versions 1, 1 (modified), & 2

3.2.1.1 The estimated costs for the three Versions are summarised in the following table. The works costs have been calculated from typical construction cost for mid 2007. The scheme cost is based on this but also includes preparation costs, land costs and allowances for risk. The figure has been projected forward to the anticipated construction year of 2010.

Table 3.1: Comparison of cost estimates

	Version 1	Version 1 (modified)	Version 2
Works Cost	£4,258,400	£4,621,700	£4,674,100
Scheme Cost	£7,089,789	£7,561,244	£7,571,710

4 Engineering Assessment

4.1 Engineering Description

4.1.1 Engineering Standards

4.1.1.1 Both options have been designed to TD 40/94 The Layout of Compact Grade Separated Junctions and TD 9/93 Highway Link Design. The main carriageway has been assessed against the requirements of TD 9/93 Highway Link Design and the key new link roads have been designed to the same standard. The slip roads have been designed to TD40/94 The Layout of Compact Grade Separated Junctions. The key difference between the Versions is the treatment of the northbound access onto the A1. In Version 1 and Version 1 (modified) the northbound slip roads connect to Coalpit Lane adjacent to the village. In Version 2 the northbound slip roads are positioned adjacent to the proposed overbridge and connected to the link road over the A1 via a roundabout.

4.1.2 Climate, Topography and Land Use

Climate

4.1.2.1 The climate is typical for the area, no unusual climatic conditions have been identified.

Topography

4.1.2.2 The topography is unremarkable and does not present any engineering difficulties.

Land Use

4.1.2.3 Land use is predominantly agricultural with both residential and commercial use adjacent to the proposed works. No engineering difficulties have been identified associated with land use.

4.1.3 Geology, Geomorphology, and Ground Conditions

4.1.3.1 Soils in the area belong to the Cuckney association which are Permo-Triassic reddish sands. No superficial drift deposits are present within the vicinity of the proposed scheme. There is a small outcrop of Till (Boulder Clay) 350m south of the scheme, and there have been recent river terrace deposits of sand and gravel at the southern part of the scheme. Alluvium comprising of clay and silt is present to the south and east of the site area in the valley of the R Poulter.

4.1.3.2 The underlying geology of the site comprises rocks of Early Triassic Age consisting of the top of Nottingham Castle Sandstone Formation (formerly the Bunter Pebble Beds). In the upper 2m this weathers to a fine-medium rounded sand. This overlies mudstones and limestones of Permian age, which is in turn underlain by Carboniferous Upper Coal Measures, the top of which is estimated to be at a depth of 450m. Between the village and Dover Bottom, the sandstone is overlain by strata of the Retford Member, which is believed to comprise interbedded red and green sandstone and mudstones. The Retford member

is expected to be up to 5m thick. The Nottingham Castle Sandstone is anticipated to be over 100m thick.

- 4.1.3.3 A fault approximately 500m east of Elkesley was identified running southwest to northeast from the A1 towards Dover Bottom.
- 4.1.3.4 Estimated bearing capacities for the Sherwood Sandstone strata are given in the table below:

Table 4.1: Estimated Bearing Capacities

Rock Type	Anticipated Bearing Capacity (kN/m ²)	Assessment
Weathered Sherwood Sandstone Group	200-600	Good
Un-weathered Sherwood Sandstone Group	2500-3000	Excellent

- 4.1.3.5 The Coal Authority indicated that the site is within the likely zone of surface influence of former underground workings in three seams of coal. These seams were mined between depths of 690m and 880m, and were last worked in 1992.
- 4.1.3.6 The village is known to have been affected by mining subsidence in the early 1990s. Given the age, depth and nature of workings however, further subsidence is considered unlikely.
- 4.1.3.7 There are no geological, geomorphologic Sites of Special Scientific Interest (SSSIs) or Regionally Important Geological Sites (RIGS) located within 1km of the proposed site
- 4.1.3.8 The likelihood of encountering contaminated land during construction is considered to be low.

4.1.4 Hydrology, Hydrogeology Drainage

4.1.4.1 Hydrology

The nearest identifiable surface water features are the River Poulter which crosses the A1 from the south west to the north east to the south of the site adjacent to Twyford Bridge and the River Meden to the south east of the site. There eight surface water abstractions within 250m of the proposed site and six boreholes located within 50m

4.1.4.2 Hydrogeology

The site is spilt between a Minor Aquifer to the east, where drift deposits are located and a Major Aquifer to the west where no drift deposits are present. The Minor Aquifer, which is variably permeable, consists of fractured or potentially fractured rocks, which do not have a high primary permeability, or other formations of variable permeability including unconsolidated deposits. Although not producing large quantities of water for abstraction, they are important for local supplies and in supplying base flow to rivers. The Major Aquifer is located to the west, no drift deposits are present. The solid geology is highly permeable with highly permeable formations, usually with a known or probable presence of significant fracturing. They may be highly productive and able to support large abstractions for public supply and other purposes.

4.1.5 Public Utilities

4.1.5.1 Both options have similar impact on services. The most significant apparatus is the Anglian Water main running across the field between Coalpit Lane and the A1. This is a major drinking water pipeline approximately 500mm in diameter. The alignment of the link road over the A1 has been designed to pass over this pipeline and Anglian Water have confirmed that this will be acceptable without alteration to the pipeline. A protective concrete slab will be needed. Version 1 and 1 (modified) will require further protection to this main where it passes beneath the proposed northbound slip road taper. Some disturbance of telephone cables along the main carriageway is also expected. Some diversion works are likely to facilitate construction of the new slip roads and bridge.

4.2 Structures

4.2.1 A1 Bridge

4.2.1.1 The only principal structure required will be the bridge over the A1. The design of the bridge will be subject to a full options review process, but at this stage it appears likely that a new bridge over the A1 will be appropriate. The structure will be similar for each option. For Versions 1 and 2, the bridge will be in the same location, the key difference being that for Version 2 the bridge will need to span the northbound entry slip road in addition to the main carriageway and southbound exit slip road. The bridge will be a minimum length of around 56m for Version 1 and around 60m for Version 2. In each case the skew will be approximately 26°. Version 1 (modified) allows this to be reduced to around 10° and the length reduces to a minimum of approximately 53m.

4.2.1.2 It is anticipated that the structure will be founded on the Sherwood Sandstone Group using spread foundations. Presumed allowable bearing values are 200-350 kN/m² for the Weathered Sherwood Sandstone Group and 2.5-3.0MN/m² for the underlying Un-weathered Sherwood Sandstone Group. The bridge is likely to be founded in the top of the weathered sandstone, with any overlying made ground being removed. The safe bearing capacity is sufficient for spread (pad) foundations to be adopted, with acceptable levels of settlement over the design life of the structures. Piled foundations are not expected to be necessary. Piles may be beneficial where necessary to provide greater flexibility for full height integral abutments.

4.2.1.3 The differing scheme versions are not likely to influence the structural form of the bridge superstructure. Single, two or three spans could be utilised for any of the three options. A single span is unlikely as the significant span would result in a deeper deck. The three span layout with piers in each verge and a clear span over the main carriageway is unlikely to work, again due to the width of the central reserve. The likely solution will be a 2 span layout with a pier in the central reserve, offset towards the southbound carriageway in order to minimise impact on the northbound carriageway sight lines. Steel beams with an in-situ concrete deck will be the likely form of construction. Abutments could be full height at the back of the main carriageway verge or set back to improve the open aspect of the bridge. A fully open aspect with bank seats set back from the main carriageway is unlikely due to the proximity of the roundabout on the northern side.

4.3 Departures from Standard

4.3.1 Main Carriageway

- 4.3.1.1 The existing alignment of the main A1 carriageway was not designed to current highway geometry standards. The proposal to reintroduce the national speed limit will require a careful evaluation of the existing geometry against current standards as the limited scope of the proposed junction improvements does not extend to a realignment of the A1. The introduction of new slip road merges and diverges to the current alignment is likely to require some mitigation in the form of auxiliary lanes or additional lane width.

5 Environmental Assessment

5.1 Baseline Conditions

5.1.1 Air Quality

Local Sensitive Receptors

5.1.1.1 There are 146 and 140 properties within 200m of Version 1 and 2 respectively. One sensitive receptor was identified within the vicinity of the proposed scheme. This is Elkesley Primary and Nursery School which is located around 300m from the nearest point to the proposed development.

Review and Assessment of Air Quality

5.1.1.2 A review of Bassetlaw District Council's (BDC) Air Quality reports: Review and Assessment Report: Updating and Screening Assessment (USA) (2006) and Air Quality Progress Report (AQPR) (2007) revealed the following:

- There are no Air Quality Management Areas (AQMAs) within the District;
- The Air Quality Objectives for PM₁₀ are unlikely to be exceeded; and
- Despite NO₂ unlikely to exceed the Air Quality Objective limit (40µg/m³), it has been identified that areas adjacent to busy roads and junctions are more susceptible to exceedences. As a result a network of diffusion tubes has been installed.

5.1.1.3 The 2007 AQPR confirmed that the 2005 NO₂ conclusions remain valid despite a correction of monitoring results.

5.1.1.4 The Environment Agency website¹ indicates that there are no Part A1² authorized processes within a 10 km² centred on the proposed development.

Existing Continuous Local Air Quality Monitoring Data

5.1.1.5 There are no continuous monitoring units within the District for NO₂ and PM₁₀ however there has been an extensive network of diffusion tube monitoring locations for several years.

5.1.1.6 Two diffusion tube locations within the vicinity of the site (as detailed in Table 5.1) have been selected for the purpose of this study as they are deemed to be representative of air quality on associated local road links. Twelve (12) months data for 'Diffusion Tube B' are currently unavailable, therefore in accordance with Local Air Quality Management Technical Guidance Note 3 (LAQM.TG(03)) an Annual Mean Equivalent has been estimated.

¹ <http://www.environment-agency.gov.uk> – Accessed 22/01/2008

² Large scale industrial processes requiring authorisation from the Environment Agency.

Table 5.1: Summary of Diffusion Tube Monitoring Locations

	OS Grid Ref	Location	Distance from Site	Period Mean ($\mu\text{g}/\text{m}^3$)	Annual Mean ($\mu\text{g}/\text{m}^3$)	Data Capture (%)
A	468515, 375695	Elkesley A1 (Lamp 93)	Within 700m	-	46.2	100
B	468508, 375689	Elkesley A1 (Lamp 95)	Within 700m	33.9	41.9 (Equivalent)	75

Note: Concentrations are not bias corrected.

- 5.1.1.7 Bias correction values between 0.91 and 1 reduce measured concentrations between 0-9 percent. Therefore by taking a conservative approach it can be assumed that Annual Mean concentration will remain unchanged after consideration of the bias correction value. Consequently, the Air Quality Objective limit for NO_2 ($40 \mu\text{g}/\text{m}^3$) is likely to be exceeded at both roadside locations.
- 5.1.1.8 While exceedences of Air Quality Objectives as monitored in 2007 have been identified, it is anticipated that by 2011 concentrations are likely to reduce below the objective limit due to improvement in technology. Consequently, a Detailed Assessment is unlikely to be required.

Background Pollution Concentration Estimates

- 5.1.1.9 Predictions of total pollutant concentrations comprise contributions from local emissions sources (such as roads, chimney-stacks, etc.) and local background concentrations. BDC does not have any monitoring units at background locations. Therefore, in the absence of any local background monitoring data, LAQM.TG(03) recommends the use of empirically-derived national background estimates available from the National Air Quality Information Archive (NAQIA)³.
- 5.1.1.10 Estimated Annual Mean background concentrations for NO_x , NO_2 , and PM_{10} at Elkesley (Grid Reference 468500, 375500) are provided in Table 3.2. These values are representative of the whole study site. Background estimates for NO_x are presented, as they are required in the conversion of modelled NO_x concentrations to total Annual Mean NO_2 . Concentrations have been factored forward/backwards to those years considered in this assessment, using scaling factors provided in LAQM.TG(03) and are shown in underlined italics.

³ <http://www.airquality.co.uk/archive/laqm/tools.php?tool=background>.

Table 5.2: Estimated Annual Mean Background Concentrations in the vicinity of the proposed scheme ($\mu\text{g}/\text{m}^3$)

Location 468500, 375500	NO _x ($\mu\text{g}/\text{m}^3$)	NO ₂ ($\mu\text{g}/\text{m}^3$)	PM ₁₀ ($\mu\text{g}/\text{m}^3$)
2006	<u>19.53</u>	<u>15.23</u>	<u>19.49</u>
2007	<u>18.72</u>	<u>14.83</u>	<u>19.16</u>
2010	15.70	12.30	18.20
2011	<u>15.22</u>	<u>12.08</u>	<u>18.02</u>

5.1.1.11 The above table shows that the Annual Mean background concentrations for all years concerned are below the objectives for NO₂ and PM₁₀ ($40\mu\text{g}/\text{m}^3$). This could be due to the fact that background concentrations for regulated pollutants are expected to decline in future years as a result of Government and European Union policies and legislation to reduce pollution emissions and expected improvement in car technology.

5.1.2 Cultural Heritage

5.1.2.1 The study area for the assessment comprises a zone extending 1km to either side of the proposed A1 Elkesley Junction Improvements. This area forms a swathe of landscape dominated by agricultural land, which also contains the village of Elkesley, portions of West Drayton and the Retford (Gamston) Airfield. Historically the study area encompasses land within the townships of Elkesley, Babworth, Gamston, Bothamsall and West Drayton.

5.1.2.2 The topography of the study area is largely conditioned by the presence of the Rivers Poulter, Idle, Maun and Meden, which converge east of the village of Elkesley close to the route of the A1. These rivers, particularly the River Poulter, have created shallow river valleys, which are surrounded by a series of low hills rising to a maximum height of c. 55m Above Ordnance Datum (AOD).

5.1.2.3 Nottinghamshire County Council has undertaken a Historic Landscape Characterization (HLC) study as a means of mapping the historic dimension of the present environment of the county. Within the study area this assessment identified six HLC types, namely park and garden; regular geometric; irregular geometric fields; semi-irregular fields; reflecting open fields; and modern modified fields. The HLC types which abut the A1 include: regular geometric fields, irregular fields and modern modified fields in the western portion of the study area; modern modified fields in the central portion of the study area; and semi-irregular fields and park and garden in the eastern portion of the study area.

5.1.2.4 Within the study area a total of 56 cultural heritage assets comprising either archaeological remains or historic buildings have been identified by the present assessment.

5.1.2.5 There are no Scheduled Ancient Monuments, Conservation Areas or Historic Parks and Gardens within the study area.

5.1.2.6 There are seven Listed Buildings within the study area, of which six are Grade II and one - St Giles' Church is Grade I. These are all located within the village of Elkesley.

5.1.2.7 The study area also contains nine buildings which are considered of local historical and architectural significance by Nottinghamshire County Council.

5.1.2.8 Within the study area there are three hedgerows which meet criterion 1 of the archaeological and historical criteria for the classification of Important Hedgerow given in

Schedule I, Part II of the Hedgerow Regulations 1997, that is a hedge is classified as 'Important' where it marks the boundary of one or more historic parishes or township, 'historic' in this context meaning existing before 1850. The identification of such hedgerows is based on early mapping for the surrounding townships of Bothamsall, West Drayton, Babworth and Eaton; there is no tithe award or early township map for Elkesley itself.

- 5.1.2.9 The western portion of the study area also contains numerous cropmarks. These cropmarks have been identified through aerial photography and were initially identified and mapped by Riley in the late 1970s⁴ and later in the 1980s and 1990s by the Royal Commission on the Historical Monuments of England (RCHME). Although the identification and in turn distribution of these cropmarks are conditioned to some extent by geological and pedological conditions, as well as by modern land use and weather conditions, they suggest that an extensive buried late prehistoric and Romano-British landscape is found to the west of the village of Elkesley. It is also possible based on the linear morphology of the cropmarks that these buried remains extended eastwards, across the areas of the proposed bridge and junction improvements, towards the Rivers Poulter and Idle. This is supported by reports of Roman pottery and coins discovered in a field to the north of the A1 (Site 1f – Figure B3) and by an Iron Age saddle quern which was recovered from a field located between Coal Pit Lane and the A1 (Site 55 – Figure B3).
- 5.1.2.10 The cropmarks appear to be largely formed through the presence of buried ditches, which form a series of regular and irregular enclosures, track ways and settlement nuclei (Sites 1 and 1e – Figure B3). In the western portion of the study area these enclosures form a north-south swathe that is bisected by the present course of the A1. These types of enclosures are relatively common in North Nottinghamshire and South Yorkshire and excavation suggests that elements of these may date to the latter part of the first millennium BC and/or the Romano-British period⁵. Moreover, within the study area an archaeological trial trench was excavated across one of the enclosures (Site 1d – Figure B3) which exposed two boundary ditches associated with Romano-British pottery dating to the middle and latter part of the Roman period.⁶ These features were located at a depth of c. 0.3m below the present ground surface.
- 5.1.2.11 Early medieval activity within the study area is represented by a Viking pin found at Elkesley Wood to the south-east of the village (Site 55 – Figure B3).

5.1.3 Disruption due to Construction

- 5.1.3.1 The majority of the study area is primarily under agricultural land-use. Inventories of archaeological / cultural, ecological and watercourse sensitivities are set out in the following sections.

⁴ Riley, D N (1980) Early Landscapes from the Air: Studies of Crop Marks in South Yorkshire and North Nottinghamshire, Sheffield, University of Sheffield.

⁵Bishop, M (2000a); An Archaeological Resource Assessment of the First Millennium BC in Nottinghamshire, www.le.ac.uk/archaeology/east_midlands_research_framework and Bishop, M (2000b) An Archaeological Resource Assessment of Roman Nottinghamshire, www.le.ac.uk/archaeology/east_midlands_research_framework

⁶ Samuels, J, & May, J (1980) 'The excavations' in D N Riley, 73-81.

Receptors

5.1.3.2 Receptors as defined by the Design Manual for Roads and Bridges (DMRB) (www.standardsforhighways.co.uk) within the study area likely be affected include:

- Residents within 100m of the anticipated working areas and along access routes for construction vehicles and materials
- Ecological resources;
- Archaeological and cultural features; and
- Water resources.

Residential and Commercial Properties

5.1.3.3 There are 68 and 56 residential properties within 100m of Version 1 and Version 2 respectively. No sensitive receptors (e.g. schools, hospitals) were identified within 100m of either option. Only 1 commercial property, a row of garages on Coal Pit Lane, was identified within 100m of either option.

Ecological Receptors

5.1.3.4 There are no ecologically designated sites within the prescribed study area. No protected species or habitats were identified in the study area. The habitats consists of arable, semi-improved, improved and amenity grasslands bordered by hedgerows, many contain mature tree species including oak, sycamore and silver birch.

Archaeological and Cultural Heritage

5.1.3.5 Evidence of cropmarks have been found at four locations to the west of the study area along with an important hedgerow. Eight non statutory sites are also within 100m of Version 2 while an additional feature; a Grade II listed building Brown's Cottage is located within 100m of Version 1. An Iron Age quernstone is reported to have been found in the field between the A1 and Coal Pit Lane.

Water Resources

5.1.3.6 The study area is located within a groundwater source protection zone. The nearest water body is River Poulter located about 1km east of the A1. Several drains are located along the edge of the A1 to the south east of the study area. No ponds were identified within the study area.

Landscape Features

5.1.3.7 No prominent landscape features were identified in the study area.

5.1.4 Ecology and Nature Conservation

Statutory Designated Sites

5.1.4.1 No statutorily designated sites have been identified within 2km of the study area.

Non-statutory Designated Sites

- 5.1.4.2 NBGRC provided records of three local wildlife sites (SINCs) occurring within 1km of Elkesley. These are Poulter Valley Plantation located south of Elkesley at grid reference SK 677746; West Drayton Woodland located at grid reference SK 697751 which surrounds the River Poulter to the south east; and Dover Holt Wetland which can be found at SK 701757 located to the north east of Elkesley.

Habitats

- 5.1.4.3 The various habitats identified during the field survey are shown in Figure B4 and are described below.

Overview

- 5.1.4.4 The study area is largely flat with few gently undulating hills with small scattered woodlands. The habitats include arable, semi-improved, improved and amenity grasslands bordered by hedgerows, many containing mature tree species including oak *Quercus sp.*, sycamore *Acer pseudoplatanus* and silver birch *Betula pendula*. There are also small stands of alder *Alnus glutinosa* and larch *Larix decidua*.
- 5.1.4.5 There are occasional areas of plantation and semi-natural broad-leaved and coniferous woodland interspersed throughout the area. There are two watercourses in the area; the River Poulter running broadly west-east to the south of the survey area into a confluence with the River Idle (to the north-east of Elkesley village).

Cultivated and arable land

- 5.1.4.6 Arable land is the most abundant habitat within the survey area. Many areas have been used for crops such as sugar beet and grassland leys.

Habitats of Local Value

Hedgerows

- 5.1.4.7 The study area contains numerous hedgerows bordering the arable and semi/improved grasslands and also bordering the A1. Typical woody hedgerow species present include hawthorn *Crataegus monogyna*, ash *Fraxinus excelsior*, sycamore, oaks, holly *Ilex aquifolium*, bramble *Rubus fruticosus agg.*, dog rose *Rosa canina* and blackthorn *Prunus spinosa* with occasional gorse *Ulex europaeus*, elder *Sambucus nigra*, hazel *Corylus avellana*, honeysuckle *Lonicera periclymenum* and ivy *Hedera helix*.
- 5.1.4.8 During the field surveys in 2003, 34 hedges were assessed using the Hedgerow Evaluation and Grading System (HEGS); 12 of these hedgerows were considered to be of nature conservation value. None of the hedgerows within the proposed scheme footprint were assessed as being of high nature conservation value.
- 5.1.4.9 Hedgerows are a UK BAP priority habitat. The majority of the hedgerows within the survey area are assessed as being of value within the immediate zone of influence only, although they may also be of value for certain faunal species such as bats and nesting birds. The hedgerows of greatest species and structural diversity are likely to be of value at the **local** level.

Broad-leaved woodland

5.1.4.10 Areas of broad-leaved woodland occur towards the west and east of the survey area, mainly south of Elkesley village. Most of the woodlands here appear to be of semi-natural origin and could potentially be remnants of ancient woodland (Ancient woodland is land that has been continuously wooded since at least AD1600). West Drayton Woodland SINC occurs within the survey area (but outside the area of the proposed scheme) bordering a section of the River Poulter (SK 697751). The woodlands within the survey area are typically assessed as being of value at the **local** level. All areas of woodland may also be of value for certain faunal species such as birds, bats and badgers.

Watercourses

5.1.4.11 The River Poulter flows from the south of Elkesley village bordered by semi-improved grasslands and plantation woodlands, until it joins the River Idle to the north-east of the village. The River Idle is heavily vegetated on both sides of the banks containing a variety of trees, shrubs, tall ruderal vegetation, reeds and herbs. Due to their value in terms of habitat connectivity and their intrinsic value, the watercourses are assessed as being of value at the **local** level although they may also be of value for certain faunal species such as otters and bats.

Habitats of value within the immediate zone of influence only

Grassland

5.1.4.12 Semi-improved grasslands are mainly located to the south and along the verges of the A1. A few of the semi-improved fields were grazed by sheep and horses and were generally species poor. Improved grasslands (located mainly in areas south of the River Poulter) consisted of species such as perennial rye-grass *Lolium perenne* and cock's-foot *Dactylis glomerata*. Tall ruderal herbs were interspersed around the survey area, many within the grasslands and included species such as rosebay willowherb *Chamerion angustifolium*, common knapweed *Centaurea nigra* and common nettle *Urtica dioica*.

5.1.4.13 Amenity grasslands such as playing fields are characterised by regularly mown amenity grassland and are typically species poor consisting of species such as perennial rye-grass *Lolium perenne*, cock's-foot *Dactylis glomerata* and daisy *Bellis perennis*. The grasslands within the survey area are assessed as being of value **within the immediate zone of influence only** although they may also be of value for certain other faunal species such as bats.

Scattered trees

5.1.4.14 Many scattered trees can be found throughout the survey area and several could potentially support bat roosts. Typical woody species present include horse chestnut *Aesculus hippocastanum*, Scot's pine *Pinus sylvestris*, larch, oak *Quercus sp.*, silver birch *Betula pendula* and field maple *Acer campestre*.

5.1.4.15 Scattered trees are present on both verges of the A1, including within the proposed scheme footprint. An area on the northbound verge within the scheme footprint consists of semi-mature trees including horse chestnut *Aesculus hippocastanum* and aspen *Populus*

tremula. The scattered trees are assessed as being of value **within the immediate zone of influence** only.

Plantation woodland

5.1.4.16 There are two distinct areas of plantation woodland bordering the River Poulter immediately east of Elkesley village. An area of riparian coniferous plantation woodland is located to the south of the broad-leaved section (SK 689750). It appears there is additional planting of broad-leaved species around the eastern edge of the woodland, but this area was not fully accessible for survey. The plantation woodlands are assessed as being of value **within the immediate zone of influence** only.

Scrub

5.1.4.17 Within the study area scrub is largely restricted to scattered patches along watercourses and fence lines etc. Typical species include hawthorn, bramble, elder and willow. The scrub is assessed as being of value **within the immediate zone of influence** only.

Fauna

Species of Local Value

Amphibians and reptiles

5.1.4.18 Some of the habitats accessed during the initial walkover appear to be suitable for reptiles and it is possible that populations of reptiles such as common lizard *Zootoca vivipara*, slow worm *Anguis fragilis* and grass snake *Natrix natrix* (all of which are UK BAP priority species) could be present within these habitats including the verges of the existing A1.

5.1.4.19 If present, populations of amphibians and reptiles could potentially be of at least **local** value.

Otter *Lutra lutra*

5.1.4.20 Otter have been recorded from the wider area (from SK67 10km grid square) and it is considered likely that they use the watercourses in the vicinity of scheme area, although no evidence of otter was recorded during the survey in 2003. During the 2007 field survey it was noted that the banks of the River Poulter are densely covered in vegetation that could be particularly suitable for holts and resting places. The survey area is assessed as potentially being of value at the **local** level (or higher) for otters.

Breeding and wintering birds

5.1.4.21 Species recorded incidentally during the field survey in 2007 include common farmland species such as wren *Troglodytes troglodytes*, pied wagtail *Motacilla alba*, robin *Erithacus rubecula*, blackbird *Turdus merula*, fieldfare *Turdus pilaris*, redwing *Turdus iliacus*, blue tit *Cyanistes caeruleus*, great tit *Parus major*, buzzard *Buteo buteo*, sparrowhawk *Accipiter nisus* and chaffinch *Fringilla coelebs*. Species recorded at Dover Holt Wetland adjacent to the River Poulter over 500m from the scheme area include mute swan *Cygnus olor*, widgeon *Anas penelope*, teal *Anas crecca*, little grebe *Tachybaptus ruficollis* and cormorant *Phalacrocorax carbo*.

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- 5.1.4.22 The habitats present are likely to support a species assemblage of birds typical of lowland farmland habitats, although it is possible that rare or scarce species are also present.
- 5.1.4.23 During the field survey in 2003 a kingfisher *Alcedo atthis* was recorded on the River Poulter, although no potential kingfisher nesting sites were identified. Kingfisher is listed on Schedule 1 of the Wildlife and Countryside Act 1981. No species which receive special protection through Schedule 1 of the Wildlife and Countryside Act 1981 are likely to breed within the survey area. Based on current information, the survey area is likely to be of value for breeding and wintering birds **within the immediate zone of influence** only, although if rare or scarce species are present, this could increase to **local** value.

Bats

- 5.1.4.24 In 2003 a daytime bat assessment was undertaken and any structures/features with the potential for bat roosts were highlighted although no suitable sites were identified at that time. Records of bats provided by NBGRC are known from the wider area, but at the time of writing no records of bats are known within the survey area.
- 5.1.4.25 During the 2007 field survey, numerous opportunities for bat roosts in mature trees were identified, including within the scheme area. The area of the proposed scheme may contain potential for roosting bats and the habitats within the study area provide good opportunities for foraging/commuting bats, e.g. tree and hedgerows. Several species of bat are UK BAP priority species including noctule *Nyctalus noctula*, soprano pipistrelle *Pipistrellus pygmaeus* and brown long-eared bat *Plecotus auritus*.
- 5.1.4.26 On current information, the survey area is assessed as likely to be of value **within the immediate zone of influence** only, although if bat roosts are found this value could increase to the local level or higher.

Water vole *Arvicola terrestris*

- 5.1.4.27 The nearest record of water vole was about 750m away (SK 691752), south east of Elkesley by River Poulter which provides suitable habitat for water voles. There are no suitable habitats for water voles within the study area and the presence of the village between the study area and river habitat acts as a deterrent for the movement of this species.

Badger *Meles meles*

- 5.1.4.28 The badger survey undertaken in 2003 revealed no evidence of badgers within the survey area. The field survey in December 2007 identified habitat of good quality both for foraging and sett construction within the wider area. Two setts were identified in the western part of the survey area approximately 0.5 to 0.7 km from the A1; a five-hole subsidiary sett; and an eleven-hole main sett (three of the holes were only partially used). The locations of these setts must remain confidential due to the threat posed by badger baiting should their location become widely known. It is likely that members of the same badger clan use both setts as they are less than 100m apart. A variety of tracks and signs were found near to each sett including badger prints, paths and a dung-pit. The survey area is assessed as being of value for badgers **within the immediate zone of influence** only.

White-clawed crayfish *Austropotamobius pallipes*

5.1.4.29 No records of crayfish have yet been received at time of writing and no specific surveys have been undertaken. Suitable areas exist along the River Poulter that could potentially support white-clawed crayfish.

5.1.5 Landscape

Countryside Character Areas

5.1.5.1 Countryside Agency's Character of England Map locates Elkesley within Sherwood Character Area. The key features of this area are:

- Rolling landforms with numerous dry valleys;
- Large amount of woodland, particularly oak – birch broad-leaved woodland and conifers;
- Extensive, enclosed, arable farmlands with rectilinear field patterns divided by low, treeless hedges;
- Strong contrast between open arable fields and woodland;
- Strong heathland character, diminishing in north, often evident at roadsides and in woodlands;
- Parks and estates;
- Narrow river corridors with pasture, flood meadows and woodland, often in sharp contrast to the adjacent arable farmland; and
- Buildings of local sandstone with older building materials being generally red brick and pantile.

Local Character Areas

Area A: Open Undulating Arable Farmland - Grade 3 Good Quality Landscape

5.1.5.2 To the north and east of the A1 corridor lies an open, flat, intermediate scale arable landscape of good quality punctuated by rivers and settlements. Regular medium sized fields are bounded by well maintained predominantly thorn hedges, with occasional blocks of woodland. An over-mature pine windbreak is a very distinctive and characteristic feature of the more open arable landscape. The area is considered to be of high sensitivity with limited capacity to accommodate change.

Area B: Gamston Aerodrome – Grade 5 Poor Quality Landscape

5.1.5.3 The southern part of the area comprises light industrial land uses adjacent to the A1 corridor. All traces of the surrounding landscape pattern have been removed in the creation of the aerodrome although part of the site is designated a local nature conservation site. This area of open grassland and arable crops with concrete run way is considered to be of low sensitivity with capacity to accommodate change.

Area C: Dominant A1 Corridor and Associated Land Uses – Grade 5 Poor Quality Landscape

- 5.1.5.4 The A1 corridor cuts a swathe through the landscape and the section past Elkesley is also lit and particularly intrusive. High traffic volumes result in a very unpleasant external environment and crossing the carriageway at the junction is difficult and dangerous.
- 5.1.5.5 Occasional derelict commercial premises exacerbate the sense of degradation that the northern edge of the village portrays. The area is considered to be of low sensitivity with considerable capacity to accommodate change.

Area D: Reclaimed Tips and Old Workings – Grade 4 Ordinary Quality Landscape

- 5.1.5.6 Locally elevated lands approximately 1.5km to the southeast of Elkesley and comprises former tips and mine workings. The grassed slopes are steep and are not broken with hedges or trees and lack structure. The River Meden flows through the landscape and has been straightened in places. The area is considered to be of moderate sensitivity with some capacity to accommodate change.

Area E: River Corridors and Settlements – Grade 2 Very Attractive Landscape

- 5.1.5.7 A generally smaller scale and enclosed landscape characterized by the meandering river valleys and nucleated settlements located just on higher ground above the rivers.
- 5.1.5.8 Enclosure is provided by blocks of woodland and local ridgelines between the river valleys of the Poulter, Meden, Maun and Idle. The area is considered to be of high sensitivity with limited capacity to accommodate change.

Area F: Enclosed Arable Farmland – Grade 3 Good Quality Landscape

- 5.1.5.9 The landscape to the west of Elkesley village is also smaller scale with blocks of woodland enclosing arable farmland. The area is considered to be of moderately high sensitivity with limited capacity to accommodate change

Visual Amenity

- 5.1.5.10 The site will not be visible outside this area or will be very difficult to perceive. The Zone of Visual Influence (ZVI) for the grade separated junction at Elkesley is illustrated in Figure B5. (The ZVI has been combined for Versions 1, 1(modified), and 2 as their visual envelopes are almost identical).
- 5.1.5.11 The ZVI for the proposal broadly extends towards existing woodland blocks and landform. It extends furthest to the north due to the openness of the undulating landscape to the north. To the south the smaller scale landscape with numerous field boundary hedges and hedgerow trees and more varied landform restrict the visual envelope which extends to generally less than 1km.
- 5.1.5.12 Views from settlements, public rights of way and properties are described below for each version (see Appendix D for viewpoints):
- 5.1.5.13 The elevated over-bridge and embankments associated with the new grade separated junction (GSJ) will be visible mainly to the north and northeast of Elkesley extending to approximately 1km to Jockey House in the north and across half of the Gamston

Aerodrome. However, the properties to the north west of the proposals on Jockey Lane are well screened by perimeter vegetation. A coniferous hedge approximately 2.5m high screens all ground window views from Jockey House (viewpoint 4), and a 3m high hedge and tree planting screens The Gables house (viewpoint 7).

- 5.1.5.14 Views from Gamston to the east and Bothamsall to the south are screened by the intervening landform and blocks of woodland.
- 5.1.5.15 Properties on Pepperly Rise on the western edge of Elkesley village will have direct views of the grade separated junction embankments and link road (Viewpoint 10) whilst those on Headland Avenue will have oblique and increasingly limited views with distance from the screening properties on Coal Pit Lane. Properties on the edge of the High street (Blacksmith Cottage opposite the existing A1 junction and Holly Cottage on the corner of the existing junction) will also have direct views of the new junction. There will be oblique and restricted views from properties on the western end of the High Street.
- 5.1.5.16 The warehouses and light industry on the north western side of the A1 would have views of the proposals however these buildings are warehouses with no windows therefore no views. This area in the Bassetlaw plan has been identified as a possible area for employment allocation and potential new buildings would have views of the proposals.

Views from Public Rights of Way

- 5.1.5.17 Restricted views of the Grade Separated Junction and embankments will be evident through tall gappy vegetation from Cross Lane (Sandy Lane) (viewpoint 14) to the west. This is a 4m wide gravel Byway lined with historic hedgerows on raised banks. Views eastwards through the vegetation are generally long distance over rolling countryside with groups of trees on hill tops. Man made features, including a cooling tower and communications mast, are visible on the distant skyline.
- 5.1.5.18 Brough Lane is also a Byway and consists of a 3 m wide track surfaced in a poor quality concrete wearing course. Brough Lane is lower lying than Cross Lane (Sandy Lane) and therefore views of the proposed junction are unlikely due to the topography and field boundary vegetation (viewpoint 15). There are long distance views from Brough Lane southwards towards the River Poulter.
- 5.1.5.19 There is one footpath that passes through Elkesley village. It starts at the high Street and heads south, out of the village into open pasture. It crosses Brough Lane and heads to Elkesley woods. All views towards the proposed junction from this footpath are blocked by buildings and tree canopies. (Viewpoint 18).

Key Visual Receptors

- 5.1.5.20 The key visual receptors identified for Options 1 and 2 are listed below:
- Jockey House, 1km to north of Elkesley (viewpoint 4);
 - Timber yard / Industrial Estate north of existing Jockey Lane / A1 junction;
 - The Gables, north of existing Jockey Lane / A1 junction (viewpoint 7);
 - Jockey Lane (viewpoint 1);
 - Cross Lane (Sandy Lane) Byway, south of Jockey Lane / A1 junction (viewpoint 14);

-
- Brough Lane Byway, south of Elkesley Village (viewpoint 15);
 - Properties on Pepperly Rise (Coal Pit Lane) (Viewpoint 10);
 - Properties at the northern end of Headland Avenue;
 - Properties on the High Street (viewpoint 29);
 - Footpath south of Elkesley (viewpoint 18);
 - Housing allocation H37 Top Farm; and
 - A1 (T) corridor (viewpoint 39).

Byways

5.1.5.21 There is evidence that the Byways along Cross Lane (Sandy Lane) and Brough Lane are used by the dog walkers and horse owners in Elkesley. They also provide valuable links to the network of public footpaths and bridleways in the area, namely the footpaths leading south to the woods along the River Poulter and beyond.

5.1.6 Land Use

5.1.6.1 Land within the study area is primarily under arable agricultural use. Other land uses are residential and commercial. The village of Elkesley is the principal area of residential use, houses on Coalpit Lane being closest to the proposed works. Principal commercial land use within the study area consists of a wood processing plant (Plevins) on Coalpit Lane, a timber and scrap metal yard located about 260m from the A1 on Jockey Lane and Gamston Airfield on the northern side of the A1. Other commercial properties include a café, a pub, and a post office in the village of Elkesley.

5.1.6.2 Data gathered from the Agricultural Land Classification (ALC) map of England indicates that land classification for farmland in the study area is of Grade 3; good to moderate agricultural quality. At present the ALC map does not differentiate between grade 3a and 3b land quality. Fields are generally medium to large and irregularly shaped and most share a boundary with the A1.

5.1.6.3 The only sensitive receptor identified is Elkesley Primary and Nursery School located within the heart of the village, around 300m away from the nearest works at the junction of Coal Pit lane and the A1.

5.1.6.4 During this assessment, no approved or proposed development was identified in the study area.

5.1.6.5 The wider network of footpath consists of a track located to the west of the study area. This track, as identified on the Bassetlaw area map, runs adjacent to the River Poulter from the A614 and links up with Cross Lane (Sandy Lane).

5.1.7 Traffic Noise and Vibration

Noise

5.1.7.1 Do-Minimum noise levels have been predicted for 2026 at potentially sensitive receptor locations within 300m of the existing A1 and the proposed route options which are likely to

be affected. Table 5.3 contains the predicted noise levels for the Do-Minimum scenario in 2026. Figure B3 shows the location of these receptors.

Table 5.3: Predicted noise levels for do-minimum 2026 scenario

I.D	Receptor	Distance from Existing A1 (m)	Version 1 (m)	Version 2 (m)	Do-Minimum 2026 Calculated Noise Level LA10 18 hr dB(A) ⁷
R01	1 Pepperly Rise	275	25	25	68.7
R02	9 Coal Pit Lane	150	25	25	73.2
R03	Top Farm	80	25	25	74.8
R04	The Gables, Jockey Lane	170	75	75	72.1
R05	The Bungalow, Jockey Lane	275	177	177	66.4
R06	1 High Street	80	40	40	75.1
R07	14 Holly Bush Close	25	50	50	84.5
R08	1 Robinson Close	100	75	75	72.1
R09	Tea Table Cottage	30	23	23	82.7

Vibration

5.1.7.2 The advice on the prediction of vibration impacts contained in the DMRB is restricted to properties within 40m of the road where there are no barriers and advises that care is required when assessing the potential disturbance beyond this distance. There are 28 properties within 40m of the proposals.

5.1.8 Pedestrians, Cyclists, Equestrians and Community Effects

5.1.8.1 The number of public rights of way (PROW) in the land surrounding Elkesley is low (Figure B1).

5.1.8.2 One national trail, two Byways and one Footpath make up the non-motorised users network. Cross Lane (Sandy Lane) located west of the village of Elkesley is a Byway that extends from Coal Pit Lane to the A1

5.1.8.3 PROW 2 (national trail) and 4 (Byway) are located a sufficient distance from the A1 as to not be impacted upon by the proposed A1 improvements. PROW 3 is a footpath that extends from Brough Lane down to the A1 southern boundary.

5.1.8.4 The current A1 layout provides a barrier to non-motorised users (NMUs) between Elkesley and Gamston / Eaton. As a result of this, the community at Elkesley is isolated and dependent on motorised links via the busy A1. It is a dual carriageway Trunk Road and hence not suitable for cycling. A number of quiet roads to the north and south of Elkesley

⁷ Noise level calculated at most exposed façade

are suitable for cycling however these are not readily accessible from one another due to the presence of the A1⁸.

- 5.1.8.5 A number of community facilities have been identified within Elkesley. The closest facility to the proposed junction improvement is Elkesley Primary and Nursery School which is located off Headland Avenue, off Coal Pit Lane. Other community facilities within Elkesley include St. Giles's Church, the Old Vicarage, Elkesley Village Hall, Robin Hood public house, and the post office.

5.1.9 Vehicle Travellers

The View from the Existing Road

- 5.1.9.1 The study area is divided into six (6) local character areas namely:
- open undulating arable farmland; medium sized fields bounded by well maintained thorn hedges in an area of good landscape quality;
 - Gamston Aerodrome, area of open grassland and arable crops with a concrete runway located to the north of the study area of poor landscape;
 - A1 corridor, of poor landscape quality dominated by high traffic volumes and the occasional derelict commercial properties;
 - Reclaimed tips and old workings, located 1.5km to the southeast of Elkesley consisting of grassed slopes and the River Meden, land of ordinary quality;
 - River Corridors and settlements, enclosed landscape characterized by river valleys and nucleated settlements of very attractive landscape and
 - Enclosed arable farmland to the west of Elkesley village comprising blocks of woodland enclosing arable farmland of good landscape quality.
- 5.1.9.2 Landscape character of the existing A1 can be summarized as semi-rural landscape on moderately undulating landform. Views from the A1 are restricted by tall hedgerows to the north with open sections of arable farmland. To the southwest of the study area, views are restricted by tall trees with large canopies and thick hedgerows. Further north views of rolling arable land become open.
- 5.1.9.3 Drivers currently using Coalpit Lane are afforded a mixture of intermittent and restricted views of the landscape to the north, with tall unmanaged hedgerows acting as visual barriers. To the south, views from the road consist of wide managed lawns and semi-detached houses with well kept hedges. Beyond the village there are no views of the wider landscape on either side.
- 5.1.9.4 Drivers approaching the junction of the A1 and High Street experience open views of the road ahead and approaching traffic. Prominent in the sight lines are signs, safety fences and lighting columns. Views from the southbound A1 carriageway consists of open, flat

⁸ Cycling in Bassetlaw: including Workshop & Retford Town Maps, Nottinghamshire County Council.

large fields with a boundary hedgerow of varying height which result in intermittent views of the landscape.

- 5.1.9.5 Views from the westbound carriageway at the proposed bridge location are restricted by a mixture of semi mature and mature trees and hedgerows. On the eastbound carriageway, views consist of open, flat crop land and managed hedgerows, the latter blocking longer views to properties in Elkesley.

Driver Stress

- 5.1.9.6 A number of factors associated with this section of the A1 contribute to driver stress:
- Limited lay-by provision
 - Frequent junctions and accesses
 - High traffic flows
 - High proportion of HGV traffic
- 5.1.9.7 Factors such as street lighting and clear signage ease matters and driver stress on the A1 has been judged to be **moderate**.
- 5.1.9.8 Traffic flows on Coal Pit Lane and High Street are very low and therefore driver stress along these roads is adjudged to be **low**.

5.1.10 Road Drainage and the Water Environment

Watercourses

- 5.1.10.1 The River Poulter rises just south of Worksop. When it reaches the Elkesley area it flows from the west to the east before turning north to join the River Idle. The River Poulter and the River Idle are both classified as main rivers at this point in the catchment.
- 5.1.10.2 In addition to these watercourses, there is a wet ditch within the site corridor that flows into the River Poulter just upstream of the A1 Twyford Bridge.
- 5.1.10.3 The existing drainage system splits at the high point just north of Jockey Lane so that most of the new drainage from the junction improvement works runs south towards the River Poulter. While the new drainage for the lay-bys to the north of the junction will drain north into the existing drainage.
- 5.1.10.4 Surface water courses across the study area are shown on Figure B1 (Appendix B).

Surface Water Resources

- 5.1.10.5 There are no ponds in the road corridor affected by any of the works being undertaken.

Surface Water Quality

- 5.1.10.6 The most appropriate Environment Agency (EA) monitoring point is located downstream of the proposed works site on the River Poulter upstream of the confluence with the River Idle. The monitoring point is at grid ref SK 69993.69, 75294.75. The results from this monitoring point are shown below.

Table 5.4: 2004 - 2006 Environment Agency Water Quality Data

EA Water Quality Data for River Poulter from Normanton Bridge to confluence of River Idle	
	Value or grade
River Quality Target	RE2 (Grade 2) <i>Marginal</i>
River Chemistry	
Biochemical Oxygen demand (BOD) mg/l (90 percentile)	4.34 <i>Grade C – fairly good</i>
Ammonia mg/l (90 percentile)	0.121 <i>Grade A – very good, natural ecosystems</i>
Dissolved Oxygen (DO) % saturation (10 percentile)	83.75 <i>Grade A – very good, natural ecosystems</i>
Overall Chemistry General Quality Assessment (GQA)	Grade C <i>Fairly good</i>
Nutrients	
Nitrates mg/l (mean)	27.49 <i>Grade 4 - Moderate</i>
Phosphates mg/l (mean)	0.23 <i>Grade 5 – very high</i>
River Biology	
NTAXA (observed/expected)	0.86 <i>Grade A – very good – biology is similar to that expected for unpolluted river</i>
ASPT (observed/expected)	0.91 <i>Grade B – good, biology is a little short of an unpolluted river</i>
Overall biology Grade	Grade B - good, biology is a little short of an unpolluted river

Source: Environment Agency Website

- 5.1.10.7 This water quality data shows that the river has a water quality target of Grade 2 (low presence of nutrients) to which it is marginally compliant meaning that some of the EA's targets were met.
- 5.1.10.8 The river chemistry has seen great improvements over the last 15 years. The grade of the river has risen in recent years from D in 2001 – 2003 to C in 2004 – 2006. The biochemical oxygen demand (BOD) is the parameter that has affected the river chemistry grading in different years since 1991. From 1991 - 1993 the BOD (90 percentile) was 9.13 mg/l that has steadily fallen to 4.34 in 2004 – 2006.
- 5.1.10.9 The nitrate level within the river has improved from grade 5 in 2002 - 2004 to grade 4 in 2004 - 2006. Overall nitrate level has fallen marginally from 33.01 mg/l (mean) in 2002 – 2004 to 30.85 mg/l (mean) in 2004 – 2006.
- 5.1.10.10 The phosphate level is grade 5 which is very high possible due to the agricultural activities taking place in the local area. There has been a minor decrease in the level of phosphate since 1998 from 0.35 mg/l (mean) to 0.23 mg/l (mean) in 2006.

5.1.10.11 The river is a biology grade B - good, meaning the biology is a little short of an unpolluted river. This is an improvement from 2000 when the first EA records are available, the river was then graded C due to the high average score per taxon (ASPT).

5.1.10.12 In accordance with the Water Framework Directive, the River Poulter is considered overall to be “at risk”. Risk assessment results for the River Poulter are as shown in the table below:

Table 5.5: Risk assessment results

Point source pollution	Diffuse source pollution	Water abstraction & flow regulation	Physical morphological alteration or	Alien species
At risk	At risk	Probably at risk	Probably at risk	Probably not at risk

Source: Environment Agency Website

Flood Risk

5.1.10.13 The study area is outside the flood risk area.

Groundwater/Hydrogeology

5.1.10.14 The Elkesley site sits over a solid geology of Sherwood Sandstones and pebble beds over the Lower Mottled Sandstone dating from the Triassic Period. This is underlain by Upper Permian Marl, Magnesian Limestone and Coal Measures.

5.1.10.15 The EA have established three groundwater source protection zones which aim to protect vulnerable aquifer sources. Information gathered by the EA shows that the site is located within groundwater protection zone 3 – total catchment. This zone is defined by the EA as “The total catchment is the total area needed to support removal of water from the borehole, and to support any discharge from the borehole.” This is illustrated in Figure B6. This identifies that the works along the A1 in Elkesley is split across 3 zones of groundwater vulnerability. These are Major Aquifer high vulnerability, Major Aquifer low vulnerability and Minor Aquifer low vulnerability. The main changes to the road layout occur in the Major Aquifer high vulnerability zone.

5.2 Environmental Effects

5.2.1 Air Quality

Operational Phase

Local Assessment (Simple Level)

5.2.1.1 Five receptor locations have been identified as the worse case receptors with concentration shown in the table below.

Table 5.6: Verified NO₂ and PM₁₀ Concentrations

	2007 Baseline		2011 Without Development		2011 With Development	
	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)
Receptor 1 (Version 2)	<u>40.7</u>	25.4	36.0	21.6	36.0	21.6
Receptor 2 (Version 2)	30.0	20.0	26.8	18.5	25.8	18.2
Receptor 3 (Version 1)	31.5	20.5	28.1	18.8	28.3	18.9
Receptor 4 (Version 1)	30.0	20.0	26.8	18.5	27.2	18.6
Receptor 5 (Version 1)	32.6	21.0	29.0	19.1	28.6	19.0

Exceedences of Air Quality Objective Limit are shown in underlined italics.

5.2.1.2 Table 5.6 shows the only exceedences to occur for NO₂ was at Receptor 1 during 2007. There are no exceedences for PM₁₀ at any of the assessed receptor locations. The significance of change in air quality as a result of the development at the assessed receptor locations range from not significant to neutral. Minor beneficial impacts would be felt around Receptor 2. See Appendix B: Figure B2 for the location of these receptors.

Regional Assessment (Simple Level Assessment)

5.2.1.3 The regional air quality assessment revealed an improvement in air quality in the range of 35% for NO_x for; improvement of about 43% for PM₁₀ and improvement of approximately 13% for C for Versions 1, 1 (modified), and 2.

5.2.2 Cultural Heritage

Construction Impacts

5.2.2.1 The impacts are considered firstly in relation to archaeological remains, secondly to historic buildings, and thirdly to the historic environment affected directly or indirectly by the options. The construction impacts are summarized in Table 5.7.

5.2.2.2 Cropmarks and artefactual evidence suggest that the areas of the proposed junction improvements may contain below ground archaeological remains dating to the prehistoric and Roman periods. Remains of these periods would be considered to be of Medium importance.

5.2.2.3 There is the potential for below-ground remains within the study area to be damaged or destroyed by a reduction or disturbance of ground levels. The causes of such an effect include topsoil stripping, and movement of machinery, as well as deeper engineering works for the bridge and road construction.

5.2.2.4 The known or potential impacts can be more closely identified as follows:

5.2.2.5 To the west of the junction of the A1 with Jockey Lane, proposed access routes cross the plotted and projected lines of prehistoric / Romano-British enclosures. Works for the

construction of these access routes have the potential for damaging or destroying below ground remains.

- 5.2.2.6 The plotted position of the cropmarks does not extend into the area of the proposed new bridge and its link roads from the A1, Jockey Lane and Coal Pit Lane (which will itself be widened to encroach beyond its northern boundary hedgerow). However, an Iron Age quernstone is reported to have been found in the field between the A1 and Coal Pit Lane (Site 55 - Figure B3) and given the linear morphology of the cropmarks it is possible that the buried remains of the enclosure system continue across the area of the proposed bridge and junction improvement, towards the Rivers Poulter and Idle. This could possibly be impacted upon by Version 1 and Version 1 (modified). Again works within this area have the potential for damaging or destroying below-ground remains. Because the extent of below ground remains in this area is at present unknown, it is not possible to say which of the two options would have the greater or lesser impact on the archaeological resource.
- 5.2.2.7 The proposed options will not have a direct impact upon the historic buildings within the study area. There may be an indirect impact on the setting of two Grade II Listed Buildings in Elkesley village in that the new road system between Coal Pit Lane and the A1, both during construction and while in operation, may intrude into the view of Brown's Cottage and Meadow Farmhouse looking at these buildings westwards along High Street. However, the level of impact is considered to be Negligible or Slight Adverse.
- 5.2.2.8 As plotted by the Nottinghamshire HLC, the area of the proposed new bridge and its link roads from the A1, Jockey Lane and Coal Pit Lane is one of modern modified fields. This landscape type also makes up nearly half of the areas alongside the A1 to be used for new access routes and lay-bys, with the remainder being classified as regular geometric fields and irregular geometric fields. The significance of the historic landscape which will be affected, either directly or by an alteration to its setting, during construction, is considered to be low and the level of impact to be Slight and Adverse.

Table 5.7: Construction impacts

Asset	Value	Magnitude of change	Significance of Effects
Archaeological Remains – Prehistoric / Romano-British enclosures	Medium	No change	Neutral
Historic Buildings- Grade II Listed Brown	Medium	Negligible/ Minor	Neutral / Slight Adverse
Historic Landscape	Low	Minor	Neutral / Slight Averse

- 5.2.2.9 At the time of the assessment no construction compound site had been identified, but it is possible that some of the land between the A1, the new link road and Coal Pit Lane may be used for the site office. This location might impact on the potential prehistoric/Romano-British archaeology within this area.
- 5.2.2.10 No borrow pits had also been identified at the time of the assessment and the potential impact in this regard is at present unknown.

Operational Impacts

- 5.2.2.11 Following construction, no further impact has been identified in the case of archaeological remains.
- 5.2.2.12 There may be an indirect impact on the setting of the Grade II Listed Brown's Cottage and Meadow Farmhouse but the magnitude of impact is considered to be Negligible or Minor.
- 5.2.2.13 The level of impact on the surrounding historic landscape during operation is considered to be Minor.

Table 5.8: Operational impacts

Asset	Value	Magnitude of change	Significance of Effects
Archaeological Remains – Prehistoric / Romano-British enclosures	Medium	Minor/Moderate	Slight/Moderate Adverse
Historic Buildings- Grade II Listed Brown	Medium	Negligible/ Minor	Neutral / Slight Adverse
Historic Landscape	Low	Minor	Neutral / Slight Adverse

5.2.3 Disruption due to Construction

- 5.2.3.1 Construction is anticipated to commence in the latter part of 2010 and take around 15 months to complete. There will be some direct impact on road users with carriageway restrictions and short term closures required for some construction activities.
- 5.2.3.2 A substantial amount of embankment construction material will need to be imported.
- 5.2.3.3 The main sources of dust and PM₁₀ during construction activities include haulage routes, vehicles and construction traffic; materials handling, storage, stockpiling, spillage and disposal; exhaust emissions from site plant; site preparation and construction processes.
- 5.2.3.4 Vibration impacts associated with construction activities such as earth moving are likely to generate relatively small levels of ground borne vibration and are not anticipated as significant.
- 5.2.3.5 Spread foundations for the bridge are anticipated and therefore any piling activities would be limited to temporary works.

Receptors

Residential and Commercial Properties

- 5.2.3.6 Potential construction impacts to residents identified in include a localised increase in noise, vibration, dust and dirt, visual impact and disruption to normal movement.
- 5.2.3.7 The DMRB recognises that beyond 100m less than 20% residents would be seriously disturbed by construction activities and related impacts. More residential properties would be affected during the construction of Version 1 than Version 2, however this is marginal.
- 5.2.3.8 Construction will cause some disruption to local residents. Site access for the bulk of the construction work can be made via the A1. However construction works on the

connections to the local road network will require traffic control. Version 1 (modified) will involve the least work on Coalpit Lane.

Ecological Receptors

5.2.3.9 A number of hedgerows would be lost leading to temporary open views of the construction corridor however these views would become closed considerably as replanted hedges mature. Version 1 (modified) reduces this impact

Archaeological and Cultural Heritage

5.2.3.10 The location of the crop marks does not extend into the area of the proposed bridge; however all versions propose the construction of new field accesses. Construction of these could impact upon buried remains within this area.

5.2.3.11 Version 1 and Version 1 (modified) have a higher potential than Version 2 to impact upon buried remains at the proposed location of the A1 High Street link road where an Iron Age quernstone is reported to have been found. At present, no predictions can be made as to the importance of any potential find.

Water Features

5.2.3.12 No water features would be impacted upon during construction.

Landscape Features

5.2.3.13 Version 1 and Version 1 (modified) would require the demolition of a row of garages on Coal Pit Lane. Version 1 would also bring about disruption in the normal use of the link road to Elkesley during construction of the running lanes of the new link. As compared to Version 2, where the link road could remain open during construction.

5.2.4 Ecology and Nature Conservation

5.2.4.1 Only features assessed as being of at least local value are considered in detail here.

Impact on designated nature conservation sites

5.2.4.2 Given the distance between the proposed scheme area and the nearest protected sites, no significant impacts are anticipated.

Impact on nesting birds

5.2.4.3 If undertaken during the bird nesting season, construction activity could result in the damage/destruction of birds' nests resulting in a significant impact in legal terms.

Direct habitat loss, damage of habitats and fragmentation

5.2.4.4 Construction will result in the direct loss of hedgerows and habitat fragmentation, potentially resulting in a significant impact at the local level.

Impact on watercourses and riparian fauna

- 5.2.4.5 Given the distance of the proposed scheme from the nearest watercourse, no significant impacts on any watercourses are predicted. Similarly, no significant impacts are predicted on any riparian fauna such as white-clawed crayfish, otters, water voles or riparian birds.

Impact on amphibians

- 5.2.4.6 Given that no water-bodies have been identified within 500 metres of the proposed scheme area, no significant impacts on amphibians are predicted.

Impact on reptiles

- 5.2.4.7 Given the presence of potentially suitable habitat along the verges of the A1, potential impacts on reptiles include killing, injuring and loss of habitat. The impact could be significant at the local level and in legal terms.

Impact on birds

- 5.2.4.8 Potential impacts associated with direct habitat loss for breeding birds; habitat fragmentation; and road kill are assessed as potentially significant at up to the local level although impacts could be significant within the immediate zone of influence only.

Badgers

- 5.2.4.9 Given the distance between the scheme area, the nearest sett and the nature of the proposed scheme, no significant impacts on badgers are predicted.

Bats

- 5.2.4.10 Given the presence of trees that could potentially support bat roosts within the scheme area, the loss of such trees could potentially be significant at up to the local level and in legal terms. The loss of potential bat foraging habitat such as hedgerows could also be significant at up to the local level. All options could result in habitat fragmentation for bats and possibly an increased rate of bat mortality through road kill which could result in a significant impact in legal terms and in nature conservation terms.

5.2.5 Landscape

- 5.2.5.1 All options require land take through areas of arable agriculture and boundary vegetation such as hedgerows, resulting in field severance and the loss of characteristic landscape features. The proposals will involve modifications to the existing A1 verges to accommodate new slip roads and sight lines for increased speeds to the national speed limit.
- 5.2.5.2 Both Versions 1 and 2 propose widening Coal Pit Lane to 7.3m. The junction with the new link road over the A1 would also require visibility splays to give adequate sight lines. A long length of hedgerow along the northern boundary of Coal Pit Lane would be lost. Version 1 (modified) would reduce this loss as a substantial length of Coalpit Lane will remain unaltered.

Version 1 - Grade Separated Junction and New Junction at Elkesley

5.2.5.3 With Version 1 the junction will be moved approximately 20m westwards and involve the removal of a block of garages and field boundary hedgerows. However the garages are not in keeping with the vernacular architecture of the village and detract from the setting of the surrounding landscape. The main landscape impacts are listed below:

- New bridge structure – elevated traffic would be more visible during the day;
- 1 new roundabout – large feature visible in the landscape;
- Significant earthworks / embankments conflict with undulating topography;
- Loss of field hedgerows – particularly around the new realigned junction with Coal Pit Lane and the High Street;
- Loss of agricultural land to the north and south of A1;
- Closure of lay-by – currently large number of lorries that park here and are a significant feature in the landscape (viewpoint 14 – Appendix D);
- 2 new junctions on Coal Pit Lane;
- Widening of Coal Pit Lane;
- Severance of several hedgerows some of conservation importance; and
- Localised effects on setting of residential properties on Coalpit Lane, High Street and Pepperly Rise.

5.2.5.4 Version 1 – the grade separated junction and new junction at Elkesley would result noticeable changes to the existing hedgerows closest to the village of Elkesley. The new embankments associated with the new features are at odds with the local landscape character and landform, however the proposals in Version 1 will have less of an impact on the village of Elkesley and the single slip road at the bridge site will create fewer changes to local landform and will be less visually intrusive than the proposals in Version 2. The loss of the block of garages would also have a slight beneficial impact on the landscape. Therefore the anticipated impact on the landscape character is considered to be in the order of **slight and adverse**.

5.2.5.5 Version 1 (modified) will have largely similar impact but with reduced effect on hedgerows.

Version 2 Grade Separated Junction with compact Dumbbell design

5.2.5.6 The main landscape impacts are listed below:

- New bridge structure – elevated traffic would be more visible during the day;
- 2 new roundabouts – large features more visible in the landscape;
- Significant earthworks / embankments conflict with topography;
- Loss of field hedgerow boundaries;
- Loss of agricultural land north and south of the A1;
- 1 new junction where proposal meets Coal Pit Lane;
- Widening of Coal Pit Lane;
- Closure of field boundaries along A1 and widening of A1 carriageway;

- Closure of lay-by – currently large number of lorries that park here and are a significant feature in the landscape (viewpoint 14); and
- Effect on setting of residential properties on, Coalpit Lane, Pepperly Rise and High Street (viewpoints 10 and 29).

5.2.5.7 The grade separated junction with dumbbell design would result in more noticeable changes to the existing landscape character. The creation of a slip road, a roundabout and embankments in the fields south of the A1 would detract from the setting of the western parts of the village of Elkesley. Therefore the impact on landscape character is considered to be **moderate and adverse**.

Table 5.9: Summary of impacts on visual amenity

Visual Receptor	Description / Distance	Sensitivity to change	Magnitude		Impact	
			Version 2	Version 1	Version 2	Version 1
Jockey House	1km to north of Elkesley	Medium	Low	Low	Slight Adverse	Slight Adverse
Timber yard / Industrial Estate	north of existing Jockey Lane / A1 junction	Low	Low	Low	Neutral	Neutral
The Gables	north of existing Jockey Lane / A1 junction	Medium	Medium	Medium	Moderate Adverse	Moderate Adverse
Jockey Lane		Low	Medium	Medium	Slight Adverse	Slight Adverse
Cross Lane (Sandy Lane) / Sandy Lane Byway	south of Jockey Lane / A1 junction	Medium	Low	Low	Slight Adverse	Slight Adverse
Brough Lane Byway	south of Elkesley Village	Medium	Low	Low	Slight Adverse	Slight Adverse
Pepperly Rise	Coal Pit Lane	High	High	High	Large Adverse	Moderate / Large Adverse
Headland Avenue	Properties at the northern end of	Medium	Medium	Low	Moderate Adverse	Slight Adverse
High Street		Medium	High	Low	Moderate Adverse	Slight Adverse
Footpath	south of Elkesley	Medium	Low	Low	Neutral	Neutral
Housing allocation	H37 Top Farm	Medium	Medium	Low	Moderate Adverse	Slight Adverse
A1 (T) corridor		Low	Medium	Medium	Slight Adverse	Slight Adverse

Differences in impacts for the options are highlighted in grey tone.

5.2.5.8 Effects would be concentrated on the visual receptors located on the north-western edge of Elkesley, particularly those properties along Pepperly Rise. They would all have open direct views of the new over bridge, roundabout and embankments, and the new junction on Coalpit Lane. The existing situation includes views across the A1 corridor and the lay-by parked up with lorries. This would be curtailed by the new grade separated junction.

Traffic would be brought closer to the properties on Pepperly Rise. These properties are of high sensitivity and the visual impact is assessed to be **large adverse** for Version 2 due to the presence of the second roundabout and **moderate to large adverse** for Version 1 and Version 1 (modified).

5.2.5.9 For Version 2, the second roundabout in the field south of the A1 would be prominent in views along the High Street. The High Street is considered to have a moderate sensitivity and the magnitude of change in the view is high therefore the visual impact is considered **moderate adverse**.

5.2.5.10 For Version 1 and Version 1 (modified), the single slip road in the field south of the A1 would be less prominent in views along the High Street than the roundabout and embankments in Version 2. The High Street is considered to have a moderate sensitivity and the magnitude of change in the view is moderate therefore the visual impact is considered **slight adverse**.

5.2.6 Land Use

5.2.6.1 Land take to the northern end of the proposed scheme would chiefly be required for a 3 arm roundabout with exits to Jockey Lane and the southbound carriageway of the A1. This would result in arable agricultural land take. Five (5) field accesses, the existing junction of the A1 and Jockey Lane would be closed. This element of the design passes through 5 land holdings.

5.2.6.2 A large field between the A1 and Coal Pit Lane would be significantly adversely affected by all options. A strip of land would be required along Coal Pit lane for its proposed widening to 7.3m and this field would be severed into half approximately to accommodate the bridge link from Coal Pit Lane over the A1. Version 1(modified) moves the link road over the A1 towards the boundary of this field but the new link to bypass Coalpit Lane will require further land.

5.2.6.3 It is anticipated that the proposal improvement would provide better and safer access to motorists wishing to travel to Gamston and Eaton. No negative impact is anticipated to the commercial Timber and Scrap yard located on Jockey Lane.

Version 1

5.2.6.4 This option impacts upon private and commercial properties near the A1/High Street junction. This junction would be closed under the proposal for Version 1 and relocated to the west. Land would be required across the arable field to accommodate this new link road. A row of garages by Coal Pit Lane would need to be demolished to accommodate this option.

5.2.6.5 Total land take for Version 1 would be approximately 66,000m².

5.2.6.6 Land would be required for drainage as there are three rivers in the wider study area. At present, no information is available on land required for this measure but it is envisaged that this would take the form of a balancing pond.

Version 2

5.2.6.7 Total land take for Version 2 would be approximately 70,000m².

5.2.6.8 Impact on land use north of the A1 is the same as Version 1. South of the A1 more land is required to accommodate the roundabout and slip road to/from the A1 northbound carriageway.

5.2.7 Traffic Noise and Vibration

Noise

5.2.7.1 To assess the number of properties that have the potential to be affected by changes in noise level as a result of the proposed scheme, a property count has been undertaken for Versions 1 and 2. Although the property count has identified all properties within 300m of each route options, it is anticipated that beyond the first row of properties noise levels are expected to be attenuated due to the intervening properties. The following table indicates the number of properties within 300m of Versions 1 and 2 may experience changes in road traffic noise.

Table 5.10: Number of properties potentially exposed to changes in road traffic noise

Distance Band	Number of Properties	
	Version 2	Version 1
0-100m	56	68
100-200m	84	78
200-300m	51	55
Total	191	201

5.2.7.2 Version 2 has the least number of properties within 300m and therefore the least number of properties potentially exposed to changes in road traffic noise. Both options are within 300m of Elkesley Primary and Nursery School.

5.2.7.3 Version 2 has a larger number of properties within the 100-200m band than Version 1.

5.2.7.4 The calculated Do-Something scenario in 2026 noise level at representative properties for each route option is shown in the following table. The change compared to the Do-Minimum scenario in 2026 is also shown for each property and route option.

Table 5.11: Predicted noise levels for do-something 2026 scenario

I.D	Receptor	Do-Minimum LA10 18 hr dB(A)	Version 2		Version 1	
			Do- Something LA10 18 hr dB(A)	Change over Do-Minimum (dB)	Do- Something LA10 18 hr dB(A)	Change over Do-Minimum (dB)
R01	1 Pepperly Rise	68.7	69.3	+0.6	69.3	+0.6
R02	9 Coalpit Lane	73.2	73.0	-0.2	73.2	0.0
R03	Top Farm	74.8	74.4	-0.4	74.6	-0.2
R04	The Gables, Jockey Lane	72.1	72.1	0.0	72.1	0.0
R05	The Bungalow, Jockey Lane	66.4	66.4	0.0	66.4	0.0
R06	1 High Street	75.1	74.6	-0.5	74.7	-0.4
R07	14 Holly Bush Close	84.5	84.5	0.0	84.5	0.0
R08	1 Robinson Close	72.1	72.1	0.0	72.1	0.0
R09	Tea Table Cottage	82.7	82.7	0.0	82.7	0.0

5.2.7.5 The predicted noise impact in relation to the significance criteria at each property for Versions 1 and 2 is shown in the following table.

Table 5.12:: Predicted noise impact for 2026

I.D	Receptor	Noise Impact	
		Version 2	Version 1
R01	1 Pepperly Rise	Negligible Adverse	Negligible Adverse
R02	9 Coalpit Lane	Negligible Beneficial	None
R03	Top Farm	Negligible Beneficial	Negligible Beneficial
R04	The Gables, Jockey Lane	None	None
R05	The Bungalow, Jockey Lane	None	None
R06	1 High Street	Negligible Beneficial	Negligible Beneficial
R07	14 Holly Bush Close	None	None
R08	1 Robinson Close	None	None
R09	Tea Table Cottage	None	None

5.2.7.6 The predicted noise impacts represent a worse case scenario as no mitigation (for example the attenuation due to barrier effects) has been considered

5.2.7.7 It is predicted that for Version 1 receptor R01 will experience the highest adverse noise impact with an increase of 0.6 dB(A) over the 2026 Do-Minimum noise level. The calculations indicate that R06 will experience the highest beneficial noise impact with a decrease of 0.4 dB(A) over the 2026 Do-Minimum noise level.

5.2.7.8 It is predicted that for Version 2 R01 will experience the highest adverse noise impact with an increase of 0.6 dB(A) over the 2026 Do-Minimum noise level. The calculations indicate that R06 will experience the highest beneficial noise impact with a decrease of 0.5 dB(A) over the 2026 Do-Minimum noise level.

Vibration

- 5.2.7.9 For all Versions there are 28 properties within 40m of the improvements. The percentage of those that may be bothered by vibration is 18%, approximately 5 properties where the noise level is 73.2 dB(A).

5.2.8 Pedestrians, Cyclists, Equestrians, and Community Effects

Change in Journey Pattern and Length / Relief in Severance

- 5.2.8.1 The proposed scheme will greatly improve the current conditions for pedestrians as the barrier effect of the A1 will be significantly reduced by the incorporation of a footway running from Coal Pit Lane to Jockey Lane on the western side of the new link.
- 5.2.8.2 Using the DMRB guideline of 5km/hr for the speed of pedestrians, the travel time from Coal Pit Lane to Jockey Lane for pedestrians will be approximately 4 minutes. This is a significant improvement on the baseline as previously the only travel option would have been by car.
- 5.2.8.3 For cyclists, using an average speed of 20km/h, the journey time from Coal Pit Lane to Jockey Lane will be approximately 1 minute. The proposed junction improvements will decrease the barrier effect of the A1 for cyclists and will link the areas suitable for cycling south of Elkesley to the areas suitable for cycling north of Elkesley
- 5.2.8.4 There will be a significant beneficial impact for all Non Motorised Users.

5.2.9 Vehicle Travellers

Views from the Road

- 5.2.9.1 The scheme lies in a good quality settled vale landscape area. The scheme will have a significant effect on views from the road, in particular introducing elevated views from the proposed bridge for travellers crossing over the A1.

Driver Stress

- 5.2.9.2 The junction improvement will reduce driver stress. Drivers on the A1 will be presented with a more straightforward road layout in keeping with other sections of the road network. Users of the new junction will also benefit from reduced stress as the bridge will eliminate the need to negotiate gaps in the central reserve. Local users will also benefit from the opportunity to avoid using the A1 at times of high traffic flow and at times when incidents cause closure of the Trunk Road.

5.2.10 Road Drainage and the Water Environment

5.2.10.1 This section identifies the key impacts on the hydrology that may arise as a result of the proposed highway layout.

Construction Impacts

Downstream Flooding

5.2.10.2 Once construction starts on site there is an immediate likelihood of a small increase in surface run-off volume as preparation of the ground reduces the holding capacity of the sub soil and reduces the rate of infiltration, leading to a marginal increase in overland flow and peak flows, which will marginally increase the risk of downstream flooding in the River Poulter. The rise in run-off will occur from an increased surface compaction due to construction traffic and also an increase in impermeable area once construction of the site begins.

5.2.10.3 Assuming no mitigation measures are provided, the impact of the construction phase on downstream flooding will increase slightly over time as surface runoff increases. Near the end of construction phase the significance of the impact will be at its highest. For all options the significance is assessed as **neutral**.

Loss of Areas of Standing Water

5.2.10.4 No ponds are located in the therefore the impact is **neutral**.

Surface water quality

5.2.10.5 The Environment Agency is responsible for maintaining and improving the quality of fresh, surface and underground water in England and Wales. The Water Resources Act 1991 states that it is an offence to pollute such waters either deliberately or by accident. In order to discharge to controlled waters either directly or via soakaways; formal drainage consent must be sought from the Environment Agency.

Surface Water Quality - Silt

5.2.10.6 The movement of heavy plant during the construction stage will increase the risk of pollution from elevated suspended solids. Suspended solids have the potential to impact on the physical, chemical and microbiological water quality characteristics and can potentially cause some of the most damaging effects on the integrity of surface waters including:

- Damage to fish gills by sediment particles;
- Impacts on aquatic vegetation by sediment coating of leaf lamina;
- Visual effects on the watercourse; and
- Silting of the watercourse.

5.2.10.7 The significance of the unmitigated risk of pollution on the downstream watercourse is **moderate adverse**.

Surface Water Quality – Oils, Hydrocarbons and Other Chemicals

5.2.10.8 Oil is the second most common pollutant from construction sites. There will be the risk of spillage or leakage on site from general use including; storage tanks, leaking valves, refuelling, inadequate fuel storage facilities. There will also be a risk of a more significant event such as an accidental spillage. These contaminants may enter the River Poulter in the following ways:

- Discharge of polluted surface runoff into surface waters;
- Spills of liquids during delivery to site;
- Inadequate storage of fuels, oils and other liquids; and
- Inadequate storage and handling of waste materials.

5.2.10.9 Construction plant may also generate a diffuse source of hydrocarbons and to a lesser extent, heavy metals that could leach into the sub soil and find their way into the watercourse.

5.2.10.10 The majority of these pollutants would be mobilised during storm events and will enter the partially constructed permanent drainage system. In the event of a minor storm, a large proportion of the sediment load would be removed through settlement in attenuation ponds. However, due to the high sediment loading that can be expected from the construction phase, a large storm may re-mobilise already settled sediments or have insufficient time to settle out all of the pollutants.

5.2.10.11 The significance of the unmitigated impact of pollution on the downstream watercourse is **large adverse**. This depends on the scale of any spillages or quantities of oils and hydrocarbons that enter the water environment.

Groundwater

5.2.10.12 Although the construction phase of the development will have an impact on groundwater flows by reducing the amount of natural infiltration occurring, the impact will be most severe on development completion. As such the significance of the impact on groundwater flow is considered in the operational phase only.

On Site Flooding

5.2.10.13 The development site is not highlighted as being at risk on the Environment Agency Flood Map. The significance of the impact of flooding of the construction site with no mitigation measures is deemed to be **neutral**.

Operational Impacts

Downstream Flooding

5.2.10.14 The road improvements will result in a slight increase in impermeable area and a resultant increase in surface water run-off. If no mitigation measures were put in place, there would be a slight increase in surface water discharge to the River Poulter.

5.2.10.15 No assessment has been made to assess the actual impacts as mitigation measures should always be incorporated to prevent increases in flood risk. The impact of no

mitigation is therefore a qualitative assessment only and the significance of the impact is deemed to be **neutral** for all options.

Surface Water Quality

5.2.10.16 The road improvements will increase the potential for pollution from road runoff containing particulates including metals and hydrocarbons. The majority of run-off will occur from the increase in road area from the new junction arrangement, which could still result in a detrimental effect on water quality in the River Poulter and in turn have detrimental effects on local habitats and species present. With no mitigation measures in place the significance of the impact is considered to be **large** adverse.

Groundwater Flow

5.2.10.17 Once construction begins on site the volume of precipitation infiltrating to groundwater will be reduced slightly as natural ground is replaced with impermeable surfaces. A reduction in infiltration will also occur in localised areas, caused by heavy construction traffic compacting and partially sealing the surface. In the early part of the construction phase this reduction will be small and the increased run-off is likely to find flow paths to other areas of the site where some infiltration may be possible. During the operational phase this impact will be increased. The work will be conducted mostly in an area that supplies a major aquifer with high vulnerability so the impact of the works is likely to be more significant in this area.

5.2.10.18 A second impact of the revised road layout on the local groundwater regime is the slight diversion of water away from the groundwater or surface water body to which it currently flows. Any groundworks have a slight possibility of altering the current hydrological and hydrogeological regimes. The significance of the impact on groundwater flow is deemed to be **neutral** for both options.

On Site Flooding

5.2.10.19 During the operational phase of the road improvements the risk of on site flooding will come from pluvial flooding of the on-site drainage. Flooding from the on site drainage network can occur frequently if the pipe network and ancillaries are not designed and maintained to expected standards. The severity of the flooding will depend upon the rainfall event, while the degree of impact is dependant on the network design and pipe levels, which are not available at this time.

5.2.10.20 On completion of the works there is a risk of debris entering the drainage system which if not maintained may cause blockages, thus increasing flood risk. Without suitable mitigation measures the significance of the impact is judged to be **slight adverse** for both options.

5.3 Mitigation

5.3.1 Air Quality

5.3.1.1 Where potential mitigation/enhancement/monitoring is to be considered for the options, there are unlikely to be any significant differentiations with respect to air quality. Therefore all generic construction phase mitigation measures can be applied to Versions 1, 1(modified), and Version 2.

5.3.2 Cultural Heritage

5.3.2.1 The evidence of cropmarks is indicative of the potential for late prehistoric/Romano-British remains to be damaged or destroyed by the proposed scheme. The confidence level of such an impact is considered to be moderate to high.

5.3.2.2 The area of the works should be assessed to establish whether buried remains are present. The first stage would be a non intrusive assessment consisting of a geophysical survey to plot the position of buried features.

5.3.2.3 Following the Detailed Assessment, in mitigation of the scheme, prior to ground works for its construction preservation through record would be carried out by a programme of trial trenching and excavation. The position and extent of the trial trenching would be dependant on the results of the geophysical survey and would be determined through consultation with the County Archaeologist for Nottinghamshire.

5.3.2.4 Should significant remains be found, these would be recorded through full excavation where required by the County Archaeologist.

5.3.3 Disruption due to Construction

5.3.3.1 All options will have common mitigation which would involve the incorporation of statutory and best practice measures related to protection of environmental resources and sensitive receptors within site specific working methods and operational protocols. These would be formalised as part of a Construction Environmental Management Plan (CEMP).

5.3.4 Ecology and Nature Conservation

5.3.4.1 Ecological mitigation is common to all options and not likely to sway the selection process. In order to ensure legal compliance, activities that are likely to have adverse impacts on potential bird nesting habitat including hedgerows should be undertaken outside of main bird nesting season (March to August inclusive). Loss of hedgerows would be mitigated as part of the landscape design.

5.3.5 Landscape

5.3.5.1 Mitigation measures would be similar for all options. Severed field corners could be incorporated into the design of the scheme as essential mitigation where justified, to retain existing features and to provide areas required for screen planting. This would be the case for the severed land by Jockey Lane between the A1 Southbound carriageway and the bridge link to Jockey Lane. This is a key location for providing planting to mitigate the impact of views from the High Street.

5.3.5.2 A landscape strategy should be prepared to address loss of vegetation and road screening. Established mitigation planting in year 15 is expected to reduce the visual impact of the scheme by screening views of the road from receptors.

5.3.6 Land Use

5.3.6.1 A landscape strategy should be developed and modified as the preferred option is chosen and design progresses. It should be based on the following principles:

- Replanting of lost landscape features such as trees, hedgerows by the implementation of a planting strategy;
- Incorporation of a mixture of hard and soft landscape design along the proposed alignment to re-integrate the proposals and adjacent areas; and
- The need for reinforced earthwork, retaining walls and strengthened embankments at sensitive areas.

5.3.6.2 The undertaking of consultation with land owners and drafting of comprehensive strategies aimed at minimizing impacts and effects of the scheme would serve to mitigate impact on land use.

5.3.7 Noise and Vibration

5.3.7.1 No noise mitigation measures have been recommended as predicted impacts are negligible.

5.3.8 Pedestrians, Cyclists, and Community Effects

5.3.8.1 Mitigation for pedestrians, others and community effects will not be required during the operation of the proposed scheme as the baseline conditions currently experienced for NMUs will be significantly improved upon. Temporary diversion would be required for users of Coal Pit Lane footway during construction

5.3.9 Vehicle Travellers

5.3.9.1 The key issues surrounding the proposal design and engineering which have shaped the approach to mitigation for view from the road are as follows:

- To explore the opportunities for habitat creation and enhancement, and the protection and enhancement of areas of existing vegetation as far as practical within the design requirements of the new scheme; and
- The implementation of significant areas of planting early in the construction programme, where possible, to aid in the wider landscape integration process.

5.3.10 Road Drainage and Water Environment

5.3.10.1 Mitigation measures would be required during the construction and operational phases of all options. Mitigation therefore applies to all in general terms.

Construction Phase Mitigation

Downstream Flooding

5.3.10.2 To mitigate the risk of downstream flooding in the River Poulter discharge to the river will be limited to levels agreed with the EA.

Loss of Areas of Standing Water

5.3.10.3 While there is no loss of ponds across the site, new ponds may form part of the permanent surface water drainage system.

Surface Water Quality – Silt

5.3.10.4 The following measures are typically used to mitigate the impact of silt entering local watercourses during construction work:

- No direct discharges to watercourses. If the water table is sufficiently high that de-watering is required, trench water would be pumped to surrounding areas to allow settlement of suspended solids;
- Collection of surface water from areas of hard sanding through trapped gullies;
- The use of surface drainage ditches and settlement ponds to intercept and contain overland flow preventing it from discharging to local watercourses without prior treatment to settle out high sediment loads. Such ditches and ponds may be a combination of permanent and temporary drainage features.

Surface Water Quality – Oils and Hydrocarbons

5.3.10.5 To mitigate the risk of accidental spillage, the works at site should be carried out following the development of a Pollution Control Strategy by the contractor prepared in accordance with EA guidelines such as Pollution Prevention Guideline 6 “Working at Construction and Demolition Sites”. Guidance on good site management practices contained within this document should be incorporated into a site Environmental Management Plan and would typically include:

- Point source pollution such as oil spillage or leakage should be mitigated through the provision of designated storage and refuelling areas. Storage areas should have adequate bunding to contain spillage. Construction should follow guidance by the Construction Industry Research and Information Association (CIRIA Report 163, the Construction of Bunds for Oil and Storage Tanks 1997);
- Designated waste storage areas should be isolated from any surface water drains and any contaminated water should be discharged to the foul drainage system with permission of the appropriate drainage authority.

-
- In order to prevent hydrocarbons associated with construction traffic entering local watercourses a fabricated bypass petrol/oil interceptor should be installed upstream of attenuation ponds. Alternatively the ponds may be modified to incorporate an interceptor compartment by providing an underflow baffle wall such that any oil entering the ponds would be retained.
 - In order to ensure that the construction phase Pollution Control Strategy is adhered to, inspection and monitoring will be required for the duration of the works.
 - A Construction Environment Management Plan (CEMP) describing measures to be implemented on site to reduce pollution risk.

Groundwater

5.3.10.6 To be considered in the operational phase only.

On Site Flooding

5.3.10.7 During construction temporary site drainage may be installed and any drainage points would be agreed with the regulatory authorities.

Operational Phase Mitigation

Downstream Flooding

5.3.10.8 To mitigate the risk of increasing downstream flooding, it has been agreed with the EA that the discharge from the proposed route will be limited with storage provided up to the 1 in 100 year + 20% (climate change allowance) rainfall event. This will ensure that the surface water discharge from the road will be restricted to the current discharge level.

Water Quality

5.3.10.9 The general water quality from the works should be controlled. Typically this would be through a combination of treatment ponds and swales. The Environment Agency may require the provision of oil interceptors where there is a higher risk of spillage.

Groundwater Flows

5.3.10.10 The impact of impeding groundwater recharge through the compaction and sealing of the surface would continue once the site has been developed. To mitigate the effects of this the design should keep impermeable areas to a minimum to reduce the impact.

On Site Flooding

5.3.10.11 Surface water drainage infrastructure will be designed with sufficient capacity to convey and attenuate the future flows generated from the impermeable areas indicated on the plan and will fulfil the following functions:

- Collection of water from the surface or sub surface;
- Conveyance of surface water to reduce peak flows;
- Coarse sediment removal to prevent blockages;

-
- Some pollutant removal to protect receiving waters; and
 - Disposal of collected surface water to watercourse

5.4 Consultations

5.4.1 Public Consultation

5.4.1.1 The Public Consultation was held in 2005. An exhibition was held at Elkesley Memorial Hall on Friday 2nd September & Saturday 3rd September 2005. The consultation period concluded on Saturday 26 November 2005. The exhibition was attended by approximately 280 people. A total of 196 formal responses were received. These were completed questionnaires, letters, e-mails and 32 signatures on a petition. Most of the people who replied lived in the village. People generally preferred option A or a variant of option A.

5.4.2 Public Exhibition

5.4.2.1 A further exhibition was held in February 2008 and attended by approximately 250 people. 39 people made comments on comment card provided. Almost all supported the proposals, and most had no preference as to the version to be taken forward. The main concerns raised were the visual impact of the proposals on residents of Coalpit Lane and Pepperly Rise, especially in relation to the increase in road lighting, and the changes in traffic flows along Coalpit Lane.

5.4.3 Other Consultations

5.4.3.1 The following organisations were consulted as part of the environmental assessment: Nottinghamshire County Council were also consulted as part of the engineering development and assessment of the scheme options.

- Environment Agency (EA);
- Natural England (NE);
- English Heritage (EH);
- Nottinghamshire County Council (NCC);
- Bassetlaw District Council (BDC);
- Nottinghamshire Wildlife Trust;
- Nottinghamshire Badger Group;
- Royal Society for the Protection of Birds (RSPB);
- Nottinghamshire Biological and Geological Record Centre (NBGRC)
- Farming and Wildlife Advisory Group (FWAG);
- Local Mammal Recorder;
- Local Bird Recorder and;
- North Nottinghamshire Bat group

6 Traffic and Economic Assessment

6.1 Modelling

6.1.1 Data Collection

6.1.1.1 A programme of traffic surveys was designed to establish turning movements and traffic patterns at the central reserve gaps and junctions. The survey sites were chosen to establish an accurate representation of the existing traffic situation, as a basis for reassignment of traffic following the proposed grade separated junction scheme.

Manual Classified Counts

6.1.1.2 Manual Classified Count (MCC) Surveys were undertaken on Tuesday 6th November 2007 at the following locations.

- A1 Worksop Road / Jockey Lane Junction;
- A1 Worksop Road Central Reserve Gap – North of Elkesley junction;
- A1 Worksop Road / High Street Junction;
- High Street / Coalpit Lane Junction;
- Coalpit Lane / Headland Avenue Junction;
- A1 northbound / Twyford Lane Junction; and
- High Street / Twyford Lane / Brough Lane Junction.

6.1.1.3 The traffic surveys were undertaken over a 12 hour period between 0700 and 1900. The vehicle information was recorded in 15 minute time intervals and divided into 7 vehicle classifications, as listed below:

- Cars;
- Light Goods Vehicle (LGV);
- Heavy Goods Vehicle (HGV);
- Buses and Coaches (PSV);
- Motorcycles;
- Pedal cycles; and
- Other Vehicles

Automatic Traffic Counts (ATC)

6.1.1.4 ATC data for the month of October 2007 (Neutral traffic month) has been utilised for the MCC data validation. This traffic information included estimated data which was used to infill missing counts.

6.1.2 Data Analysis

Identification of Peak Periods

6.1.2.1 An analysis of the A1 northbound and southbound mainline observed flows, travelling past the A1 junctions with Jockey Lane, High Street and Twyford Lane, indicated that the AM peak and PM peak traffic flows occur within the typical period of 0700 – 1000 and 1600 – 1900, although the southbound peak tends to be half an hour later in both periods. This is shown in the following table.

Table 6.1: A1 Southbound & Northbound Peak Traffic Periods

Traffic Flow Direction	AM Peak Period	PM Peak Period
A1 Southbound (towards Peterborough)	0800 – 0900	1630 - 1730
A1 Northbound (towards Blyth)	0830 – 0930	1700 - 1800

Comparison of MCC and ATC Data

6.1.2.2 In order to verify the accuracy of the MCC data, the observed A1 northbound and southbound AM & PM peak flows, relative to the ATC site, were compared with the equivalent ATC data obtained from the Traffic Flow Database System (TRADS). Table 4.2 shows the comparison of the manually observed traffic flows, collected on 6th November 2007, with the average AM & PM peak flows obtained from TRADS for the period 1/10/07 to 19/10/07. This period was chosen because schools were on mid-term break from 22/10/07 to 26/10/07, which could affect the overall month's traffic flows. Full TRADS information, which includes estimated data, is contained in Appendix B. The percentage difference between the two sets of traffic data, for AM and PM peak periods, are low. The observed MCC data are consistent with the ATC data.

Table 6.2: Comparison of 12 hour MCC Data and October TRADS ATC Data

Peak Hour Traffic	Hourly Northbound	Hourly Southbound	Hourly Total (Both Directions)	% Difference from ATC data
Observed AM Peak (06/11/07)	1390	1259	2649	6.30
ATC Flow AM Peak (October 2007)	1428 (0900)	1399 (0800)	2827	
Observed PM Peak (06/11/07)	1499	1486	2985	0.27
ATC Flow PM Peak (October 2007)	1590 (1700)	1403 (1700)	2993	

6.2 Forecasting

6.2.1 Base Year Traffic Forecasts

6.2.1.1 The Base Year for the traffic study is 2007. Base year flows were developed from the MCC data collected for the key trunk road and non trunk road junctions. Figure C1 in Appendix C presents the 2007 base year 12 hour flows.

6.2.2 Future Year Traffic Growth Factors

6.2.2.1 In order to generate the traffic levels for the future year forecast, a localised TEMPRO factor adjustment was applied to the National Road Traffic Forecasts (NRTF) by road type (for all vehicle types) as set out by the Department for Transport. The growth rates used to forecast 2011 traffic are shown in Table 6.3. The calculation to obtain the Adjusted Growth Factor was as follows:

$$\text{Adjusted Growth Factor} = \text{NRTF} * (\text{TEMPRO Local} / \text{TEMPRO National})$$

Table 6.3: Applied Traffic Growth Factors

Growth Factors	2007 - 2011	2011 - 2026
NRTF Central Estimates*	1.066	1.181
TEMPRO Local (Bassetlaw Rural Zone)	1.028	1.072
TEMPRO National	1.042	1.103
TEMPRO Adjusted Growth Factor	1.051	1.148

- Table 3: National Traffic Forecasts by Road Type (Central Estimates)

6.2.2.2 For the COBA assessment, which establishes the economic performance of the scheme, National Traffic Model (NTM) traffic forecasts for East Midlands inter-urban roads have been utilised to forecast traffic growth for the different vehicle classes- Cars, LGV, OGV1, OGV2 and PSV.

6.2.3 Future Traffic Assumptions

6.2.3.1 The following are the traffic assumptions within the study area:

- It is assumed that the traffic level to and from the village and the A1 mainline is the same in the Do-Nothing (Base Case) and Do-Something (Version 1, Version 1 (modified) and Version 2); and
- There will be no additional traffic generated by the introduction of the Grade Separated Junction and other junction changes highlighted in scheme Versions 1, 1 (modified) and 2, also there will be no change of origin or destination within the village.

6.2.4 Traffic Reassignment

- 6.2.4.1 The proposed scheme options involve the reassignment of traffic to and from the village. The reassignment of traffic movements for Versions 1 and 2 are illustrated in Figures C2 and C3.
- 6.2.4.2 Table 6-4 describes the assumptions made regarding traffic reassignment for the traffic scenarios. The traffic assignment assumptions in Items 3 and 6 of Table 6.4 were based on turning traffic observations at traffic survey Site M3 – A1 Worksop Road/High Street Junction. Items 4 and 5 were based on observations at Site M1 – A1/Jockey Lane Junction, while Item 2 was produced from Site M2 observations. Although, Item 1 was mainly derived from Sites M1 & M3 observations, a 50%:50% split was applied to the origins of the right turning traffic into Jockey Lane. This was with the aim of representing a worst case scenario traffic for the GSJ options.
- 6.2.4.3 Figures C4 - C6 show the 12 hour traffic flows for the 2011 Base case and scheme Versions 1 and 2.
- 6.2.4.4 With Version 1, 1282 vehicles would be using the GSJ to access Jockey Lane and Elkesley village. In Version 1, 760 vehicles would use the revised High Street left on, left off junction within the 12 hour traffic period. Version 1 (modified) would give similar traffic flows on those links but lower flows on Coalpit Lane.
- 6.2.4.5 With the opening of the scheme Version 2 in 2011, 1570 vehicles would be using the GSJ in the 12 hour period; 0700-1900, to and from Jockey Lane and Elkesley village.

Table 6.4: Summary of Traffic Re-assignment Assumptions

	Do Nothing	Version 1 and Version 1 (modified)	Version 2
1.	50% of the right turning movements into Jockey lane from A1 northbound are assumed to be originating from the A1 main line traffic while the remaining 50% originates from High Street (Elkesley village)	50% will divert from High street GSJ entry and the remaining 50 % will join from the slip road on A1 south.	All the A1 northbound traffic heading to Jockey Lane would join the GSJ from the slip road while those from Elkesley village would join the GSJ from High Street
2.	All the U turning traffic at the central reserve gap from A1 north are assumed to originate from High Street	All the U turning vehicles will join the GSJ from High Street and exit through the A1 slip road towards A1 southbound.	All the U turning traffic from A1 north would join the GSJ from High Street to complete their manoeuvre
3.	Left turning vehicles from High Street to the A1 are assumed to include vehicles going to make a U turn at the central reserve gap and those joining the A1 northbound traffic.	Vehicles wishing to join the A1 northbound from Jockey Lane or A1 southbound carriageway from High Street would now use the GSJ.	Due to the closure of A1/High Street junction, vehicles wishing to join the A1 northbound or A1 southbound carriageway from High Street would now use the GSJ.
4.	A1 southbound U turning vehicles at the A1/Jockey Lane junction are assumed to be going back towards A1 north.	U turning vehicles at A1/Jockey Lane junction would use the GSJ	U turning vehicles at A1/Jockey Lane junction would use the GSJ
5.	Left turning traffic from Jockey lane are assumed to include vehicles heading southbound on the A1 or turning right into High Street.	Left turning vehicles from Jockey Lane to the A1 southbound, would use the GSJ slip road to complete their movement	Left turning vehicles from Jockey Lane to the A1 southbound, would use the GSJ slip road to complete their movement
6.	U turning traffic at A1/High Street junction from A1 south are assumed to be going back to A1 north	U turning traffic would join the GSJ from the Jockey Lane connection to make a U turn and join the A1 northbound traffic from High Street	U turning traffic would join the GSJ from the Jockey Lane connection to make a U turn and join the A1 northbound traffic

6.3 Effects of Scheme Options

6.3.1 Version 1

- 6.3.1.1 In this case, the existing at-grade A1 junction with Jockey Lane together with, the existing gaps for right turning and U-turn traffic along the A1 study section would be closed. The existing A1/High Street junction would be closed and relocated approximately 30 metres to the west from its current position, to form a new “Left in, Left out” junction.
- 6.3.1.2 A link road over the A1 would be provided to connect Jockey Lane and Elkesley village. The GSJ would also tie in with Jockey Lane, at one end and Coal Pit Lane at the other end. Unlike in Version 2, “Left in, Left out” slip roads from the GSJ would be provided for the A1 southbound traffic only. However, access to the GSJ for the A1 northbound traffic would be provided via the relocated A1/High Street Left in Left out junction.
- 6.3.1.3 The new A1/High Street Left in Left out junction would provide access for A1 northbound traffic heading to Jockey Lane or traffic turning to join the A1 northbound carriageway.

6.3.2 Version 2

- 6.3.2.1 With this Option, the existing at-grade A1 junctions with High Street and Jockey Lane would be closed, together with, the existing gaps for right turning and U-turn traffic along the A1 study section. All the proposed closures would be permanent.
- 6.3.2.2 Following the closures, vehicular movements between Jockey Lane and Elkesley village would be undertaken through a grade separated junction (GSJ), designed as a compact dumbbell. The GSJ would connect Jockey Lane at one end and Coal Pit Lane (Elkesley village) at the other end, and also provide “Left in, Left out” slips roads connected to the A1 northbound and southbound carriageway respectively
- 6.3.2.3 The Cross Lane (Sandy Lane) connection to the A1/Jockey Lane junction would be closed and a turning head provided for vehicles, thereby converting the road into cul-de-sac.
- 6.3.2.4 This option removes all right turning movements along the A1 study section. Therefore, A1 northbound traffic, heading to Jockey Lane, or U-turning or heading to or from Elkesley would join the slip road connection to the GSJ to make the respective movement(s). Similarly, the A1 southbound traffic heading to or from Elkesley village or Jockey Lane would use the slip road from the A1 to connect with the GSJ for onward movement to / from the village or Jockey Lane.

6.4 Economic Performance of Scheme Options

6.4.1 Introduction

- 6.4.1.1 The COBA program version 11.7 has been used for the scheme assessment. The COBA (COst Benefit Analysis) program compares the costs of providing road schemes with the benefits derived by road users. It is the Department of Transport's chosen basis for the assessment of highway infrastructure investments and the basis of Highways Agency appraisal techniques. The COBA network for the design options extends from approximately 600m north of the A1/Jockey Lane junction, to approximately 280m south of the A1/Twyford Lane junction, which is located on the northbound carriageway. It extends to the south towards High Street / Coal Pit Lane and to the north towards Jockey Lane.

Costs and benefits are assessed over the 60 year period of the scheme, assuming an opening year of 2011.

6.4.2 Economic Assessment Results

6.4.2.1 Versions 1 and 2 of the scheme both provide a positive Net Present Value (NPV) with negative net impact for Government as indirect tax outweighs investment and operating costs. Version 2 performs slightly better when considering the monetised impacts, with a Net Present Value of £21.7M compared to £18.8M.

6.4.2.2 A summary of the COBA results is outlined in the following table.

Table 6.5: Costs and Benefits Summary Results

	Scheme Version 1 (£000)	Scheme Version 2 (£000)
Consumer User Benefits	8,601	9,558
Business Benefits	9,843	11,268
Private Sector Provider Impacts	-20	-15
Accident Benefits	-151	440
Emission Benefits	-501	-483
Present Value of Benefits (PVB)	17,792	20,768
Government Funding		
Operating Costs	165	143
Investment costs	3,262	3,263
Developer and Other Contributions	-	
Indirect Tax Revenues (a)	-4,501	-4,338
Present Value of Costs (PVC)	-1,266	-933
Net Present Value (NPV)	18,845	21,701