PART 4 : ECOLOGY AND NATURE CONSERVATION

4.1 Methodology

Assessment Methodology

4.1.1 The methodology for assessment evaluation of the nature conservation value of the sites, habitats and species which may be affected by the proposals is based on the broad guidance within The Design Manual for Roads and Bridges Volume 11, Section 3 Part 4 (Ecology and Nature Conservation). The assessment has also followed the more specific guidance on methodologies described within the 'Guidelines for Ecological Impact Assessment in the United Kingdom' (IEEM, 2006).

4.1.2 This approach involves collection of sufficient data to describe the baseline conditions through desk-top studies and other consultation (See Section 4.3 below) as well as field surveys. The baseline conditions (flora and fauna) are then subject to evaluation to determine their 'value'. Recognition is also made of the 'potential value' of habitats, species and features which are currently below favourable conservation status, including consideration of their potential to be restored.

4.1.3 The potential direct, indirect and cumulative effects of the scheme are assessed to identify any significant effects. This assessment considers the effects which may arise from construction and operation of the proposed road scheme. Measures are proposed to mitigate (avoid or reduce) for the identified significant effects and an assessment is made of the residual effects of the scheme.

4.1.4 Further details on the methodology are contained in the *A453 Widening Environmental Assessment: Ecology and Nature Conservation* report reference A021959-REP-E-EN-214.

4.1.5 'Significant' effects are those which are considered likely to result in a change in the 'ecological integrity' of a site or the 'conservation status' of the habitat or species concerned where:

- *Ecological Integrity* is the ability of the environment in the area of the site to effectively support natural processes such as food webs and the water cycle and to support the species that live there.
- *Conservation Status of a habitat* is the ability of the natural environment of plants to continue to exist and function within the area of concern.
- *Conservation Status of a species* is the ability of a species to maintain favourable population levels within it's natural range.

4.1.6 Significant effects are attributed to the relevant geographic scale (international / UK / national (England) / regional / county / district / local / within immediate 'zone of influence' only) and a confidence level (based on the assessors' experience of highway construction schemes and the ecological receptors concerned) is given on the significance of effects in accordance with IEEM guidance as follows:

- Certain/near-Certain: probability estimated at 95% chance or higher

- Probable: probability estimated above 50% but below 95%
- Unlikely: probability estimated above 5% but less than 50%
- Extremely unlikely: probability estimated at less than 5%.

4.1.7 'Residual effects' are the likely effects on flora and fauna which remain after implementation and establishment of proposed mitigation (avoidance or reduction measures).

Field Survey Methodologies

4.1.8 Field survey methods have followed relevant published guidance where this is available and the general guidance within 'Guidance on Survey Methodology (IEEM, 2006). Detailed methodologies are provided within the A453 Widening Environmental Assessment: Ecology and Nature Conservation report (see paragraph 4.1.4 above).

4.2 Key Guidance and Legislation

Legislation

International and European Legislation

4.2.1 Key International and European legislation of relevance to the assessment of ecology and nature conservation impacts is as follows:

- EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC): The Conservation (Natural Habitats, &c.) Regulations 1994 (amended 2007) represents the UK implementation to the Habitats & Species Directive (1992) issued by the European Community (EC).
- The Convention on the Conservation of European Wildlife and Natural Habitats 1979 (the Bern Convention) carries an obligation to protect and conserve a wide range of flora and fauna (including their habitats).
- The EC Council Directive on the Conservation of Wild Birds (79/409/EEC) requires all member states to take measures to protect wild birds.
- The Convention on Conservation of Wetlands of International Importance 1972 (the Ramsar Convention) has the status of a legal treaty for the designation and protection of wetland habitats.
- The Convention on the Conservation of Migratory Species of Wild Animals 1979 (the Bonn Convention) provides a global system offering protection for all threatened migratory species.

National Legislation

4.2.2 Key National legislation of relevance to the assessment of ecology and nature conservation impacts is as follows:

- The National Parks and Access to the Countryside Act 1949 is the mechanism under which Areas of Outstanding Beauty (AONBs), National Parks and Local Nature Reserves are designated.
- The Wildlife and Countryside Act 1981 (WCA 1981) (as amended) is the primary legislation covering endangered or threatened species in England and sets out the framework for the designation and protection of Sites of Special Scientific Interest (SSSIs).
- The Protection of Badgers Act 1992 brings together all the legislation that is specific to badgers, with the exception of their inclusion on Schedule 6 of the Wildlife and Countryside Act 1981.
- The Hedgerows Regulations 1997 aims to protect hedgerows of importance from destruction. The Regulations only apply to hedgerows growing on or adjacent to certain land use categories.
- The Countryside and Rights of Way (CROW) Act 2000 affords a greater level of protection to Sites of Special Scientific Interest (SSSIs), provides better management arrangements for Areas of Outstanding Beauty (AONBs) and strengthens wildlife enforcement legislation. Section 74(2) of the Act requires the Secretary of State to list those habitats and species of principal importance for the conservation of biodiversity in England, in accordance within the United Nations Convention of Biological Diversity 1992.
- The Natural Environment and Rural Communities (NERC) Act 2006 is designed to help achieve a rich and diverse natural environment and thriving rural communities through modernised and simplified arrangements for delivering Government Policy. Elements of the act most relevant to the proposed scheme include (i) extension of the CRoW biodiversity duty to public bodies and statutory undertakers to ensure due regard to the conservation of biodiversity and (ii) modification of the CroW Act so that species listed under section 74 are now listed under section 41 of the NERC Act 2006. The habitats and species are therefore important for priority setting within the revised UK Biodiversity Action Plan (BAP) and future revisions of the Nottinghamshire and Leicestershire & Rutland BAPs.

Policy

National Policy

4.2.3 National Planning Policy in relation to nature conservation is embodied in Planning Policy Statement 9 (PPS9) – Biodiversity and Geological Conservation and the accompanying Government circulars (ODPM Circular 06/2005, DeFRA Circular 01/2005) and Good Practice Guide. This includes requirements for development to deliver biodiversity enhancement/gain as well as avoidance, reduction and compensation for adverse effects.

4.2.4 Policy in relation to sustainable development and their relevance to the scheme is addressed elsewhere within the Environmental Statement.

Regional and Local Policy

4.2.5 Regional Strategies and Local Plans relevant to the proposed scheme are:

- East Midlands Regional Spatial Strategy RSS8 (2005)
- East Midlands Regional Environmental Strategy (2006)
- Leicestershire, Leicester & Rutland Structure Plan (2005)
- Nottinghamshire and Nottingham Joint Structure Plan (Adopted 2006)
- North West Leicestershire Local Plan (Adopted 2002)
- Rushcliffe Borough Local Plan (Adopted 1996)
- Rushcliffe Borough Non-statutory plan (2006)
- Nottingham Local Plan (Adopted 2005)

4.2.6 Regional and local policies regarding biodiversity which are relevant to the proposed scheme are discussed in more detail in the A453 Widening Environment Assessment: Ecology and Nature Conservation report (see paragraph 4.1.4 above) and the A453 Widening Environment Assessment: Impact on Policies and Plans report A021959-REP-E-PL-232.

Other Strategies and Initiatives

4.2.7 Other initiatives, plans, priorities and guidance for nature conservation at a national and local level that have informed the assessment include:

- The UK BAP (first published in 1994 and list of priority species and habitats revised in 2007)
- Nottinghamshire BAP
- Leicestershire and Rutland BAP
- Highways Agency BAP
- UK Birds of Conservation Concern (RSPB et al, 2002)

4.3 Consultations

Desk-Top Study and Consultation Methodologies

Desk-Top Study

4.3.1 The desk-top study for the ecology and nature conservation assessment has involved the following:

- Review of previous ecological studies undertaken along the A453 corridor in relation to the current and previous dualling proposals.
- Obtaining data from statutory and non-statutory consultees in relation to designated sites of nature conservation importance and records of protected and or notable flora and fauna within an area of search up to 2km from the scheme boundaries. Consultees are listed in Table 2.4.1 below.

Table 2.4.1 : Consultees Contacted and Details of Data Requested

Consultee	Data Requested
AMScott (Highways Agency's Managing Agent for A453)	Biological Records
Broxtowe Barn Owl Project	Biological Records (Barn Owl)
Environment Agency	Biological Records
Leicestershire Environmental Records Centre	Information on Local Wildlife Site designations and Biological Records
Multi-Agency Geographic Information for the Countryside (MAGIC) database	Information on statutory designations.
National Biodiversity Network (NBN) Gateway database	Information on protected and/or notable species
Natural England (website)	Information on SSSI designations
Nottinghamshire Biological and Geological Records Centre	Information on SINC designations and Biological Records
Nottinghamshire Bird Watchers	Biological Records
Nottinghamshire Wildlife Trust & Leicestershire and Rutland Wildlife Trust	Information on SINC designations and Biological Records
Ratcliffe on Soar Power Station (Eon)	Biological Records and Phase 1 Habitat Survey Data
Rushcliffe Barn Owl Project	Biological Records (Barn Owl)

- Interrogation of web-based databases holding data on designated sites and protected and notable species, specifically the National Biodiversity Network (NBN) Gateway and Multi-Agency Geographic Information for the Countryside (MAGIC) databases.

Consultation

4.3.2 Ongoing consultation during the scheme design and assessment phase in 2006 and 2007 has involved stakeholder meetings to discuss ecology and nature

conservation issues as the scheme design has developed. A series of three consultation workshops have been held to discuss and identify the potential effects of the scheme and influence the ecological design. Invitations were extended to statutory and non-statutory consultees and workshops were held on 6th September 2006, 13th December 2006 and 13th September 2007. Representatives from Natural England, the Environment Agency, Nottinghamshire Wildlife Trust, Nottinghamshire County Council, Leicestershire County Council and AMScott attended.

4.3.3 The aim of this consultation has been to inform the stakeholders of the scheme design as it is has progressed, to gain further information and opinion not available from the desk-top study, and to seek views on the significance of potential effects and requirements for mitigation and enhancement measures in relation to biodiversity.

4.4 The Study Area

Geographical Scope

4.4.1 The geographical scope of the ecological assessment is defined by the potential zone of influence of the proposed scheme. The zone of influence may differ between habitats and species, but includes any feature that may be impacted by the proposed development within the wider landscape. For the A453 Widening scheme, the maximum geographical scope (anticipated maximum zone of influence) for the ecological investigations was initially defined as land up to 2km from the scheme boundaries.

4.4.2 This scope was subject to review during the design phase of the scheme and following completion of initial investigations to determine whether the scheme could have potentially significant effects at a greater distance, effectively extending the zone of influence. No potential effects of the scheme were identified which could significantly affect the integrity or status of ecological receptors at greater distances than 2km. Therefore the geographical scope was not extended beyond this distance.

Desk-Top Study Area

4.4.3 The desk-top study area included the scheme and land up to 2km from the scheme boundaries.

Field Survey Areas

4.4.4 The field surveys concentrated on a c.500m corridor centred on the route alignment. Within this corridor, all habitats types were recorded and mapped in accordance with the Phase 1 Survey methodology (Joint Nature Conservation Committee 2003) which entails mapping habitats (the natural environment of plants and species) and dominant species. Habitats in closer proximity to the scheme (up to 100m from scheme boundaries) were recorded at a greater level of detail.

Domestic gardens were generally not entered for survey but were mapped from adjacent land.

4.4.5 Along the rural section of the scheme between Junction 24 to the outermost edge of Clifton, surveys for fauna typically extended up to 250m from the scheme boundaries in order to confirm status and distribution in the immediate locality. The surveys did not extend beyond M1 Junction 24.

4.4.6 Within the urban section of the scheme, habitats and species surveys were largely restricted to land within and adjacent to the boundaries of the proposed scheme, much of which is within the existing highway boundary. Land beyond this narrow corridor largely comprises residential land-use including buildings and gardens under private ownership; it was not necessary to access these areas for surveys.

4.4.7 If sensitive habitats, species or assemblages were identified through desk-top studies or field surveys which were likely to be affected at greater distances from the scheme, then the study area was extended where additional data was necessary to assess the main likely significant effects on that species or assemblage. This included a 500m search area for great crested newt surveys and surveys along the River Soar for otter to c. 1.5km from the scheme boundaries.

Limitations

4.4.8 There were no significant limitations to the field survey work. Areas not entered directly for the purposes of survey due to lack of access onto private land could either be recorded and mapped adequately from adjacent land and/or were at sufficient distance from the scheme that a lower level of survey detail did not affect the quality of the data available for the assessment of likely significant effects.

4.5 Baseline Conditions and Evaluation of Nature Conservation Value

Introduction

4.5.1 The baseline conditions are defined as the conditions that would pertain in the absence of any proposed actions (construction and operation of the A453 Widening Scheme) and are based on the survey and desktop study data gathered to date.

4.5.2 In the following sections, the existing baseline ecological conditions are described for the scheme route and the study corridor to either side of the route within the expected zone of influence of the scheme. The baseline conditions (flora and fauna) are then subject to evaluation to determine their ‘value’ as outlined in paragraph 4.1.2 above.

Sources of Information

4.5.3 In addition to the environmental data provided by consultees (and reported in the A453 Widening Environmental Assessment: Ecology and Nature Conservation

report) the following documents represent sources of information reviewed as part of the ecological assessment for the proposed scheme:

- A453 Clifton Lane Trunk Road Improvement. Environmental Statement Volume 1 Section 6.0 Ecology and Nature Conservation (Highways Agency, 1994).
- Baseline Ecological Appraisal (Ambios Environmental Consultants, 2005)
- A453 Widening M1 Junction 24 to A52 Nottingham. Environmental Data Review (R10040V001 Pell Frischmann, 2005)
- Assessment of Badger Activity on Land Adjacent to the A453, Nottingham (Ecosulis, 2006)
- Great Crested Newt Presence/Absence Survey at A453, Nottingham (Ecosulis 2006)
- A453 Widening Amphibian Survey Report Ref. A021959-REP-E-EN-215, 2008
- A453 Widening Bat Surveys Report Ref. A021959-REP-E-EN-217, 2008
- A453 Widening Otter Survey Report Ref. A021959-REP-E-EN-219, 2008
- A453 Widening Badger Survey Report Ref. A021959-REP-E-EN-216, 2008
- A453 Widening Phase 1 Habitat Survey Report Ref. A021959-REP-E-EN-220, 2008
- A453 Widening Water Vole Survey Report Ref. A021959-REP-E-EN-222, 2008
- A453 Widening Reptile Survey Report Ref. A021959-REP-E-EN-221, 2008
- A453 Widening Bird Surveys Report Ref. A021959-REP-E-EN-218, 2008

Vegetation and Habitats

4.5.4 The vegetation and habitats survey recorded the extent and nature of habitats within and adjacent to the proposed scheme boundaries. The recorded habitats are illustrated on Figure 2.4.2 in the ES Volume 2, and the description below, divided into the rural and urban sections of the proposed scheme, refers to Target Notes (TN) which are located on the drawings. Details of the survey results are included in the technical report 'Phase 1 Habitat Survey' A021959-REP-E-EN-220. Nomenclature follows Stace (1997).

Rural Section (Junction 24 to Clifton)

4.5.5 The habitats within the existing highway boundary are dominated by species-poor improved grassland, immature broadleaf plantation woodland and scrub and ruderal habitats. Hedgerows along the highway boundary are generally dominated by hawthorn, are species poor and, apart from common and widespread arable 'weed'

species, support a very limited ground flora. The route corridor outside the existing highway boundary is dominated by intensively managed agricultural (arable) land through the rural section between Junction 24 and Clifton.

4.5.6 These habitats are of low botanical and structural diversity which are not considered to play a critical role in maintaining the conservation status of habitats and species, or the ecological integrity of designated nature conservation sites. As individual areas of grassland or lengths of hedgerow they are assessed as having only zone of influence value.

4.5.7 The route crosses the Ratcliffe Cut Canal and the River Soar to the south of Ratcliffe on Soar power station and the floodplain area between the two comprises previous (currently unfarmed) arable land, dominated by tall ruderal species. Scattered trees and both dense and scattered scrub line the banks of the River Soar and the Canal.

4.5.8 Coniferous, mixed and broadleaf plantation woodlands border the existing A453 with more extensive areas being at March Covert, Ratcliffe on Soar power station, Wrights Hill and Twenty Lands Plantations near Thrumpton and Drift Lane Plantation to the south of Clifton. These woodlands are assessed as being of local value where they are in association with designated SINCs.

4.5.9 Relatively diverse (herb-rich) semi-improved neutral grassland has been recorded on E.ON land to the south of the power station (TN 2.3, Fig 2.4.2.2).and also at Barton Lodge (TN5.2, Fig 2.4.2.5). Both areas are outside the footprint of the proposed scheme and are assessed as being of local value.

4.5.10 A single diverse hedgerow has been recorded which runs from the West Leake Junction towards plantation woodland to the north of Winking Hill Farm (TN3.3, Fig 2.4.2.3). The hedgerow is assessed as being of local value. All other hedgerows are species-poor, being typically dominated by hawthorn and with a ruderal/arable weed ground flora.

4.5.11 There are several individual mature trees in close proximity to the proposed scheme including three mature trees within the Ratcliffe on Soar power station. Another large, mature pedunculate oak tree is present on the opposite side of the existing A453 to Drift Lane Plantation (TN6.1. Figure 2.4.2.6).

4.5.12 No specially protected or rare habitats or plant species have been recorded within the existing highway boundary, the footprint of the proposed route or immediately adjacent land.

4.5.13 As a whole the ecological resource is more substantial due to its extent and particularly the linear arrangement of hedgerows, scrub and field margins providing an ecological corridor parallel to the A453 between Junction 24 and Clifton. In recognition of the function that even species poor habitat examples can perform, the revised UK Biodiversity Action Plan list of priority habitats includes all hedgerows with more that 80% cover of native species. Although they are not as

intrinsically as valuable as species-rich examples, in this context, these linear habitats are assessed as being of local value due mainly to their large extent rather than their diversity.

Urban Section

4.5.14 Through Clifton, the route is flanked by immature plantation woodland on the verges within the highway boundary, species-poor, rough grassland verges and managed amenity grassland, fragmented hedgerow and scattered, planted trees. The Nethergate Stream runs through a culvert beneath the existing (and proposed) Clifton Green Junction.

4.5.15 The route is bordered on both sides mainly by residential properties. The route is also adjacent passes the Nottingham Trent University Clifton Campus and several small areas of public amenity land. A mature (though species-poor) hedgerow is also on the boundary of Nottingham Trent University though this hedgerow has been recently thinned (spring 2007) as part of highway maintenance works to remove dead trees (elm). The remaining habitats comprise road verge and narrow belts of planted trees.

4.5.16 A mature pedunculate oak is present in Clifton to the south of the Crusader roundabout (TN7.1 Figure 2.4.2.7). A mature turkey oak, also in Clifton, is located adjacent to the field of improved grassland and overhanging the road verge north of the A453 (TN 7.2 Figure 2.4.2.7).

4.5.17 No specially protected or rare habitats or plant species have been recorded within the existing highway boundary, the footprint of the proposed route or immediately adjacent land.

Designated Nature Conservation Sites

Statutory Designated Sites

(refer to Figure 2.4.1 *Location of Statutory and Non-Statutory Sites* in the Environmental Statement (ES) Volume 2)

4.5.18 There are no statutory designated sites of nature conservation importance within or immediately adjacent to the proposed scheme. The nearest such site is Clifton Grove, Clifton Woods and Holme Pit Pond Local Nature Reserve (LNR) which is designated under Section 21 of the National Parks and Access to the Countryside Act 1949. This LNR runs along the River Trent corridor to the north of Clifton residential area. Fox Covert is the section of the LNR which is closest to the scheme as the boundary of this woodland is within 100m of the existing A453. The SSSI sections of this area are described below. As describe below, Wilwell Cutting is also a LNR.

4.5.19 There are no Sites of Special Scientific Interest (SSSI) within or immediately adjacent the proposed scheme, although a number of these sites have been identified within the search area. Citations are included in the detailed environmental assessment mentioned in paragraph 4.1.4 above. Summary information is given in Table 2.4.2 below:

Table 2.4.2 : Sites of Special Scientific Interest within 2km of the Proposed Scheme

Site Name & Location	Distance from Scheme	Principal Ecological Interests
Lockington Marshes SSSI SK486304	0.8km	One of the largest remaining areas of willow carr woodland in Leicestershire including pools and inundation meadow habitats and supporting an important invertebrate fauna.
Gotham Hill Pasture SSSI SK532307	1km	One of the best examples of species-rich pasture and associated grassland on calcareous and neutral clays in Nottinghamshire.
Attenborough Gravel Pits SSSI SK522341	0.9km	A site of regional importance, providing a valuable refuge for over-wintering waterfowl and supporting a range of terrestrial, marsh and aquatic habitats
Holme Pit SSSI SK536345	0.6km	A site of regional importance containing some of the best remaining areas of marsh, reed swamp, and open water in Nottinghamshire
Wilwell Cutting SSSI SK567348	1.2km	Managed as a Local Nature Reserve, this former railway cutting and borrow pit contains some of the best examples of neutral grassland and marsh in Nottinghamshire
Wilford Claypits SSSI SK571355	1.4km	A former claypits site containing some of the best remaining marsh in Nottinghamshire, including springs, pools and dykes.

4.5.20 Beyond the designated sites described above it is considered that none of the habitats or species recorded along or adjacent to the proposed scheme during the desk-study exercise or the field surveys are of international, national or regional value and likely to qualify for statutory designation at this level (e.g. SSSI).

4.5.21 None of the habitats recorded along or the scheme route during the desk-study exercise or the field surveys is considered to be critical to the ecological integrity of the statutory designated sites or to contribute significantly to their nature conservation value, because of the distance of the scheme from these sites, the general low naturalness and diversity of the habitats within and adjacent to the scheme, and the lack of significant habitat connectivity between the habitats within the scheme and the boundaries of the designated areas.

4.5.22 Nevertheless, it is likely that some of the habitats along the proposed scheme help to support the ecological value of the designated sites, as part of the wider ecological network. In particular this includes the following areas:

- The treeline and hedgerow, on the north side of the existing A453, which connects the road corridor to Fox Covert woodland, part of Clifton Grove, Clifton Woods and Holme Pit Pond Local Nature Reserve, of which part is designated as Holme Pit SSSI (see Figure 2.4.1.6).
- The River Soar and Ratcliffe Cut and the drainage ditch to the north of March Covert, which connect to watercourses and other wetland habitats associated with Lockington Marshes SSSI 0.8km downstream of the proposed scheme (see Figure 2.4.1.1 and 2.4.1.2).

4.5.23 Although the influence of these habitats within the scheme boundary on the ecological integrity of the designated sites and the conservation status of their component habitats and species is unlikely to be significant, they are assessed as being of local value as connecting habitats to the statutory designated areas and part of the wider ecological network.

Non-Statutory Designated Sites

(refer to Figure 2.4.1 *Location of Statutory and Non-Statutory Sites* in the Environmental Statement (ES) Volume 2)

4.5.24 There are no non-statutory designated Sites of Importance for Nature Conservation (SINCs) occurring within the scheme boundaries. SINCs in close proximity or connected to the proposed scheme are as follows:

- The 'River Soar (Ratcliffe)' SINC which is 0.2km downstream of the site but is part of the River Soar which flows under the proposed A453 river crossing. Although it does not support any notable or rare habitats or species, the section of the River that falls within the proposed scheme boundaries is assessed as being of local value for the role it plays in supporting the downstream designated site and also for providing habitat for water vole and otter (considered further below).
- 'Pond, Ratcliffe on Soar' SINC is located within the power station grounds within plantation woodland less than 0.05km to the west of the existing A453. The site was originally listed due to the presence of notable aquatic vegetation. However, records from NBGRC indicate that the vegetation of interest was introduced as part of a habitat creation scheme in the past. During initial Phase 1 Habitat surveys by WYGE in summer 2006 the pond was recorded as dry and overgrown with tall ruderal vegetation, with only isolated stands of rushes remaining to show that the area is occasionally wet. Follow-up surveys in March 2007 recorded a seasonal pond, up to 1m depth, although this began drying out in early April 2007. Although the site appears to have deteriorated since its designation, it remains designated as

a SINC. The pond is assessed as being of county value given its current status.

- 'Thrumpton Park Lake' SINC (a waterbody with notable wetland flora) is approximately 0.4km to the west of the scheme, through the lake itself is over 0.5km from the scheme.
- 'Gotham Hill Woods' SINC (mixed woodland with botanical interest) is approximately 0.3km to the east of the scheme.
- The 'Brandshill Grasslands' SINC (calcareous species-rich grassland) and the 'Marsh Below Brandshill' SINC (species-rich marshy grassland) are 0.2-0.4 km from the proposed scheme.
- 'Clifton Wood and Clifton Fox Covert' SINC is part of the LNR described above in paragraph 4.5.16, and Clifton Fox Covert is less than 100m west from the proposed scheme, which includes part of the approach of Fox Covert Lane to the designated SINC. The broad-leaved woodland is assessed as only being of district value only.
- 'Clifton Grove' SINC is a wooded bluff above the River Trent, approximately 0.25km from the urban section of the proposed scheme.
- 'Clifton Spinney Pond' SINC is within 100m to the south of the northernmost end of the proposed scheme.
- 'Fairham Brook' SINC is downstream from the Nethergate Stream and comprises grassland and scrub on the left bank of the northward-flowing Fairham Brook. The water quality, and thus the ecological integrity of the Fairham Brook will be influenced by the quality of the water within the Nethergate Stream although the latter is not of substantive nature conservation value in itself, being culverted for most of its length through Clifton. The Nethergate Stream adjacent to the scheme is assessed to be of value in the immediate area only. The connection between the Nethergate Stream and Fairham Brook is assessed as being of local value in that the Nethergate Stream provides a source of water to maintain flows within the designated watercourse.

4.5.25 Within Leicestershire (to the west of the River Soar) Sites of Importance for Nature Conservation are known as Local Wildlife Sites. None of these sites occur within the study area.

4.5.26 No other habitats or species within or adjacent to the scheme boundaries are considered likely to qualify for designation as a non-statutory designated site or to be important for the ecological integrity of such sites or the conservation status of the habitats and species they support.

Protected and Important Fauna

4.5.27 Key findings of the fauna surveys undertaken within or adjacent to the footprint of the current proposed scheme are described below. Further detail is provided within the technical reports listed in paragraph 4.5.3 above.

Otter

4.5.28 There are historical records of otter along the River Soar and River Trent and a record of an otter mortality on the A52 approximately 0.75km to the east of the northern end of the scheme. It is presumed that the mortality was an animal using the River Trent/Fairham Brook network. Surveys in 2006 (July and November) and 2007 (February and April) have confirmed that otter move along the River Soar but no holts or other places of shelter have been recorded within 1km of the proposed scheme.

4.5.29 A single otter spraint site over 100m to the north of the proposed scheme, and suspected feeding remains (freshwater mussel shells) were recorded along the River Soar during the field surveys in 2006 and 2007, though no evidence has been found within 100m of the scheme boundaries.

4.5.30 The stretch of River within and adjacent to the scheme boundaries provides foraging habitat and a corridor which connects upstream and downstream sections and provides an important connection to the River Trent where otter has frequently been recorded in recent years.

4.5.31 No evidence of otter was recorded along the Canal or along other smaller watercourses and drains crossed by existing A453 or the proposed scheme. Otters could utilise the canal or field drains between Thrumpton and Barton in Fabis and the Barton in Fabis fishponds (a SINC), all of which are features which remain wet and provide a potential year-round feeding resource and potential corridor for dispersal. However, to the east of the Barton in Fabis fishponds, the drainage network is interrupted by the A453 which currently presents a barrier to otter movement, though there are no records (live otters or traffic related mortalities) for this section of the scheme.

4.5.32 Otter is a European Protected Species which, along with its places of shelter (including holts and couches), is afforded full protection under the Wildlife and Countryside Act 1981 (as amended), the Countryside and Rights of Way Act 2000 and Conservation (Natural Habitats, &c.) Regulations 1994 (amended 2007). It is a species of principal importance for nature conservation being listed on Section 41 under the NERC Act 2006, and is listed as a priority species on the UK Biodiversity Action Plan, the Nottinghamshire Biodiversity Action Plan and the Leicestershire, Rutland Biodiversity Action Plan and the Highways Agency Biodiversity Action Plan.

4.5.33 The number of otters using the section of River Soar through the scheme is likely to be limited to a few individuals as territorial ranges for this species fairly large (a dog

otter range can be up to 40km). This area is assessed as being of district value for the number of otters it supports and role it plays in supporting the status of otter in the wider area.

Water Vole

4.5.34 Historical records of water vole exist for a small watercourse in Ratcliffe on Soar approximately 150m to the south of the proposed scheme boundary but data from the desk-based study indicate that this species has not previously been recorded anywhere else within the study area.

4.5.35 During field surveys in 2006 (May to June and July to October) and 2007 (March), water vole was recorded in several field drains to the north and south of the existing A453 between Thrumpton and Barton in Fabis, and also in the road side drain to the south of the carriageway.

4.5.36 Several areas with feeding remains (feeding stations) were recorded and water vole sighted on two occasions during the surveys in this area. However, the presence of just two latrines in this area indicates only a small population present in this drainage network, a proportion of which is only seasonally wet. However, the population is one which may well be connected to a larger population in the Trent Valley Catchment.

4.5.37 The existing A453 presents a barrier to water vole movement, though it is not certain to what extent voles cross underneath the carriageway. There is currently a single c. 25m long 300mm concrete culvert which takes field drainage underneath the A453 and could be used by water vole.

4.5.38 Water vole is a rapidly declining species which is protected under the Wildlife and Countryside Act 1981 (as amended) and the Countryside and Rights of Way Act 2000. It is a species of principal importance for nature conservation being listed on Section 41 under the NERC Act 2006, and is listed as a priority species on the UK Biodiversity Action Plan, the Nottinghamshire Biodiversity Action Plan and the Leicestershire, Rutland Biodiversity Action Plan and the Highways Agency Biodiversity Action Plan.

4.5.39 Due to the local scarcity of water voles, the supporting habitats and population(s) of this species within and adjacent to the scheme at the River Soar and the drainage ditches at Thrumpton, though likely to be small, (as indicated by only a single latrine being recorded within the study area), are assessed as being of district value. The local status of water voles within the A453 corridor is complicated by the fact that, on a county scale, the species is more common in Nottinghamshire than it is in Leicestershire. However, consultation with the local Wildlife Trusts and the Leicestershire Environmental Records Office have not revealed any evidence to suggest that the status of the species should be classed as higher than district value. The populations are however fragile even when considered as part of a much

larger population within the Trent and Soar catchments, since the survival of one colony can influence the status of the next.

Bats

4.5.40 A bat roost under the B5 Flood Span structure has been identified during surveys in 2006 and 2007. Full details are provided in the technical report A021959-REP-E-EN-217. The bats are roosting in several locations within the spaces between the beams and beneath the main concrete road deck. Patterns of recorded activity suggest this is a regularly used summer roost by highly variable numbers of bats (predominantly soprano and common pipistrelle with occasional *Myotis* sp) and unlikely to be a maternity site or significant hibernation site for any of these species. The pipistrelle colonies using the structure may also use another roost site identified through field surveys and consultation in Holy Trinity Church, Ratcliffe on Soar, approximately 0.2km from the proposed scheme. The roost is assessed as being of district value. The value of the feature to bats is considered to be related to accessibility and security of the roost space(s) itself within the structure as well as accessibility to the River Soar and Canal corridors.

4.5.41 A pipistrelle (probably soprano) bat roost in Keeper's Cottage to the north of the proposed scheme near Barton Lodge has been identified. The occupier has confirmed that bats have been found within the dwelling space of the property. Surveys in 2006 (August to September) and 2007 (April to July) have not recorded bats emerging from the property though droppings have been recorded underneath a potential roost access point on two occasions. The status of the roost is confirmed and the property is assessed as being of district value. Accessibility into the building is important for the bats and the connecting corridor of hedgerow and woodland alongside Barton Lodge and Barton Lane are also important factors in maintaining the roost for bats.

4.5.42 No other roosts have been identified within the scheme boundaries, though a mature oak tree within the curtilage of Four Winds Nursing home in Clifton (approximate chainage, 10330) is within the scheme boundaries. No potential roost sites were observed on this tree during a visual inspection, but the presence of such features could not be ruled out as not all parts of the tree was visible. This feature was assigned low/moderate suitability for roosting bats as their presence cannot be definitively ruled out.

4.5.43 Records obtained from consultees indicate the presence of a Leisler's bat roost is in the Thrumpton area to the west of the proposed scheme and this species was recorded flying high over the A453 during the activity surveys in the Thrumpton/Barton Lodge area.

4.5.44 Relatively higher levels of bat activity were recorded during transect surveys in 2006 in several locations:

- along the River Soar and Ratcliffe Cut Canal;

- around woodland and hedgerows at Barton Lodge and the junction of Barton Lane with the A453;
- in the vicinity of Wrights Hill Plantation and Twenty Lands Plantation to the south-east of Thrumpton and;
- along roadside hedgerows between Mill Hill Spinney and the Crusader roundabout in Clifton.

4.5.45 Common pipistrelle comprised the majority of records, with soprano pipistrelle also frequently observed. Leisler's, Daubenton's bat, Noctule and other (unconfirmed) *Myotis* species were also occasionally recorded. The Leisler's and Noctule bat records were of small numbers flying at height above the survey transects rather than foraging alongside or over the trafficked A453 carriageway.

4.5.46 All native species of bat are European Protected Species which, along with their place of shelter (roosts), are afforded full protection under the Wildlife and Countryside Act 1981 (as amended), the Countryside and Rights of Way Act 2000 and Conservation (&c) Regulations 1994 (amended 2007). Common pipistrelle is a species of principal importance for nature conservation being listed on Section 41 under the NERC Act 2006 and is listed as a priority species on the UK Biodiversity Action Plan. All UK bat species are listed as a priority in the Nottinghamshire Biodiversity Action Plan, the Leicestershire and Rutland Biodiversity Action Plan and the Highways Agency Biodiversity Action Plan.

4.5.47 The roadside hedgerows and woodland habitats and the River Soar and Ratcliffe Cut Canal are each assessed as being of local value for the role they play in providing a resource for local bat populations which also include both common and soprano pipistrelle, Daubenton's bat and other (unconfirmed) *Myotis* species. Maintenance of continuous habitats (hedgerow and plantation) alongside the road as well safe crossing points under the A453 along the River Soar and Ratcliffe Cut Canal are considered to be important aspects contributing to this value. Other than the Cattle Creep underpass near M1 Junction 24, the Ash Lane underbridge near the Power Station and the mainline railway bridge, there are no other crossing points identified under the A453.

Badger

4.5.48 Badger surveys were carried out in March 2006, between June to October 2006 and between March to April 2007. Numerous badger setts have been recorded within the study area, and there are several specific locations along the scheme where clusters of badger mortalities have been recorded. The woodlands and largely arable farmland which dominate the landscape provide foraging habitat for badger, as do the amenity areas within Clifton, but as these habitats are large in extent and widespread across the study area, no specific areas were identified during the surveys as being of exceptional value or as critical to the status of this species in the locality.

4.5.49 Although not rare, badgers play an important role as predators and scavengers and are one of the UK's few remaining large carnivores. The population of badger recorded within and adjacent to the proposed scheme is assessed as being of local value. Further detail is given in the confidential badger report.

Brown Hare

4.5.50 Brown hare was recorded on several occasions in 2006 and 2007 during the Phase 1 habitat surveys (May and June) and surveys for badger, bats, water vole and breeding birds. Records were gained in arable fields to either side of the A453 in the following areas:

- Between March covert and Long Lane
- Between Thrumpton and Barton Lodge (both sides of the A453)
- In fields between Barton Lodge and Brandshill Woods
- In the fields around Drift Lane Plantation Area

4.5.51 In each occasion records were of one or two individuals at distances between 20m and 500m from the proposed scheme. No areas were identified which provided particularly good habitat for brown hare.

4.5.52 Brown hare habitat requirements are considered to include a range of different habitat types to provide cover, especially for young (leverets) and the presence of a range of feeding resources. Both cover and diverse foraging resources tend to be scarce in an intensively managed agricultural (arable) landscape, such as exists along much of the rural section of the proposed scheme.

4.5.53 The roadside and field hedgerows alongside the proposed scheme and ruderal habitats provide some degree of shelter for Brown Hare and also provide a potential source of food. The field margins are generally species-poor and often cultivated. Habitats within and adjacent to the proposed scheme are assessed as being of zone of influence value.

Barn Owl

4.5.54 From the desk-based study and consultation data, barn owls are known to be active in the area. The Rushcliffe Barn Owl Project Provided records of 6 occupied nest boxes at Gotham, Gotham Hill, Barton in Fabis and Ruddington, with 5 of these sites within 2km of the proposed scheme. Of these, the locations of the nest site in Barton in Fabis and two nest sites to the west and north-west of Gotham are between 0.5-1km of the existing A453 and the proposed scheme. The Broxtowe Barn Owl Project provided additional nest box records for the western side the River Trent in Attenborough.

4.5.55 The nocturnal field surveys undertaken in August and September 2006 did not record any Barn Owl in close proximity to the proposed scheme.

4.5.56 Nottinghamshire Birdwatchers have recorded Barn Owl on several occasions between 1998 and 2006. Records are of birds leaving known nest boxes and also several records of hunting owls. All records were in the Barton in Fabis and Thrumpton Area.

4.5.57 A dead barn owl (assumed road kill) was found by White Young Green Ecologists on the A453 near Thrumpton during field surveys in 2006 and this was confirmed as a locally ringed individual.

4.5.58 The hedgerow and field edge habitats within the proposed scheme boundaries and adjacent to the existing A453 provide potential foraging habitat for Barn Owl though this habitat is limited as much of the A453 verges are planted with trees and the agricultural fields are often cultivated up to the field boundaries.

4.5.59 Barn owl is specially protected under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and the Countryside and Rights of Way Act 2000. Although the sites that barn owls use are not protected, they do have special protection against wilful or reckless disturbance whilst nesting is taking place. Barn owl is listed on the amber list for species of conservation concern due to a moderate contraction (25%-49%) in breeding population over the last 25 years and the fact that it is a species with unfavourable conservation status in Europe.

4.5.60 If all nest sites identified through the consultation work are assumed to support a pair of barn owl, the value of the five known nest sites within 2km of the proposed scheme represents 5% of the estimated Nottinghamshire population and 20% of the estimated population in the Rushcliffe Borough Area. The population local to the scheme is assessed as being of district value.

Breeding Birds

4.5.61 The desk-based study identified records of bird species recorded between 1998 and 2006 within a 1km corridor centred on the proposed scheme. The consultation process identified historical records of notable birds, mainly in the Clifton Pastures area, including quail and hobby, both species protected under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended).

4.5.62 Other notable breeding species previously recorded within the A453 corridor include declining farmland species such as lapwing, corn bunting, linnet, grey partridge and skylark, which are on the RSPB Red List and also on Section 41 of the NERC Act 2006.

4.5.63 Initial field surveys in June 2006 confirmed that many of the habitats within and adjacent to the scheme boundaries were not considered to be of high value for birds within due mainly to the low structural and botanical heterogeneity and proximity to the road. However, five main areas of potential value for breeding birds were identified and subject to further survey between April and July 2007.

4.5.64 Areas subject to further study by an experienced ornithologist on four further surveys in 2007 were:

- Area 1: March Covert Plantation
- Area 2: Long Lane to the Grand Union Canal
- Area 3: Land to either side of the A453 near Ratcliffe on Soar Power Station
- Area 4: Thrumpton Village Area
- Area 5: Barton Lodge to Drift Lane Plantation

4.5.65 A total of 47 species were recorded by the breeding bird surveys. Of this total, 25 are regarded as common and widespread woodland and farmland species which have relatively stable populations and are not considered to be of particular conservation concern in either a national or regional context.

4.5.66 Of the remaining species, 12 are listed on the RSPB red list due to significant decline in UK breeding numbers and/or listed as priority species under Section 41 of the NERC Act 2006. A further 9 species are listed on the RPSB Amber list.

4.5.67 Only one schedule 1 bird species was recorded; a hobby was noted c. 100 east of Drift Lane plantation on 22/05/07. This species was only recorded once and is not considered likely to be breeding in proximity to the proposed scheme.

4.5.68 In summary Area 2 (Long Lane to Grand Union Canal) and Area 5 (Barton Lodge to Drift Lane Plantation) support a greater diversity of notable species within 100m of the scheme, with an assemblage of 5 notable species recorded in Area 2 and an assemblage of 6 notable species in Area 5.

4.5.69 Overall the breeding bird assemblage (excluding species of principal importance) within the study area is assessed as being of local value. The habitats within and immediately adjacent to the scheme boundaries include arable habitats, hedgerows and other vegetation which support these species and are assessed as being of zone of influence value (see paragraph 4.4.1 above).

4.5.70 In the wider area, the farmland in the Barton in Fabis area and the area referred to as Clifton Pastures, represents an farmland which supports a similar assemblage of important bird species on a scale uncommon in Rushcliffe, and this assemblage in the wider area is assessed as being of importance at the district level.

Amphibians & Reptiles

4.5.71 Surveys for amphibians were undertaken of 17 features (ponds and ditches) within 500m of the scheme boundaries in 2006 (May to August) and 2007 (March to May), none of which are within the scheme boundaries. These surveys found no evidence of great crested newt.

4.5.72 Small numbers of common newt were recorded in several ponds including Burrows Farm Pond, Brands Hill Pond 1 and Manor Farm Pond and the pond designated as a SINC at Ratcliffe on Soar Power station. Common frog and common toad were also regularly recorded in the surveyed features. Common toad has just been added to the revised UK Biodiversity Action Plan list of priority species.

4.5.73 None of the species are rare or scarce in Nottinghamshire, but together, the amphibian assemblage of common species in the study area is assessed as being of local value.

4.5.74 Reptile surveys undertaken in 2006 at 7 locations along the proposed scheme route (see Figure 2.4.3 in the ES Volume 2) recorded no evidence of reptiles. The details regarding the location of the areas surveyed and the numbers of refugia mats placed within each is provided in the technical report A021959-REP-E-EN-221.

Invertebrates

4.5.75 The River Soar could potentially provide habitat for the white-clawed crayfish *Austropotamobius pallipes*. However, species specific surveys were not undertaken as this habitat will not be directly affected by the proposed development and there are no recent records of the species from the Soar or associated watercourses.

4.5.76 There are no other areas considered to be of potentially high value for invertebrates within or adjacent to the proposed scheme. The low naturalness of the habitats present, the high level of agricultural management and the low structural and botanical heterogeneity generally precludes significant interests for this group.

4.5.77 Purple hairstreak butterfly (*Neozephyrus quercus*) was seen in the small oaks either side of the track leading to Fox Covert (TN 6.4 Figure 2.4.2.6), and also in the garden of the Spinney Care Home, in north east Clifton (Figure 2.4.2.8).

4.5.78 Röesel's bush cricket (*Metrioptera roeseli*) was recorded on a grassland road verge north of Drift Lane Plantation during the Phase 1 Habitat Surveys in 2006 (Figure 2.4.2.6). This is not a protected or Nottinghamshire BAP species, but consultation with the county ecologist confirmed that this is likely to be the first record for Nottinghamshire for this species which is gradually spreading north from south and eastern England.

4.6 Potential Impacts

Introduction

4.6.1 In the following sections the likely main effects of the construction and operation of the scheme on flora and fauna are discussed as they would occur without any measures being taken to avoid, reduce or compensate for the effects.

4.6.2 Only those effects considered as likely effects of the scheme on flora and fauna are discussed in the assessment.

4.6.3 The main effects arising during the construction phase and considered within this assessment can be described in the following categories:

- Direct habitat loss to sites and habitats;
- Direct harm (inc mortality) to species;
- Indirect effects on sites through losses of connecting habitats, foraging habitats and ecological networks and corridors;
- Severance and fragmentation effects on other habitats and species;
- Potential for habitat degradation through pollution during construction, particularly uncontrolled discharges to watercourses.

4.6.4 The main operational effects considered within the assessment can be described under the following categories:

- Proximity of the trafficked road to sensitive sites and species leading to effects on habitat quality and/or disturbance from noise and lighting;
- Pollution of watercourses from routine highway discharge affecting biotic (i.e. living) and abiotic (i.e. non-living, such as temperature and light) characteristics of immediate habitats and downstream sites, habitats and species;
- Increased mortality of species which are likely to attempt to cross the carriageway;
- Other fragmentation effects of an operational road (some of which may be ongoing from the construction phase);
- Changes in public use of land which increases disturbance or other pressures on sensitive sites and species; and
- Effects of maintenance regime, particularly on flora and fauna associate with roadside habitats.

4.6.5 Cumulative effects arising from the proposed scheme are those which, in combination with a range of other activities (including development) affecting the baseline conditions in the area, could cause changes in the integrity of sites and habitats or the conservation status of species' populations.

4.6.6 For the purposes of this assessment, other projects which may affect the same baseline environment as the proposed scheme are as follows:

- The Parkway Station and traffic signalled junction adjacent to the Ratcliffe Power Station;
- Clifton Nottingham Express Transit (Tram) Park and Ride Scheme;
- ExtraCare/Larkhill Retirement Village;

- M2 Widening Contract 2 (Junctions 21-30).

4.6.7 Cumulative effects are assessed further in paragraphs 4.6.80 – 4.6.89 and in Section 3 of this Volume 1 of the Environmental Statement.

Potential Effects on Designated Sites

Construction Effects

4.6.8 There would be no direct effects on designated nature conservation sites arising from construction of the proposed A453 Widening scheme. Direct habitat loss, fragmentation and degradation would all be avoided due to the distance between the scheme and the designated site boundaries.

4.6.9 Potential indirect effects on designated sites arising from scheme construction include habitat losses and fragmentation of the wider ecological network which support designated nature conservation sites, and degradation of connecting habitats (particularly watercourses) from pollution events during construction, leading to degradation of downstream habitats and sites.

4.6.10 Habitat and features identified as being of value in their connectivity to designated sites are listed in Table 2.4.3 below, together with a description of likely construction effects and comment on the nature and significance of the effect. Effects on particular species or groups (e.g. bats and nesting birds) which are not a main reason for site designation are described below in subsequent sections.

4.6.11 The potential effects on the designated sites as a result of construction activities are insignificant in magnitude, and are considered to be both temporary and reversible within the construction period and a post-construction period of approximately 5-10 years.

Table 2.4.3: Potential Indirect Construction Effects on Designated Sites (Connecting Habitats)

Habitat/Feature		Potential Effects	Comment
1	Clifton Fox Covert Woodland (LNR and SINC): tree line and hedgerow on western side of existing A453 connects the roadside habitats to the SINC	• Permanent loss of c. 300m length of connecting hedgerow and trees alongside northbound existing A453 and fox covert lane due to construction of new Fox Covert access road and realigned A453 (Barton Lane) into Clifton. Temporary interruption of habitat corridor alongside A453 during construction phase and until new planting established in c.5 years after completion.	This would reduce habitat connectivity in the immediate locality. The unmitigated effect is assessed as being significant at the scale of the immediate area.
2	River Soar SINC	• Construction of the new Soar bridge and floodspan present a risk of pollution of the River.	The unmitigated effect is assessed as being significant at the scale of the immediate area.
3	River Soar SINC: connects to Ratcliffe Cut Canal	• Construction of the new canal bridge presents a risk of pollution of the River and/or the Canal.	As above for Item 2
4	Lockington Marshes SSSI: drainage ditch to north of March Covert drains towards SSSI	• Construction of the new carriageway presents a potential risk of pollution of the drainage network and the downstream SSSI.	As above for Item 2
5	Barton in Fabis Fish Ponds SINC; drainage ditch	• Construction of the new carriageway	As above for Item 2

Habitat/Feature		Potential Effects	Comment
	connects roadside drains to SINC	presents a potential risk of pollution of the Drainage network and the downstream SINC.	
6	Pond, Ratcliffe on Soar (SINC): woodland around pond on power station land	• The proposed Non-motorised User (NMU) route (footpath/cycleway) passes through this woodland and may require limited pruning of mature/dead trees for safety reasons.	Effects are considered extremely unlikely to affect integrity of the SINC site due to the low current value of SINC and small magnitude and extent of effects. Mature/dead trees will be retained. No significant effects are anticipated
7	Fairham Brook SINC: Nethergate Stream in Clifton connects to SINC	• Construction of the new carriageway and Clifton Green Junction presents a potential risk of pollution of the drainage network and the downstream SINC.	Effects are considered extremely unlikely to affect integrity of the SINC site due to the low current value of SINC

Operational Effects

4.6.12 No direct or indirect effects on designated sites are anticipated during the operational phase of the development due to habitat loss as no additional habitat losses are anticipated to be necessary to operate or maintain the road.

4.6.13 On the edge of Clifton, the proposed scheme will bring the carriageway approximately 10m closer to Clifton Grove, Clifton Woods and Holme Pit Pond LNR and Clifton Fox Covert SINC and losses of existing roadside vegetation reduce the screening effect between the road and the designated woodland areas. This is not anticipated to cause any significant effects due to road noise or air quality as the change in proximity in relation to the designated site is minimal and the road will be in cutting through this location, reducing the potential for disturbance due to traffic noise. The same considerations apply to the Holme Pit SSSI.

4.6.14 The proposed scheme will also bring the new main carriageway slightly closer to several designated sites on the eastern side of the existing A453, though as these sites are already at distances of 0.5km or more from the road and the new carriageway will be 20-50m closer, no significant indirect effects on these ecological integrity of these sites or their component habitats and species arising from changes in noise levels or air quality are expected as any changes would be negligible at this distance from the road.

4.6.15 With regard to highway drainage, the water quality assessment undertaken for the Environmental Statement indicates that without any mitigation at the Nethergate Stream, levels of copper and zinc from routine highway runoff (Highway Discharge points 12-14) are likely to exceed the recommended limits for this watercourse and there is consequently the potential for pollution of the substrates and water quality downstream at Fairham Brook. Such effects are assessed as a probable, permanent adverse effect on the brook. The brook is part of a designated SINC of county importance but the effect is likely to be local to the discharge and would also be unlikely to significantly affect adjacent riparian terrestrial habitats. Even so, the potential adverse effect is assessed as significant at the county level.

4.6.16 In addition, spillage calculations undertaken for the water quality assessment indicate that, without adequate protection measures, a potential major adverse effect on both the Nethergate Stream and Fairham Brook would occur were there to be a major spillage incident on the proposed new road. The magnitude of effect is dependent on the scale and nature of the spillage; whilst there is potential for a significant effect to occur which could affect the integrity of the Fairham Brook SINC, it is likely to be temporary and reversible.

4.6.17 The water quality assessment has identified no other significant risks to water quality of receiving watercourses or downstream sites and habitats due to routine runoff or spillage.

Potential Effects on Protected and Important Species

Otter

4.6.18 No direct effects on otter such as harm or disturbance are anticipated as there are no holts within or in close proximity to the proposed scheme boundaries. There will also be no significant indirect effects through habitat loss (foraging habitat or potential holt sites) for otter due to the construction works, as with the exception of a new drainage outfall on either side of the River and the construction area for the new bridge piers, the banks and watercourse along the River Soar are to remain intact and undisturbed. Although there is to be no in-river or in-canal working, there will be temporary obstruction of otter movement along terrestrial habitats along the river banks due to the placement of scaffold for construction of new floodspans and River Soar bridge piers, and storage of construction materials adjacent to the existing bridge.

4.6.19 This would only represent a significant obstruction were these to be located in close proximity to the river banks or in place during high flow (flood) conditions on the River when otter may attempt to use terrestrial riparian habitats rather than the river Channel.

4.6.20 Construction activity on the River Soar floodplain for the River Soar floodspans and River Soar bridge is anticipated to take 11-12 months. During this period heavy construction activities would be taking place including piling for bridge and floodspan piers (estimated 1-2 weeks per structure) as well as crane activity involved in lifting bridge spans onto the piers. Although there would be no night working, when otters are more likely to be active in this area, the presence of plant and materials may inhibit otter movement along the river. Such effects are likely to be temporary as otters can habituate to the presence of human activity.

4.6.21 The above effects are minor and temporary and are considered unlikely to cause otters to attempt to cross over the A453 carriageway where they would be at increased risk of mortality. The effects are extremely unlikely to restrict access to feeding resources or to inhibit territorial behaviour and breeding success. It is therefore unlikely that there would be any significant adverse effects on the conservation status of otter at the district level.

4.6.22 The presence of a heavily trafficked dual carriageway with a concrete central reservation is not considered to represent significant effect on the movement of the local otter population through the landscape and the River Soar is the only corridor identified with the Ratcliffe Cut Canal also a possible route. It is extremely unlikely that there would be a significant effect on the conservation status of the population as a result of operation of the road.

4.6.23 In summary, no significant effects on the conservation status of otter are anticipated.

Water Vole

4.6.24 No direct impacts of burrow loss or significant indirect effects of disturbance and habitat loss are anticipated as a result of construction activities along the River Soar. With the exception of a new drainage outfall on either side of the River and the construction area for the new bridge piers, the banks and watercourse along the River Soar are to remain essentially intact and undisturbed. The new bridge deck on the south side will over shadow vegetation here, slightly affecting growth.

4.6.25 The construction of the proposed scheme would result in the direct loss of approximately 350m of roadside drainage ditch near Thrumpton adjacent to the southbound carriageway (see Ditch L and L1 in Figure 2.4.3), which has an estimated 150m of suitable habitat for water vole and within which evidence of water vole has been recorded. An estimated 20m of Ditch K would also be lost. In addition, approximately 300m of suitable connecting ditch habitat along the southbound carriageway of the existing A453 (Roadside Ditch L and the western part) would be lost under the new southbound carriageway. It is possible that burrows would be established in future and without mitigation this effect includes a risk of direct harm to individual animals as well as possible loss of burrows and foraging habitat. These effects would result in the loss of a significant proportion of suitable habitat and could threaten the viability of the population at the district level.

4.6.26 Indirect construction effects could include the cleaning out of drainage ditches and increased fragmentation of habitats to either side of the A453, and the potential for habitat degradation beyond the scheme boundaries through pollution events during construction and alteration of flows. Alteration of flows could reduce the habitat quality such that the local drainage network can no longer support water vole. This would temporarily reduce the conservation status of water vole in the locality and if a permanent effect, could inhibit potential future expansion of this species.

4.6.27 Standard best practice, pollution prevention and control measures will ensure that the risk of pollution events is low and, were such an event to occur, it would most likely involve inert materials and would be a temporary and reversible effect unlikely to threaten the conservation status of water vole.

4.6.28 The habitat loss and severance caused by widening of the road during the construction phase will not increase during the operational phase though the impact of the severance in the water vole ditches between Thrumpton and Barton-in Fabis will be ongoing. It is not known what length of a culvert acts as a complete barrier to water vole movement (Strachan, 2004), though the Water Vole Conservation Handbook (Strachan and Moorhouse, 2006) suggests that an 18m culvert (providing it can be used by water vole) is unlikely to prohibit connectivity of habitat for this species.

4.6.29 Taking a precautionary approach and considering that water vole territories may be as small as 30m (for females), the opportunity for water vole to cross under the A453 and allow future expansion of the population and genetic exchange is

considered to be increased from negligible to low due to the increase in total culvert length from c. 25m to c. 50m under the dual carriageway. This is a permanent adverse effect which is significant at the local level.

4.6.30 As water vole is currently using the roadside ditch system, disturbance due to traffic is not considered to represent a significant change to the baseline conditions. It is unlikely that water vole will attempt to cross the dual carriageway at ground level and so no significant increase in risk of mortality through collision with vehicles is anticipated.

4.6.31 In summary, although effects are likely to be relatively localised, unmitigated direct and indirect effects on water vole are threats to the viability of the small population recorded in proximity to the scheme. The status of such a small population may alter in the period up to construction (the population could increase or could be absent); this is therefore assessed as a probable, significant adverse effect at the district level. The River Soar corridor will remain passable and no further operational or maintenance works would cause changes in the quality, quantity and connectivity of habitat for this species in that locality.

Bats

Effects on Roost Sites

4.6.32 The roost at Keeper's Cottage would not be directly affected by construction work and the road scheme design has been developed to ensure that this property is retained and would be slightly further from the heavy trafficked areas, which is considered to be a benefit of the scheme proposals.

4.6.33 The B5 floodspan would not be directly affected by the construction of the new floodspan immediately to the east. However, during construction, maintenance work to the existing structure may involve exposure of parts of the bridge structure which support roosting bats. Depending on the construction programme and extent of interference with exiting cavities within the bridge, this work could result in disturbance of roosting bats and direct harm to individuals.

4.6.34 Construction of the new floodspan itself is likely to involve installation of scaffold to construct the new piers *in-situ* and then the new deck will be placed on top. This work may cause noise disturbance to the bats roosting within the adjacent structure though the noise and vibration levels are not anticipated to be significantly higher that that generated by the overhead traffic on the existing A453 above the roost site.

4.6.35 Noise effects have been found to delay emergence time from roosts (Shirley *et. al.,* 2001) but construction activities on the A453 will not involve working at roost emergence or return times. Any effect may be greater if construction work is undertaken within the period when bats are most active (May-September), present in greater numbers and breeding. Although bats are more sensitive to disturbance

in winter, and the bridge could be used as a winter roost site by bats, piling works and other noisy activities with heavy plant are more likely to be undertaken outside the winter period when ground conditions are suitable. Disturbance over and above the noise and vibration created by existing traffic flows is unlikely to occur as a result of nearby construction activities. No significant effects on the value of the roost are anticipated as a result of noise arising from the works in proximity to the floodspan. Disturbance effects may arise and would need to be permitted under licence from Natural England.

4.6.36 The presence of a scaffold immediately adjacent to the roost could cause indirect effects through obstruction of access to the roost from the eastern side and/or causing bats to cross more frequently over the A453 rather than underneath, presenting an increased risk of collisions with traffic. Lighting of construction areas and working at night could also affect the B5 floodspan roost, discouraging use and causing bats to seek alternate roost side. Such effects could occur for the approximate 6 month duration of construction of the structure.

4.6.37 Although not part of the scheme construction requirements, it is also proposed to undertake maintenance works to the existing B5 floodspan during the construction period, timetabled for the summer of 2011 although disturbance to the maternity roost would be minimised by working outside of this season. This work would involve removal of the existing black-top road surface and renewal of the waterproof layer above the concrete deck, beneath which are the cavities between bridge beams which are utilised by the bats. This work is expected to take approximately 3 weeks. It is not anticipated that it will be necessary to break out any of the concrete deck and would not directly threaten bats or their roost space(s). Depending on the methods required to remove the existing road surface and the waterproof layer, the works may cause disturbance to bats in occupation of the roost site, but is unlikely to result in abandonment of the roost and is not identified as a significant effect on the status of local bat populations. Such operations and the disturbance associated with them would require a licence from Natural England and the presence of a licensed bat ecologist on site during the operations.

4.6.38 A mature oak tree within a hedgerow in the grounds of Four Winds and Baird nursing home may be affected as a result of the proposed scheme. The tree is assessed as having low/moderate potential to support roosting bats through no roost sites or evidence of use by bats was recorded by a visual survey. Detecting tree roosts is often extremely difficult due to their typically infrequent use by small numbers of bats and their structural complexity. If this tree cannot be retained then additional assessment work by a suitably qualified ecologist would be undertaken in advance of removal.

4.6.39 The habitat loss and potential severance caused by widening of the road during the construction phase will not increase during the operational phase, though without mitigation the impact of the severance would be ongoing and permanent. This physical barrier effect would be exacerbated by the presence of night-time traffic flows along the dual carriageway, which if bats attempt to cross at the height of

vehicles, would increase the risk of mortality through vehicle collisions which in turn could lead to a reduction in size of the roost at Keeper's cottage and population size in the wider locality.

Effects on Foraging & Commuting Habitats

4.6.40 The construction of the new southbound carriageway (particularly through online widening) would result in the loss of roadside hedgerows and trees which are currently used by bats as foraging and commuting routes; these indirect effects are potentially more significant where they occur in close proximity to roosts.

4.6.41 In the area around Keepers Cottage, the new carriageway and increases in traffic flows would increase the fragmentation or barrier effect of the road, making what limited foraging resources there are to the south less available to bats using the Keeper's Cottage roost. Without mitigation these effects are likely to reduce the quality of habitat in proximity to the roost site which could inhibit potential growth of the bat roost and access to other current or future potential roost sites to the east of the A453. The unmitigated adverse effect is a likely to be significant at the local level.

4.6.42 Habitat losses around the B5 floodspan predominantly involve losses of ruderal vegetation underneath the new parallel structure and the grassland and scrub habitats on roadside embankments and adjacent to the Ratcliffe Cut Canal. Such effects, though permanent, are limited in extent and are not considered likely to affect the integrity of the roost site through removal of a foraging resource or interruption of feeding and commuting routes. Vegetated links from the floodspan to the Ratcliff Cut Canal and the River Soar would be maintained throughout the construction period.

4.6.43 The new floodspans, Soar Bridge and Canal Bridge will also increase the length of 'overshadowed' habitat through which bats would have to fly to cross underneath the road by approximately 15m. The dimensions of all structures and clearance above the watercourses are such that this is not anticipated to cause any significant obstruction to movement or fragmentation effects which could inhibit movements between roost sites and foraging habitats and other potential roost sites in the locality.

4.6.44 Effects on foraging and commuting habitats in other areas of the scheme include removal of roadside plantation and hedgerow, in particular opposite Twenty Lands Plantation and also on the western side of the A453 between Drift lane plantation and the edge of Clifton. Without appropriate mitigation, the cumulative loss of these habitats in addition to other roadside vegetation is assessed as being a probable adverse effect which is significant at the district level as, though unlikely to affect the status of local bat populations; it would reduce the overall habitat quality for bats around the scheme corridor and is likely to inhibit movement of bats through the landscape.

4.6.45 The wider carriageway will continue to support traffic flows at night-time when bats are actively foraging, and presents a greater barrier to movement across the road and an increased risk of mortality through collision with vehicles. The areas most affected are those areas where bats are more likely to attempt to cross the proposed new road alignment including Barton Lodge and Twenty Lands plantation near Thrumpton. The pipistrelle bats and other Myotis species recorded in these areas frequently fly at a height which makes them vulnerable to collision with traffic. Leisler's and Noctule often fly at greater heights but can also fly and forage at canopy height, making them vulnerable to collision risk also. Without mitigation, the combined effect of increased severance and risk of mortality is assessed as a significant local adverse effect.

4.6.46 Lighting along the rural section of the scheme will be restricted to the junctions. Parkway Junction near Ratcliffe on Soar Power Station already experiences light intrusion at night, thus scheme lighting is unlikely to cause significant effects. Scheme lighting at West Leake junction will stop approximately 200m from Twenty Lands plantation thus avoiding disturbance to bat flight routes in this area.

Badger

4.6.47 Without mitigation, operation of the new road would represent a significantly greater hazard to badgers attempting to cross the dual carriageway due to the greater width and higher traffic flows throughout the scheme and the presence of a concrete central reserve in the rural section. Increased mortality is most likely to be at the locations where road mortality clusters have been previously recorded (see confidential badger assessment report ref. A021959-REP-E-EN-216). Without mitigation it is likely that this increase in mortality would lead to a reduction in the size of the local population as badger social groups have a relatively low birth rate and cannot compensate rapidly for such mortality effects.

4.6.48 The level of mortality which could be sustained by the local badger population is not known; taking a precautionary approach, this effect would be permanent and without mitigation is assessed as significant at the local level with a confidence level of probable.

Brown Hare

4.6.49 Losses of arable habitat suitable for brown hare are insignificant in comparison with the large extent of similar habitat elsewhere within the study area and further afield. No significant effects on brown hare are anticipated as a result of scheme construction.

4.6.50 The existing A453 is likely to represent a barrier to brown hare, and the increased carriageway width and continuous concrete safety barrier in the central reserve will increase this barrier effect and also lead to an increased risk of mortality in the rural section of the proposed scheme. Mortality in relation to roads is likely to be highest in spring when activity levels are highest and in autumn when hares are often

hunted. The magnitude and significance of any increase in fragmentation and mortality risk as a result of the proposed scheme is difficult to assess as effects of road mortality, though unlikely to involve large numbers, may be significant if hare numbers in the wider area are low. This is assessed as a significant adverse effect at the scale of the immediate area.

Barn Owl

4.6.51 No effects of nest sites are likely to result from construction as there are no such sites within or adjacent to the scheme boundaries and construction areas.

4.6.52 Construction would result in the loss of roadside grassland habitats as well as hedgerows and field boundaries within the online widening sections in particular. Whilst these are not assessed as being of particularly high quality for barn owl, they are likely to be used by this species and without mitigation their loss would reduce the amount of small mammal prey available in the locality. The effect of this loss is difficult to assess as, although the existing habitats provide a source of prey, the presence of the resource currently attracts barn owl toward the road where they are at increased risk of collision with vehicles. Overall, the losses are not considered to represent a threat to the conservation status of this species and the presence of the new carriageway does not represent in itself a significant barrier to owl movements, though effects of traffic during the operational phase are discussed further below. Construction effects are therefore assessed as not significant.

4.6.53 As the proposed alignment does not deflect significantly from current alignment relative to known Barn Owl nest sites, the operation of the new road is unlikely to cause a significant change in Barn Owl distribution. The main operational effect on barn owl is the increased risk of mortality through increased traffic flows and the wider carriageway, particularly at likely crossing points where suitable habitat exists on either side of the road and along the road verge where there would be increased foraging.

4.6.54 Areas of greater risk are in places where the road is raised significantly above the levels of surrounding land and where traffic is exposed (e.g. not screened by vegetation) to low flight routes, such as at Long Lane, at West Leake Junction, across the arable land between Thrumpton and Barton-in–Fabis and at Barton Lodge.

4.6.55 The risk cannot be quantified and it is not known what level of mortality can be sustained by for the local population without affecting conservation status. However, given that road mortality is a major reason for declines in the national barn owl population, a precautionary approach should therefore be taken, and, without mitigation, this is assessed as being a potentially significant and permanent adverse local effect on the barn owl population.

Breeding Birds

4.6.56 Construction of the new road carriageway and junctions would predominantly result in the loss of areas of open farmland adjacent to the existing A453 in addition to roadside hedgerow, road verge and plantation woodland.

4.6.57 Of the species of principal importance identified within the study area, the only species which have been recorded within the scheme boundaries and which could be directly affected by construction are tree sparrow, grey partridge and bullfinch.

4.6.58 For each of these, the losses in terms of habitat areas are likely to be low in magnitude and therefore unlikely to significantly affect the conservation status of these species on a regional or national scale. However, without mitigation the effect represents a permanent (albeit small) loss of the current and potential resource in the locality as well as a risk of direct harm to nesting birds. The status of these species would mean that habitat losses, though limited, represents a permanent effect which is significant at the local level.

4.6.59 The remaining important bird species have, to date, all been recorded outside the scheme boundaries. Although they may use habitat within the boundary for other feeding and shelter resources, losses are not significant in comparison to the large areas of similar habitat elsewhere in the locality and would not affect the conservation status of these species in the locality or on a regional or national basis.

4.6.60 Along the proposed section between Barton Lodge and Clifton, the alignment is offline and results in permanent loss of open farmland which is utilised by important species including grey partridge, corn bunting, and skylark. However, it is not the total area of arable land which is considered to limit the populations of these species in the locality; rather it is the quality of the habitat for nesting and feeding.

4.6.61 The proposed A453 dualling scheme, although removing some field boundaries and open arable land, would result in an effective reduction in field sizes and an increase in field edge habitats (roadside hedgerow) which would help support these species. On balance, the effect is assessed as neutral or slightly beneficial at a very local level (though unlikely to significantly improve conservation status).

4.6.62 There will be no effects resulting from operation of the road which would result in direct or indirect habitat loss or fragmentation that could further affect the notable bird species recorded within and adjacent to the road corridor.

4.6.63 Effects on breeding success from road noise are likely to be increased along the scheme with the zone of disturbance extended from the existing road. At current traffic levels, the population densities of breeding birds are already likely to be significantly affected along the existing route. The degree of change above the existing environmental conditions which would make a significant difference to the density of existing bird populations in the vicinity of the A453 is not known and cannot be accurately predicted. A precautionary approach is taken and it is

considered likely that proposals would have adverse effects on some of the species in the assemblage of birds of principal importance which utilise habitats in close proximity to the road.

4.6.64 Overall, the local increase in noise levels may lead to reductions in breeding numbers in a restricted area close to the proposed scheme, but this would affect an already relatively low density of these species. This is assessed as a permanent adverse effect but one which is highly localised and so is considered to be significant at the local scale.

Amphibians, Reptiles and Invertebrates

4.6.65 None of the amphibian species are considered likely be dependent on habitats lost as a result of the scheme as there would be no loss of breeding habitat and terrestrial habitats would not be significantly affected as they are largely outside the scheme boundaries. However, common frogs, toads and newts may disperse significant distances from breeding ponds (0.5km or more in some instances) and so low increases in mortality rates may be experienced during construction in the areas of the scheme which include suitable habitat, including woodland around the Power Station area and some of the drainage ditches adjacent to the existing A453.

4.6.66 The existing A453 is considered likely to represent a significant barrier to species movement due to high traffic levels and noise. The increase in habitat severance effects due to vegetation removal and widening of the carriageway is unlikely increase the effectiveness of this physical barrier to most fauna (especially amphibians, small mammals and terrestrial (non-volant) invertebrates), but may reduce connectivity along the road corridor itself. This is a temporary adverse effect significant at the scale of the immediate area only.

4.6.67 None of the species are considered likely to experience operational impacts due to the distance of breeding habitats from the scheme and the fact that the existing A453 is considered to be an effective barrier to movement, so that the widening would make no significant difference.

Potential Effects on Important Habitats

Lowland Meadow

4.6.68 Both areas of relatively species-rich grassland identified in paragraph 4.5.9 are outside the proposed scheme and would not experience any direct or indirect effects as a result of construction of the proposed scheme.

4.6.69 No operational effects on these habitats are anticipated as there would be no additional land-take in the operational phase and management of the highway estate would not affect these grasslands. They are either screened from the mainline highway with high traffic levels, and/or are at sufficient distance so that

effects such as salt spray or dust emissions are unlikely to cause any significant effects.

Species-Rich Hedgerow

4.6.70 The species-rich hedgerow at Winking Hill Farm identified in paragraph 4.5.10 is outside the proposed scheme and would not experience any direct or indirect effects as a result of construction of the proposed scheme, though the eastern end of the hedgerow is close to the proposed West Leake junction and is at risk of accidental damage during construction.

4.6.71 No operational effects on this hedgerow are anticipated as there would be no additional land-take in the operational phase and management of the highway estate would not deleteriously affect this feature. The heavily trafficked mainline highway is at sufficient distance so that effects such as salt spray or dust emissions are unlikely to cause any significant effects.

Potential Effects on Other Habitats and Species

4.6.72 Losses of other habitats as a result of the scheme construction largely comprise the following:

- Arable land
- Roadside verge (species-poor grassland) with patches of ruderal vegetation;
- Roadside broadleaf and mixed plantation woodland (semi-mature);
- Coniferous plantation within the Ratcliffe power station boundary;
- Species-poor (hawthorn dominated) roadside and farmland hedgerow;
- Roadside drainage ditches lost to the new carriageway on areas of parallel widening and increases in culvert length affecting watercourse crossing the A453.

4.6.73 Effects of these losses in specific localities where the habitats are in connection with, or proximity to, designated sites and in relation to particular species, groups or assemblages of substantive nature conservation value has been considered in above sections.

4.6.74 Although they are generally common, widespread, native-species poor and of low diversity and intrinsic value and are not considered to support notable habitats species or assemblages, together they constitute a network of vegetation which contrasts with the open arable landscape and links other more valuable and extensive areas of woodland and hedgerow habitat.

4.6.75 Although largely within the highway boundary, these areas are considered to represent a functional element of the ecological network within the ‘wider countryside’, outside acknowledged and designated areas of nature conservation

importance. This value is reflected in the revised UK Biodiversity Action Plan lists as all hedgerows with 80% or more cover of any native tree/shrub species are now considered to be a Priority Habitat.

4.6.76 This network provides feeding resources and places of shelter for other flora and fauna, including a (albeit limited) population of breeding birds which would not persist in the intensively managed arable fields alone, and facilitates the movement of flora and fauna between more valuable sites and habitats. Other species which are likely to use this network include common toad and hedgehog, both of which have recently been included on the revised UK Biodiversity Action Plan Priority Species list.

4.6.77 One particular hedgerow which would be lost is the hedgerow along the frontage of Nottingham Trent University. This hedgerow is species poor and fragmented but has in the past represented the only mature vegetation feature alongside the road. The current proposals would result in the loss of the remaining sections (estimated 100m) of this hedgerow.

4.6.78 No additional operational effects are anticipated on other vegetation and habitat types as a result of the scheme operation. There are no habitats of significant value that would be affected by salt spray, particles and other emissions from use of the road and such effects are highly localised.

4.6.79 In total, the unmitigated loss of these habitats is assessed as being an adverse effect significant to nature conservation interests at the local level.

Cumulative Impacts

4.6.80 Cumulative effects of the proposed scheme in combination with other developments in the wider area are considered in Section 3 of the Environmental Statement and include the following developments:

- Parkway Station, including traffic signalled junction and Park & Ride Site
- Nottingham Express Transit (NET) Park & Ride Site
- Extra Care/Lark Hill Retirement Village
- M1 Widening (junctions 21-25)

Parkway Station

4.6.81 The new Parkway Station is a railway station development within arable fields to the south of the mainline railway and Ratcliffe on Soar Power Station, under construction at the time of this assessment. This development requires a new junction off the A453 and access road across the railway. Coniferous plantation woodland adjacent to the Power Station has been removed under the Parkway Station development, and some arable land. The A453 Widening scheme includes

native woodland planting within the new Parkway junction, thus reducing the cumulative effect interms of biodiversity impact.

4.6.82 The loss of arable land to the railway station does not affect any areas of significant nature conservation value and the habitats affected are common and widespread, with no rare or protected species affected. The scale of losses is relatively low and no additional impact on flora and fauna is anticipated as a result of construction or operation of this development.

NET Park & Ride Site & ExtraCare/Lark Hill Retirement Village

4.6.83 These two projects are adjacent developments which would result in loss of arable land between the proposed A453 scheme (Mill Hill Junction) and the southern edge of Clifton. The Extra Care/Larkhill site is approximately 3ha and construction has already commenced. The Clifton NET project would also be immediately to the south of Clifton and would cover a similar area.

4.6.84 The principal ecological interest in this area is the assemblage of breeding birds, including several species of principal importance. However, this area has been considered by consultants (Faulks, Perry Culley and Rech) assessing the effects of the Larkhill Retirement Village who stated that 'this area lies at the southern periphery of Clifton and is consequently highly disturbed' but that 'disturbance across adjacent remaining farmland to the south may lead to a reduction in habitat quality and/or displacement of farmland birds'.

4.6.85 The ExtraCare / Lark Hill project was therefore not considered to have a significant effect on farmland birds. The planning committee report included no objection or comment on ecological impact from Natural England and the Nottinghamshire Wildlife Trust. The Clifton NET park and ride site affects very similar habitat types.

4.6.86 The additional loss of farmland, although it may not support high numbers of birds or notable species, represents an additional impact of low magnitude which is likely to affect the bird assemblage in the immediate locality only. Planting and habitat creation associated with the retirement home proposals are likely to enhance the area for urban and suburban bird species as overall no significant cumulative impact in addition to the proposed A453 widening scheme is anticipated as a result of development in this area.

M1 Widening (junctions 21-25)

4.6.87 The M1 Widening (Contract 2) project involves widening of the motorway between Junctions 21-25. This includes junction improvements (including additional highway to the west of Junction 24 and Kegworth Bypass (a highway link between junction 23a and the A6 south of Kegworth).

4.6.88 The flora and fauna in the areas affected by the proposals are largely to the west of the existing M1 or on the other side of Kegworth (approximately 2km to the south)

and largely isolated from the flora and fauna communities along the proposed A453 scheme route by intervening farmland, the urban area of Kegworth as well as the M1 motorway.

4.6.89 No significant cumulative effects on flora and fauna are anticipated as a result of the M1 widening in addition to the A453 scheme.

4.7 Design and Mitigation Measures

Introduction

4.7.1 This section presents an outline of the key mitigation measures to be adopted in order to address the likely significant effects on flora and fauna and to maintain the integrity and conservations status of sites, habitats and species in the locality. This will help deliver targeted biodiversity enhancement for key habitats and species.

4.7.2 Mitigation includes measures to avoid or reduce significant impacts of the scheme. Proposals are also made for enhancement measures to benefit habitats and species in the locality of the proposed scheme.

4.7.3 The Environmental Masterplan illustrates the main ecological elements of the scheme. Further details of the proposed measures are described within the A453 Widening Environmental Assessment: Ecology and Nature Conservation report and illustrated on Figure 2.4.3 in Volume 2 of the ES.

4.7.4 Recommended lists of plant species for native woodland, scrub, grassland and hedgerow planting and seeding are provided in the Ecology and Nature Conservation report (see paragraph 4.1.4). These would form the basis of the detailed landscape planting and seeding design in all areas where the use of other species is not overriding (e.g. for visual impact mitigation purposes or to satisfy other mitigation requirements).

4.7.5 Sources of seed and plant stock would be native and of local provenance where practicable. We would seek to involve the East Midlands Local Origin Seed Initiative to source local native tree species such as oak, ash and rowan.

Construction Management and Monitoring

4.7.6 Prior to commencement of construction, the Construction Environmental Management Plan (CEMP) would identify risks of environmental harm and set out method statements, designs and protocols to minimise the risk of pollution events or other environmental harm during the construction period. This would include protection of watercourses, sensitive ecological areas (including mitigation areas) and areas of retained trees and other vegetation.

4.7.7 The CEMP would also specify a monitoring programme for sensitive ecological habitats and protected and/or important species so that the success of mitigation

measures may be assessed and so that the construction programme, methodology and the implementation and management of the ecological design may react to any significant changes to the baseline environment (e.g. changes in distribution of protected fauna). Monitoring would continue into the 5 year aftercare period.

Designated Nature Conservation Sites

4.7.8 No statutory designated sites of nature conservation value would be significantly affected by the proposed scheme. Therefore no specific mitigation measures are necessary for these sites.

4.7.9 Native roadside planting would be provided to compensate for losses of existing roadside habitat connecting the existing A453 road corridors to Clifton Grove LNR and Clifton Fox Covert SINC. The new planting would include broadleaf woodland and hedgerow alongside the new road and also along either side of the realigned Fox Covert Lane.

4.7.10 As indicated on the Environmental Masterplan the opportunity would be taken to secure off-site planting outside the highway boundary through agreement with landowners to create additional areas of native tree and scrub species to the south of Clifton Grove LNR and Clifton Fox Covert SINC to increase extent of woodland and scrub habitats. Such offsite planting has not been taken into consideration in the assessment of effects as it is desirable but cannot be guaranteed.

4.7.11 Similar agreements would be sought to plant and/or enhance hedgerows along the retained A453 between the proposed Mill Hill roundabout and Barton Lodge; between the new mainline southbound verge and Gotham Hill Wood; and between West Leake Road and Gotham Hill Wood (see Figure 2.4.3.3). Such planting would enhance the local network of hedgerow and woodland connecting designated sites to other areas, and represent a benefit to local nature conservation interests. As above, such offsite planting has not been taken into consideration in the assessment of effects.

4.7.12 The field drainage network to the north of the road and upstream of Barton in Fabis Fishponds would be improved for water vole including re-profiling of approximately 1km of existing ditch banks to increase suitability for this species. Land surrounding the balancing pond in this area would also be enhanced through creation of approximately 200 metres of new ditches and shallow wetlands to help maintain the water vole population and benefit the flora and fauna of the wider local wetland network, including the fishponds SINC.

4.7.13 As set out in the A453 Road Drainage and the Water Environment assessment, Report Ref. A021959-REP-E-WQ-228, proposals within the Nethergate Stream catchment area are to provide attenuation via drainage ditches and oversized pipes, as recommended by the EA. Bypass separators and penstocks will be incorporated to control routine runoff and accidental spillages respectively in the urban section. Drainage treatment and spillage containment measures would be implemented for

the Nethergate Stream to prevent pollution of downstream sections and the Fairham Brook SINC.

4.7.14 Overall pollution prevention and control during construction will be achieved through a CEMP which will identify significant effects arising from construction, specify responsibilities for environmental protection and provide methodologies and guidance to minimise risk of harm to sensitive ecological receptors.

Statutory Protected Species

Otter

4.7.15 Access along the River Soar will be maintained during the construction period and there will be no obstruction of the Soar channel or river bank habitats which would prevent otters using the aquatic or riparian habitats. With the exception of the new River Soar piers and bridge, there would be no construction activities within 20m of the Soar channel.

4.7.16 Subject to landowner consent, an artificial otter holt will be provided along the bank of River Soar. The holt would be more than 50m from the highway boundary and the location chosen to provide adequate shelter and protection from disturbance from human activity.

4.7.17 The drainage network upstream of Barton in Fabis fishponds is currently severed from ditches and drains to the south of the carriageway. Although no evidence of otter has been found in this area, the carriageway scheme design will reduce the severance effect and increase potential for otter expansion by provision of a box culvert (culvert C6) at chainage 6300 with a 500mm mammal ledge to connect the drainage network across the new dual carriageway. The culvert would be built in accordance with guidance for otters within the Design Manual for Roads and Bridges (Volume 10, Section 1, Part 9) so that the ledge is 150mm above highest anticipated water level and has 600mm headroom. The culvert will be over 900mm in width to maximise the chance of use should it be required.

4.7.18 Two further cylindrical culverts (C7 and C8) of diameter 1050mm and 1200mm respectively, would be installed between 6500 and 6600 and would connect highway drainage and field drainage on both sides of the A453. The size of culvert and anticipated flows means that these would also be usable by otter should this species expand along this drainage network. The provision of ledges is not required since if water levels rise then land at either end of the ledge will be flooded. Even so, this represents a significant improvement.

4.7.19 Monitoring would be undertaken in the 12 month period prior to construction and during the construction period to detect any new holts/couches established within proximity to the scheme which may be disturbed or damaged by construction activities.

4.7.20 Control and prevention of potential pollutants and pollution events would be achieved through the CEMP, which would also specify working methods and storage locations for plant and materials in any areas considered to be sensitive with regard to otter.

Water vole

4.7.21 A pond (approximately 0.12 hectares) and approximately 200m of new ditch habitats would be created in advance of construction on land to the north of the existing A453 between chainages 6200 and 6500 (see Figure 2.4.3.4). These would be connected to the existing field drainage network which currently supports water vole at an early stage in the construction programme and in advance of any significant losses of existing water vole habitat.

4.7.22 New roadside drainage ditches in this area south of Barton in Fabis, and throughout the scheme alongside the widened carriageway, would be profiled to include a shelf along one bank to promote a variety of flora and provide foraging and burrowing opportunities for water vole. Local drainage characteristics and topography means it is not possible to increase the water levels significantly in the ditches and drains, so that seasonally wet ditches (or their replacements adjacent to the new carriageway) are likely to remain seasonally wet.

4.7.23 The profiles of existing drains would be altered to improve suitability and increase carrying capacity for water vole by increasing the amount of aquatic and emergent vegetation able to colonise the ditch margins. New ditches would be planted with native species favoured as food by water vole. Within 1km of the recorded water vole population, an estimated 2km of improved ditch habitat would be created which would be suitable for water vole dispersal and population expansion.

4.7.24 The primary function of the balancing pond is for attenuation of highway runoff but the pond would be designed in accordance within guidance within the Design Manual for Roads and Bridges advice note HA 103/6 ‘Vegetative Treatment Systems’ which would result in additional habitat available to water vole and connected to the local drainage network which currently supports this species.

4.7.25 If future monitoring work identifies any water vole burrows in the roadside ditches and field drains to be lost under the new southbound carriageway, then water voles would be captured and excluded from these areas. Captured animals would be transferred to immediately adjacent habitats or (if this area does not have sufficient capacity due to habitat quality or presence of other animals) the new and enhanced habitats described above. In this instance, the new ditches would be created and vegetated at least 6 months prior to the destruction of existing drains to ensure that suitable habitat was available to support the translocated water voles.

4.7.26 A new culvert (Culvert C6) taking field drainage underneath the new carriageway and the existing road would be designed as a box culvert (>900mm in width) and

would include a 500mm mammal ledge in order to minimise the barrier effect of culverting for water vole.

4.7.27 Two further cylindrical culverts (C7 and C8) of diameter 1050mm and 1200mm respectively, would be installed between 6500 and 6600 and would connect highway drainage and field drainage on both sides of the A453. The size of culvert and anticipated flows means that these would also be usable by water vole, which, with culvert C6 would significantly improve connectivity across the A453 route.

Bats

4.7.28 A programme and detailed construction methodology for the B5 floodspan would be developed and specified within a method statement within the CEMP. Where necessary, a European Protected Species licence would be obtained from Natural England if necessary to permit disturbance of the roost due to construction. This would specify working methods to minimise the risk of disturbance to bats.

4.7.29 Where possible the heaviest construction work for the new floodspan (particularly piling) would be programmed to be undertaken in spring or autumn, avoiding the period between May and September inclusive when peak numbers of bats are likely to be using the roost.

4.7.30 Scaffold design for the new floodspan would include gaps to maintain access to the roost for bats and there would be no night working which could discourage bats from emerging from, or returning to, the roost. Generators and other noisy plant as well as storage of materials would be kept away from the roost site to minimise vehicle movements and other noise disturbance and emissions in this area.

4.7.31 During bridge maintenance work programmed for 2011 care will be taken not to block crevices that, although not structurally significant, provide access for bats.

4.7.32 Bat roost boxes would be provided on trees/posts along the River Soar and Canal (depending on landowner consent if on land outside the highway boundary) in advance of works commencing on the floodspan, to maintain availability of roost sites for pipistrelle species and increase the variety of roost sites for bats in the immediate locality. They would be sited over 50m from the highway boundary.

4.7.33 Trees with potential to support bat roosts in proximity to the scheme would be clearly demarcated to prevent accidental damage. Other retained vegetation would be protected to ensure that loss and fragmentation effects are kept to the minimum necessary to build the scheme.

4.7.34 New roadside planting and additional planting on other land within the proposed highway boundary would maintain and enhance habitat continuity in the medium to long term, including a net increase in woodland area, woodland edge and hedgerow length along the scheme corridor. We will also be liaising with landowners with regard to offsite planting beyond the highway boundary, which would be desirable

to enhance the ecological proposals but not essential to mitigate impacts. Woodland planting will be native broadleaf species, and hedgerows will be species-rich (5 or more woody species on average per 30m).

4.7.35 Planting design would guide bat fly-routes under the road in the vicinity of underpasses, over-bridges and floodspans to reduce risk of vehicle collision. Strategic tall planting would be employed to encourage bats to fly over the road above vehicle height at key points, particularly at Twenty Lands Plantation (north of West Leake junction) and at Barton Lodge.

4.7.36 Wetland foraging habitats with mosaics of scrub and neutral grassland would be created on existing arable land to the north of the existing A453 at chainage 6150 - 6600. This would include a mix of seasonally and permanently wet (standing water) areas and a species-diverse grassland with scrub edge habitats.

4.7.37 This area would also be adjacent to a new balancing pond. The primary function of the pond is for attenuation of highway runoff but the pond would be designed in accordance within guidance within the Design Manual for Roads and Bridges advice note HA 103/6 'Vegetative Treatment Systems' which would result in additional wildlife habitat, including promotion of invertebrate (insect) communities which would provide prey for bats. Other balancing ponds within the scheme will be similarly designed.

4.7.38 Wetland foraging habitats with mosaics of scrub and neutral grassland would also be created on existing arable land between the proposed scheme and the existing A453 to the south of Barton Lodge at chainage 6750 – 7200. This would include a mix of seasonally and permanently wet (standing water) areas and a species-diverse grassland with scrub edge habitats.

4.7.39 The lighting design will keep lit sections of road to a minimum and will utilise light designs with a focused down-beam to minimise light spillage into adjacent areas used by bats.

Badger

4.7.40 The majority of affected setts are not in current use. This will be kept under review by re-surveying prior to construction. Where loss is unavoidable, existing setts will be closed under licence from Natural England in the period July-November inclusive. If affected setts are found to be in use prior to construction then artificial setts will be provided. Landowner agreements have been reached in principle at two locations. Further details are provided within the separate confidential badger report.

4.7.41 Badger-resistant fencing will be installed along the majority of the rural section of the proposed scheme on both sides of the road to discourage badgers attempting to cross the main carriageway. Fencing would not be provided in the urban section as

accommodation of pedestrian usage and side roads means that an exclusion scheme using fencing is not feasible.

4.7.42 The Cattle Creep (B1 underpass) and Ash Lane underpass at the power station will be maintained as accessible routes for badger under the A453. Additional underpasses are to be provided in 6 locations at crossing points likely to be used by badger (including all areas with recorded clusters of road traffic causalities) and detailed design will ensure that badger resistant fencing guides badgers to these underpasses. Most underpasses will comprise a 600mm diameter cylindrical concrete pipe, however a 1200mm x 1800mm box culvert with a 500mm mammal ledge will be provided at chainage 6300. In addition, the extended Thrumpton overbridge will continue to be available for use by badger, which will also be able to use the new accommodation underpass at Barton Lane.

4.7.43 Retained setts within 30m of the proposed scheme or temporary working areas will be protected using temporary fencing during the construction period to minimise the risk of accidental disturbance or damage.

Barn Owl

4.7.44 Tall vegetation will be provided to reduce risk of barn owl crossing the road at vehicle height in the locations identified as being of greatest risk, namely either side of Long Lane; between West Leake junction and Thrumpton Accommodation Bridge; and either side of the Barton Lane accommodation underpass. Here continuous lines of trees and/or hedgerow are to be planted alongside the main carriageway to discourage low lines of flight by barn owl over the road.

4.7.45 Detailed design of roadside verges in these areas will avoid large expanses of grassland which might attract barn owl, and will instead comprise grasslands with a high proportion of cover in the form of trees and scrub species.

4.7.46 To mitigate for potential impacts on population due to road mortality, it is proposed that additional nest boxes will be provided in the wider locality in order to encourage population growth and range expansion. These areas will be identified through local consultation and will require landowner agreement.

Habitats and Species of Principal Importance

Lowland Meadow

4.7.47 There would be no losses of lowland meadow or other herb-rich grassland habitats. New grassland areas within scheme boundaries would include (neutral) lowland meadow grass and herb species. These grasslands would be established on thin topsoils and would include road verges in the rural section of the scheme in addition to specific habitat creation areas, the most substantial of which are at the following locations:

- Arable land between the proposed scheme and the realigned Barton Lane to the north of Ratcliffe on Soar Power Station at chainage 4250-4600.
- Existing arable land to the north of the existing A453 between Thrumpton and Manor Lane, Barton in Fabis at chainage 6150-6600
- Existing arable land between the existing A453 and the proposed scheme south of Barton Lodge at chainage 6750-7200.

4.7.48 The grassland on road verges would be sown in a mosaic with scrub and scattered tree habitats, avoiding open expanses of grassland which could be attractive to barn owl.

4.7.49 In habitat creation areas where grass cover is not required immediately to stabilise slopes or for visual amenity purposes, areas would be left unsown to allow for nature colonisation of the soil substrate.

4.7.50 Management of roadside grasslands and habitat areas would be designed to promote botanical diversity. An estimated area of 5ha within the scheme would be created or restored to species-rich lowland grassland which represents a benefit of the scheme.

Species-Rich Hedgerow

4.7.51 There are no losses of species-rich hedgerow as a result of the proposed scheme. The existing species-rich hedgerow at Winking Hill Farm would be protected during construction and adjacent land planted with complementary native woodland and scrub species.

4.7.52 New hedgerows planted within the scheme will be species-rich (5 or more woody species on average per 30m length of hedgerow). It is estimated that more than 8,300 linear metres of this habitat would be created, representing a significant net gain of this habitat type of benefit to local nature conservation interests.

Birds Species of Principal Importance

4.7.53 Vegetation clearance and stripping would be undertaken outside the nesting season, March – September, wherever possible. Where this is not possible, the working area and immediately adjacent habitats would be surveyed by an ornithologist to identify any nests sites which are being established or in use. Any nests would then be demarcated, protected and monitored until the nest has been confirmed as no longer in use.

4.7.54 Replacement habitats for species which may use hedgerow and scrub habitats lost as a result of construction would include new hedgerow habitats along much of the scheme boundary. In addition, the scrub habitats and wetland areas in habitat creation areas on existing highway land between the proposed scheme and realigned Barton Lane at chainage 4250-4600; on existing arable land to the north of the existing A453 at chainage 6150-6600; and existing arable land between the

existing A453 and the proposed scheme at chainage 6750-7200. These areas would result in a net gain in habitats suitable for birds and particularly species such as bullfinch, linnet, tree sparrow and reed bunting.

Other Habitats and Species

4.7.55 The badger fencing along the majority of the rural section of the proposed scheme would significantly reduce the risk of brown hare attempting to cross the main carriageway.

4.7.56 As vegetation clearance to avoid nesting birds would be undertaken over the winter period, areas of hedgerow, plantation or other habitats with potential hibernation/ shelter sites which may be used by UKBAP priority species common toad or by hedgehog would be searched in advance and left undisturbed (with measures to prevent nesting birds) until spring when they may be removed with less risk of significant harm to these species.

4.7.57 There would be a net gain in the total hedgerow and woodland/tree resource along the scheme corridor as result of new planting. There would be a net gain of ponds and other wetland habitats and in grassland and scrub habitats as a result of habitat creation and drainage design, including land taken within the scheme boundaries. In addition to the habitat creation areas described above, other areas (totals are provided in Table 2.4.4 below) within the new highway boundary that would have a predominantly biodiversity function are:

- Two parcels of land adjacent to the mainline railway, (i) between Kegworth Road and the A453 (Chainage 2600-2750) to include a mosaic of broadleaf trees, scrub and species-rich neutral grassland and (ii) between Parkway Junction and the A453 (Chainage 2600 – 2660) to include a mosaic of scrub, and species-rich neutral grassland. Both would enhance to corridor function of the railway line as well as providing intrinsic biodiversity interests.
- Arable land between the new carriageway and the species rich hedgerow north of Winking Hill Farm at Chainage 3900-4200. This would be planted with native broadleaf woodland species.

4.7.58 New drainage ditches are to be largely earth channels rather than concrete and channel profiles will include a shelf on one ‘bank’ to promote plant colonisation and a more diverse habitat structure than in a straight-sided ditch. Effort has been made to minimise lengths of new culvert, an example of which is at the drain (Kingston Brook) under Ash Lane bridge at Ratcliffe Power station. There is insufficient space to retain the existing ditch beside the new junction arrangement and the power station access, but instead of a new culvert, this feature is to be contained within an open concrete channel which will be overdeepened to accommodate a more natural substrate of sands and gravels which will trap silts and enable colonisation by flora and fauna.

4.7.59 Overall, due to replacement planting and habitat creation as indicated in Table 2.4.4 below, the scheme corridor is likely to experience increases in flora and fauna diversity in the immediate locality in the medium to long term as the new planting matures. As a result, the scheme would provide a positive contribution to several National, Local and Highways Agency BAP targets and to Regional Biodiversity targets, including hedgerow, woodland, wetland, scrub and grassland habitats.

Table 2.4.4 : Estimated Areas of Habitat Planting along the Proposed Scheme compared with Areas to be Removed (hectares unless shown otherwise)

Habitat Type	Area to be removed	Area Planted/Sown	Net Gain
Broadleaf/mixed plantation woodland	5.7ha	13.8ha	8.1ha
Amenity Grassland	3.2ha	32.5ha	29.3ha
Scrub	2.1ha	0.8ha	-1.3ha
Species-rich hedgerow	0 lin. metres	13,700 lin. m	13,700 lin. m
Pond/marginal habitats	0.01ha	9.1ha	9.09ha
Species-rich grassland	0 ha	4.6ha	4.6ha

Monitoring Programme

4.7.60 A re-survey and monitoring programme will be undertaken 12 months prior to construction, during construction and within a 5 year aftercare period following completion of construction.

4.7.61 The monitoring programme prior to construction would focus on the presence of mobile protected and/or notable species including water vole, otter, badger, bats and barn owl to identify any significant changes in distribution or status local to the scheme. The results of the monitoring would enable modification of the environmental design or construction and mitigation programmes where necessary.

4.7.62 Monitoring during construction would be undertaken to ensure that mitigation measures are being implemented in accordance with the environmental design and that adequate protection measures are in place to protect retained ecological interests. Monitoring would also identify any significant changes in distribution or status of protected and/or notable species local to the scheme which could constrain construction activities and require additional avoidance or mitigation measures to be implemented.

4.7.63 Monitoring during the aftercare period would be undertaken primarily to assess the success of the environmental design and would include monitoring of otter and

water vole activity, bat activity and badger movements across the completed scheme. Breeding bird surveys would also be undertaken in areas which supported higher densities of notable species prior to construction to confirm the nature and scale of predicted effects within the Environmental Statement.

4.8 Magnitude of Impacts and Significance of Effects

Designated Sites

4.8.1 It is assessed that, following implementation of the environmental design including planting and management of new habitats and of protection measures during construction, there would be no significant adverse residual effects on the ecological integrity of statutory or non-statutory designated sites. Effects on designated sites would be neutral in the short term (construction period) and that as planting matures (5-10 years), the increase in habitat connectivity would result in some slight benefit to the integrity of local designated sites. Additional planting by agreement with landowners would further support this resource, but overall a neutral effect is likely.

Protected and Important Species

Otter

4.8.2 There will be temporary and probably insignificant disturbance effects of up to one year on otter movements along the River Soar due to bridge construction operations.

4.8.3 If otter numbers increase in the locality, then the route corridor could potentially inhibit local population expansion over terrestrial (land rather than water) habitat although the provision of culverts will reduce this residual effect to a minimum.

4.8.4 Overall there would be no significant adverse residual effects on the conservation status of the local otter population as a result of the proposals. The scheme proposals are assessed as being neutral with regard to this species during construction and in the long term.

Water vole

4.8.5 There will be some limited loss of water vole ditch habitats during construction and post construction. In addition, the increased shading from the River Soar bridge may marginally reduce habitat quality, and the temporary alterations of water flow could have temporary effects on habitat quality.

4.8.6 If water vole numbers increase in the locality, then the route corridor could inhibit local population expansion although the provision of culverts will reduce this residual effect to a minimum.

4.8.7 Overall there would be no significant adverse residual effects on the conservation status of the local water vole population as a result of the proposals. The scheme proposals are likely to provide a net benefit in the medium to long term as a result of new habitat creation and design of much of the roadside drainage network to be more suitable for water vole than the current network. Further benefits due to improvements in culvert design and permeability in the area used by water voles are offset by the increases in culvert length under the dual carriageway. The overall magnitude of impact will be slight positive, with an overall significance of effect on water vole of moderate beneficial.

Bats

4.8.8 Construction noise and lighting effects on the B5 floodspan bat roost is difficult to mitigate and the noise effects would require a disturbance license from Natural England.

4.8.9 Increased lighting levels in sections where this is required will have small and probably insignificant residual effects on foraging bat populations.

4.8.10 There would be temporary negative effect arising from disruption to route connectivity by the removal of vegetation and interruption of potential foraging corridors at the start of the construction period, but this is not considered to threaten the conservation status of local bat populations and proposed planting together with overpasses and underpasses would, over a 5-10 year period, replace and enhance these corridors alongside and across the new road. Additional off-site planting (by agreement) would also improve habitat connectivity for bats.

4.8.11 Overall the scheme proposals, including mitigation measures, would not result in any significant adverse residual effects on the recorded bat roost sites and scheme effects are assessed as being neutral with regard to this species during construction and in the long term.

Badger and Brown Hare

4.8.12 The badger population would lose small areas of foraging habitat due to construction activity. These losses are not assessed as significant because much alternative habitat exists, however there is a small but likely insignificant residual effect. Similar effects on brown hare are also likely.

4.8.13 Following the implementation of mitigation measures, namely to provide extensive boundary fencing and wildlife underpasses, and replacement setts where necessary, it is considered that the scheme will have a slight positive magnitude of impact on badgers primarily by reducing the number of road deaths, with overall significance of effect on badger as slight beneficial. Significance of effects on brown hare are assessed as neutral.

Barn Owl

4.8.14 Habitat loss and disturbance effects from increased levels of noise and lighting could impact on nocturnal species such as barn owl.

4.8.15 Overall the scheme proposals including mitigation measures are unlikely to threaten the conservation status of the local Barn Owl population or the potential for the population to expand in the locality. There is some uncertainty over the likelihood of increased risk of collision with traffic but planting proposals are designed to avoid significant attraction of Barn Owl to roadside habitats. Significance of effects on barn owl are assessed as neutral.

Other Bird Species of Principal Importance

4.8.16 Avoidance of site clearance during the nesting season would avoid impacts on nest sites. There would be a temporary reduction in habitat availability during the construction period due to removal of scrub and hedgerow but an overall increase in habitat over a 5-10 year period after completion as hedgerow and scrub planting in particular matures. Temporary reductions are unlikely to threaten the conservation status of any of the species. There would be a net gain in foraging and nesting habitat for birds of principal importance though this is unlikely in itself to significantly improve the conservation status of these species in the locality.

4.8.17 Similar effects including habitat loss and disturbance effects from increased levels of lighting and noise will impact on farmland bird populations within the vicinity of the route corridor. Increased noise levels will cause a local redistribution of farmland bird populations adjacent to the route corridor. This is a minor residual effect given that these species are all 'wider countryside' species and not reliant on specialist habitat types within the route corridor and not regarded as the most vulnerable group to this effect.

4.8.18 An increase in risk of collision with traffic and would remain as an operational effect of the proposed scheme. Overall, there are therefore benefits and disadvantages of the scheme which are difficult to quantify. On balance, the effect is assessed as neutral and no significant adverse residual effects on the conservation status of these species are anticipated.

Important Habitats

4.8.19 There would be no significant adverse residual effects on important habitat types arising from construction or operation of the proposed scheme. The environmental design would result in an increase in the area of important habitat types in the locality, including species-rich lowland grassland and species-rich hedgerow. There would also be an increase in areas of ponds and woodland cover. Increases in total area and potential improvements in habitat connectivity are assessed as being positive impacts of the scheme and significant at the local level, though it is acknowledged that some of the potential gains are dependent upon agreement for

off-site planting with landowners. Overall significance of effect on important habitats would be slight beneficial.

Other Habitats and Species

4.8.20 Adverse impacts would be experienced during the construction phase due to losses of roadside hedgerow, plantation and other vegetation which provides connectivity between habitats. This temporary and reversible effect would be of significance to nature conservation only within the immediate area of the scheme and it is not considered that the status of any species, populations or assemblages would be under threat as a result of these operations.

4.8.21 The temporary effect would be reversed on completion of planting and after allowing several years for establishment of new trees, scrub, hedgerows and grasslands as well as vegetation within ditches and drains. As they mature, these habitats would function as places of shelter and sources of food for flora and fauna and act as corridors and/or 'stepping stones'; the total area and diversity of would be greater than the baseline conditions, representing a slight positive magnitude of impact to nature conservation at the local level and an overall significance of effect of slight beneficial.

4.8.22 Increases in collision risk for birds in particular cannot be completely avoided, though as tall planting matures the risk will decrease as more birds cross the road at heights above vehicles.

4.9 Summary

4.9.1 The mitigation proposals, potential impacts and residual effects of the scheme are summarised in Table 2.4.5 below. The residual effect is the effect likely to occur after implementation of mitigation including establishment of vegetation some 5-10 years after construction.

Table 2.4.5 : Summary of Mitigation Proposals, Potential Impacts and Significance of Residual Effects

Ecological Feature	Mitigation Proposals	Magnitude of Impact	Residual Effect and Ecological Significance
Statutory Designated Sites (SSSI & LNRs)	Protection of existing, and planting of new, connecting habitats which support the ecological value as part of the wider ecological network.	Neutral. No direct impact. Loss of connecting habits of local significance replaced over time.	Neutral
Non-statutory Designated Sites (SINCs)	As above. There will also be improvements to the local drainage network and attenuation and water pollution control	Neutral. No direct impact. Construction of River Soar bridge and floodspans and canal bridges present risk of pollution to River Soar	Neutral

Ecological Feature	Mitigation Proposals	Magnitude of Impact	Residual Effect and Ecological Significance
	measures.	SINC. Accidental spillage could adversely impact on the Fairham Brook SINC but controlled by mitigation.	
Otter	Best practice pollution control measures. Maintenance of access along River Soar; Monitoring to detect changes in activity or new holts in proximity to the scheme.	Neutral. Minor risk of obstruction of River Soar corridor and pollution of River Soar, River Trent or tributaries but controlled by mitigation.	Neutral
Water Vole	Best practice pollution control measures. Creation of new habitats; transfer of water vole to receptor area and population monitoring; creation of suitable habitat within new drainage network including culverts with mammal shelves.	Positive. Loss of habitat, risk of direct harm and increased habitat fragmentation offset by mitigation measures including habitat creation.	Moderate beneficial in the medium to long term
Bats	Timing of work to avoid most sensitive periods. Licence from Natural England would specify acceptable working methods. Maintenance of access to B5 roosts at all times. Provision of bat roost boxes along the river/canal corridor (subject to landowner consent). Retention of existing vegetation which could support bats. New planting to enhance habitat continuity, provide wetland and grassland foraging and provide fly-routes over or under the road. Lighting would be limited to main junctions within the rural section.	Neutral. Indirect impacts on B5 floodspan roost during construction & maintenance due to noise, lighting and obstruction of access. Loss of vegetation important for foraging and commuting. Increased risk of collision with traffic. Additional lighting. Offset by mitigation measures.	Neutral
Badger	Licensed disturbance and provision of artificial setts where necessary. Provision of underpasses and badger fencing along much of proposed scheme.	Positive. Disturbance to badger setts and potential loss of outlier setts. Increased risk of collision with traffic. Offset by mitigation measures.	Slight beneficial at local level

Ecological Feature	Mitigation Proposals	Magnitude of Impact	Residual Effect and Ecological Significance
Brown Hare	Badger fencing will reduce risk of hares attempting to cross the road.	Neutral. Loss of arable habitat and risk of collision with traffic reduced by mitigation measures.	Neutral
Barn Owl	Avoidance of open grassland habitats on verges and tall planting on roadside habitats to direct flight over traffic. Provision of nest boxes away from the road (subject to landowner consent).	Neutral. Increased risk of collision with traffic and loss of grassland habitats supporting prey, offset by mitigation measures.	Neutral
Breeding Birds	Timing of work to avoid nesting birds. New hedgerows and roadside planting will benefit these species; tall planting will encourage birds to cross above vehicle height but risk of collision cannot be completely avoided. Noise impacts reduced through use of low noise surfacing but some unavoidable effects will remain.	Neutral. Loss of nesting, shelter and foraging habitat and direct harm to birds during construction. Risk of collision with traffic during operation. Offset by mitigation measures.	Neutral
Amphibians, Reptiles & Invertebrates	Increase in suitable terrestrial habitat. Small risk of collision with traffic does not justify specialist fencing, but this would be provided if surveys prior to construction discovered more species.	Neutral. No loss of breeding habitats. Some loss of terrestrial habitats and connectivity.	Neutral
Lowland Meadow	New verges and other habitat areas will include species-rich grassland managed to promote botanical diversity.	Positive. No losses or degradation due to road construction and operation.	Slight beneficial at local level
Species Rich Hedgerow	Species rich hedgerows shall be protected during construction. New hedgerow planting will increase this resource in the locality.	Positive. No losses or degradation due to road construction and operation.	Slight beneficial at local level
Other Habitats & Species (hedgerows, plantation woodlands, scrub and	New planting as it matures and habitat creation will replace losses and increase the overall resource of woodland, hedgerow,	Positive. Losses due to construction are predominantly arable land and existing roadside verge and plantation habitats as well as species-poor	Slight beneficial at local level

Ecological Feature	Mitigation Proposals	Magnitude of Impact	Residual Effect and Ecological Significance
associated bird, mammal and invertebrate assemblages)	scrub, ponds and species-rich grassland. Increases in area will offset fragmentation of wider carriageway and in the medium to long term improve linkage along the road corridor.	hedgerows. Wider carriageway and increased traffic levels increase risk of mortality, particularly of birds and is an increased barrier to small mammal populations. No other operational effects anticipated. Impacts compensated by mitigation proposals.	

4.9.2 The overall significance of effects on ecology and nature conservation is assessed as neutral. Effects in relation to designated sites and protected species are neutral (with the exception of water vole). Dualling of the A453 will increase the barrier effect of the road through the increase in carriageway width, continuous concrete safety barrier in the central reserve (in the rural section) and traffic flows which will be offset by local biodiversity gains through the provision of new and enhanced habitats such as species-rich hedgerows, grassland and wetland, and the reprofiling of ditches.

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