

The West Midlands Rail Freight Interchange Order 201X
ES - Vol 1 - Chapter 10: Ecology and Nature Conservation
Regulation 5(2)(a)
Ramboll - July 2018

10 Ecology and Nature Conservation

Introduction

- 10.1 This chapter of the ES assesses the likely significant environmental effects of the Proposed Development in respect of Ecology and Nature Conservation. In particular, this chapter describes the relevant legislation and Nature Conservation policy context; the methods used for assessment and details of the criteria used to determine significance; the baseline ecological conditions at and surrounding the Site; the potential impacts and effects as a result of the Proposed Development; any mitigation or control measures required to reduce or eliminate adverse effects; and the subsequent residual effects associated with the Proposed Development.
- 10.2 This chapter is accompanied by the following technical appendices:
- Technical Appendix 10.1: Ramboll: Ecology Baseline Report;
 - Confidential Technical Appendix 10.2: Ramboll: Badger Report (submitted to ecological consultees only);
 - Technical Appendix 10.3: No Significant Effects Report;
 - Technical Appendix 10.4: Framework Ecological Mitigation and Management Plan (FEMMP); and
 - Technical Appendix 10.5 Natural England Letter of No Impediment: Draft bat licence application.
- 10.3 Further documents which should be read in conjunction with this chapter include the Outline Demolition and Construction Environmental Management Plan (ODCEMP) (Appendix 2.3).
- 10.4 This chapter was written by Ramboll.
- 10.5 Effects on geological conservation receptors, for example Geological Sites of Special Scientific Interest (SSSI) are included in Chapter 11: Ground Conditions.

Legislation and Policy Context

International Legislation and Agreements

- 10.6 The UK is a signatory to the UN Convention on Biological Diversity¹. Signed by 150 government leaders at the 1992 Rio Earth Summit, the Convention on Biological Diversity is dedicated to promoting sustainable development and the main objective of the Convention is the conservation of biological diversity and the sustainable use of its components.
- 10.7 The European Union (EU) Habitats Directive² and EU Birds Directive³ are enacted in UK legislation and Special Protection Areas (SPA) are classified by the UK Government under the Habitat Regulations (see paragraph 10.27 of this chapter) in accordance with the Birds Directive. SPAs are areas of the most important habitat for rare (listed on Annex I of the Directive) and migratory birds within the EU.

- 10.8 Special Areas of Conservation (SAC) are classified by the UK Government under the Habitat Regulations in accordance with the Habitats Directive. SACs are areas which have been identified as best representing the range and variety within the EU of habitats and (non-bird) species listed on Annexes I and II of the Directive. SACs, together with SPAs, form a network of European protected sites known as the Natura 2000 network.
- 10.9 Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971⁴. Originally intended to protect sites of international importance, especially as waterfowl habitat, the Convention has broadened its scope over the years to cover all aspects of wetland conservation and wise use, recognising wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities.
- 10.10 The Habitats and Bird Directives are transposed into domestic legislation by the Conservation of Habitats and Species Regulations 2017 (hereafter referred to as the 'Habitats Regulations').
- 10.11 Other international conventions include: the Bern Convention on the Conservation of European Wildlife and Natural Habitats⁵, which requires the maintenance of populations of wild flora and fauna, giving particular protection to endangered and vulnerable species; and the Bonn Convention on the Conservation of Migratory Species of Wild Animals⁶, which requires the protection of migratory species throughout their entire range. The obligations of these Conventions are transposed into national law by means of the Wildlife and Countryside Act 1981 (as amended).

National Legislation and Policy

National Policy Statement for National Networks, 2014

- 10.12 The National Policy Statement (NPS) for National Networks sets out the national vision and policy for the future development of nationally significant infrastructure projects on the national road and rail networks. It is noted (at paragraph 4.22) that prior to granting a development consent order, the Secretary of State (SoS) must, under the Habitats Regulations, consider whether the project is likely to have a significant effect on a European site, or on any site to which the same protection is applied as a matter of policy, either alone or in combination with other plans or projects. Specific guidance is provided by the NPS in respect of biodiversity at paragraphs 5.20 to 5.38⁷.
- 10.13 In paragraph 5.22 it states that, where relevant, the ES should clearly set out any effects on internationally, nationally and locally designated sites of ecological importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity, and consider the full range of potential impacts on ecosystems. Paragraph 5.23 notes the ways in which the project has taken advantage of opportunities to conserve and enhance biodiversity interests should be demonstrated. Paragraph 5.23 also identifies that sites of geological conservation interest should be considered which is covered in Chapter 11: Ground Conditions in this ES.

¹ United Nations (1992) Convention on Biological Diversity. *Text of the Convention*. [online] Available at: <https://www.cbd.int/convention/text/> [Accessed 20 Nov. 2017].

² European Commission (1992) Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. [online] Available at: <http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A31992L0043> [Accessed 20 Nov. 2017].

³ European Commission (2009) Council Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (codified version) [online] Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32009L0147> [Accessed 20 Nov. 2017].

⁴ Convention on Wetlands of International Importance especially as Waterfowl Habitat. Ramsar (Iran), 2 February 1971. UN Treaty Series No. 14583. As amended by the Paris Protocol, 3 December 1982, and Regina Amendments, 28 May 1987

⁵ Council of Europe (1979) Convention on the Conservation of European Wildlife and Natural Habitats [online] Available at: <https://www.coe.int/en/web/conventions/full-list/-/conventions/treaty/104> [Accessed 20 Nov. 2017].

⁶ Convention on the Conservation of Migratory Species of Wild Animals 1979

⁷ Department for Transport (2014) National Policy Statement for National Networks

- 10.14 Paragraph 5.25 states that as a general principle development should avoid significant harm to biodiversity and geological conservation interests, including through mitigation and consideration of reasonable alternatives.
- 10.15 Paragraph 5.27 states “The most important sites for biodiversity are those identified through international conventions and European Directives”, and repeating the NPPF⁸ whereby the following sites should be given the same status as European Sites:
- “Potential Special Protection Areas (SPA) and possible Special Areas of Conservation (SAC);
 - Listed or proposed Ramsar sites; and
 - sites identified, or required, as compensatory measures for adverse effects on European sites, potential Special Protection Areas, possible Special Areas of Conservation and listed or proposed Ramsar sites.”
- 10.16 Paragraph 5.29 notes that consent should not normally be granted where there is a likely adverse effect on a Site of Special Scientific Interest (SSSI), unless the benefits of the project outweigh the impacts. In addition, paragraph 5.31 identifies that the SoS should give consideration to sites with regional or local designations.
- 10.17 Ancient woodland and veteran trees are considered in paragraph 5.32. These resources, whilst recognised in this chapter are more fully assessed within the Arboricultural Report (Technical Appendix 12.7).
- 10.18 It is acknowledged that development proposals provide an opportunity to provide biodiversity benefit (paragraph 5.33) and the SoS “should consider whether the applicant has maximised such opportunities in and around developments”.
- 10.19 Many species receive protection under separate legislation (paragraph 5.34) and applicants should take account of these protections in development proposals. Paragraph 5.35 identifies that some species and habitats are noted to be of principal biodiversity importance.
- 10.20 Mitigation should be an integral part of development proposals and consider construction and operational effects, potential wildlife corridors, minimise habitat fragmentation and ecological enhancements.

National Planning Policy Framework, 2012

- 10.21 The NPPF notes that the planning system should contribute to and enhance the natural and local environment by:
- Protecting and enhancing valued landscapes, geological conservation interests and soils;
 - Recognising the wider benefits of ecosystem services; and
 - Minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government’s commitment to halt the overall decline in biodiversity, including establishing coherent ecological networks that are more resilient to current and future pressures.
- 10.22 Paragraph 118 of the NPPF states: “ *planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland ... unless the need for, and benefits of, the development in that location clearly outweigh the loss*”.

National Planning Practice Guidance, 2014

- 10.23 Of relevance to ecology and nature conservation, National Planning Practice Guidance⁹ includes sections on:

- How biodiversity should be taken into account in preparing a planning application;
- How development should not only protect but also enhance biodiversity;
- Application of the mitigation hierarchy; and
- Mitigation and compensation for ecological impacts of development projects.

Biodiversity 2020: A strategy for England's Wildlife and Ecosystem Services

- 10.24 This Government strategy¹⁰ sets out the strategic direction for biodiversity policy; the mission of the strategy is to halt the overall loss of biodiversity. It is intended that this strategy guides conservation efforts, to halt the overall loss of England’s biodiversity by 2020. In the longer term, the government’s ambition is to move progressively from a position of net biodiversity loss to net gain.

Government Circular: Biodiversity and Geological Conservation - Statutory Obligations and their Impact within the Planning System

- 10.25 Whilst intended to accompany the withdrawn PPS9¹¹, this circular¹² remains an active document and provides guidance on the application of the law relating to planning and nature conservation as it applies in England. It complements the expression of national planning policy in the NPPF and the NPS.
- 10.26 The circular provides guidance on sources of legislation relevant to various nature conservation topics which may be encountered by planning authorities, namely European sites, nationally designated sites, conservation outside designated sites and conservation of species.

National Legislation

- 10.27 The two main pieces of legislation relating to wildlife in the UK are the Wildlife and Countryside Act (1981) as amended (the WCA 1981) and the Conservation of Habitats and Species Regulations 2017 (The Habitat Regulations).
- 10.28 The Wildlife and Countryside Act 1981 (as amended) (WCA) forms the basis of much of the statutory wildlife protection in the UK. Part I deals with the protection of plants, birds and other animals and Part II deals with the designation of Sites of Special Scientific Interest (SSSIs).
- 10.29 The Act covers the following broad areas:
- Wildlife - listing endangered or rare species in need of protection and creating offences for killing, disturbing or injuring such species. Additionally, the disturbance of any nesting bird during breeding season is also noted as an offence;
 - Nature Conservation - protecting those sites which are National Nature Reserves (NNR) and SSSIs;
 - Public Rights of Way - placing a duty on the local authority (normally the County/Borough Council) to maintain a definitive map of footpaths and rights of way. It also requires that landowners ensure that footpaths and rights of way are continually accessible; and
 - Miscellaneous General Provisions.
- 10.30 SPA and SAC sites are part of a range of measures aimed at conserving important or threatened habitats and species. The Conservation of Habitats and Species Regulations 2017, commonly known as 'The Habitats Regulations', transpose the Habitats and Birds Directives into national law and set out the provisions for the protection and management of species and habitats of European importance, including Natura 2000 sites. The Conservation of Habitats and Species Regulations 2017 came into force in November 2017 and consolidated the

⁸ Department for Communities and Local Government (2012) National Planning Policy Framework

⁹ Planningguidance.communities.gov.uk. (2017). *Natural environment - GOV.UK*. [online] Available at:

<http://planningguidance.communities.gov.uk/blog/guidance/natural-environment/biodiversity-ecosystems-and-green-infrastructure/> [Accessed 20 Nov. 2017].

¹⁰ DEFRA (2011) Biodiversity 2020: A strategy for England's wildlife and ecosystem services

¹¹ ODPM (2005) Planning Policy Statement 9: Biodiversity and Geological Conservation

¹² ODPM (2005) Government Circular: Biodiversity and Geological Conservation - Statutory Obligations and their Impact within the Planning System

amendments made to the 2010 Regulations. All European Sites are of national importance and have been notified as SSSI. The Regulations also provide strict protection for species listed on Annex IV of the Act.

- 10.31 The Hedgerow Regulations 1997 set out the properties that make a hedgerow 'important' and therefore afforded protection under the legislation. This Chapter considers the ecological importance of hedgerows. Heritage criteria is considered in Chapter 9: Cultural Heritage.
- 10.32 Full details relating to species or feature (e.g. hedgerows) specific legislation is provided within the relevant sections of Technical Appendix 10.1 - Ecology Baseline Report which should be read in conjunction with this chapter.
- 10.33 The Countryside and Rights of Way Act 2000 primarily extends to England and Wales. It provides a statutory right of access to the countryside and modernises the rights of way system, bringing into force stronger protection for both wildlife and countryside. The Act is divided into five distinct sections. Part III is of relevance to ecology, nature conservation and wildlife protection.
- 10.34 The Act details a number of measures to promote and enhance wildlife conservation. These measures include improving protection for SSSIs and increasing penalties for deliberate damage to SSSIs. Furthermore, the Act affords statutory protection to Ramsar Sites which are wetlands designated under the International Convention on Wetlands.
- 10.35 Local Nature Reserves (LNR) are a statutory designation made under Section 21 of the National Parks and Access to the Countryside Act, 1949 in England, Wales and Scotland. LNRs can be declared by all local authorities and by Town and Parish Councils where the powers to do so have been delegated to them by the principal local authority.
- 10.36 In 1994, the Government produced the UK Biodiversity Action Plan (UK BAP), a national strategy for the conservation of biodiversity. This led to the creation of the UK Biodiversity Steering Group, which has since published 391 Species Action Plans and 45 Habitat Action Plans.
- 10.37 From July 2012, the UK Post-2010 Biodiversity Framework succeeds the UK BAP and Conserving Biodiversity - the UK Approach. This is as a result of a change in strategic thinking following the publication of the Convention on Biological Diversity's Strategic Plan for Biodiversity 2011 - 2020 and its 20 'Aichi targets', at Nagoya, Japan in October 2010, and the launch of the new EU Biodiversity Strategy (EUBS) in May 2011.
- 10.38 This includes five internationally agreed strategic goals and supporting targets to be achieved by 2020. The five strategic goals agreed were:
- Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society;
 - Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use;
 - Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity;
 - Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services; and
 - Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building.
- 10.39 The UK Post-2010 Biodiversity Framework constitutes the UK's response to these new 'Aichi' strategic goals and associated targets. The Framework recognises that most work that was previously carried out under the UK BAP is now focussed on the individual countries of the United Kingdom and Northern Ireland, and delivered through each countries' own strategies.

10.40 Following the publication of the new Framework, the UK BAP partnership no longer operates. However, many of the tools and resources originally developed under the UK BAP remain of use. The UK list of priority species has been used to help draw up statutory lists of priorities in England, Scotland, Wales and Northern Ireland. For England, this is in line with the Natural Environment and Rural Communities (NERC) Act 2006 (as amended) Section 41 (s14) which transposes the habitats and species from the UKBAP into a list of Species and Habitats of Principal Importance (Section 41 of the act (s41)).

10.41 The presence of Species and Habitats of Principal Importance is a material consideration for decision-makers such as public bodies, including local and regional authorities, in determining planning applications and carrying out other functions.

Regional Policy

10.42 There are no relevant, adopted regional policies that direct the assessment of ecology and nature conservation away from the approach outlined in the national and local policies set out here.

Local Policy

South Staffordshire Core Strategy DPD, 2012

10.43 Chapter 7 of the South Staffordshire Core Strategy DPD¹³, 2012 is entitled Environmental Quality and includes Strategic Objective 4: To protect, conserve and enhance the countryside, character and quality of the landscape and diversity of wildlife and habitats. Core Policy 2 Protecting and Enhancing the Natural and Historic Environment notes that development proposals should be in line with the NPPF and is supported by Policy EQ1: Protecting, Enhancing and Expanding Natural Assets.

10.44 The Core Strategy DPD includes reference to a Biodiversity SPD; however, the SPD has not been prepared at the time of writing¹⁴. Regional and local policy can be important and relevant to the determination of a DCO, however, there is no statutory requirement for the decision maker to attach weight to development plan policy and the weight attached to it is likely to depend upon its consistency with the policies of the NPS.

Other Guidance

10.45 The Staffordshire Biodiversity Action Plan (SBAP) has been in place since 1998 to assist in delivering the UK BAP targets at a more local level. The SBAP adopts an ecosystems approach to focus conservation efforts on the areas within the county that will result in the greatest benefit for ecological networks, habitats and species. Biodiversity objectives are integrated with other environmental, social and economic needs. The traditional Habitat and Species Action Plans have been replaced with 14 "Ecosystem Action Plans" (EAPs) and one Rivers Action Plan.

10.46 The Site is within the Staffordshire Central Farmland EAP area, where priority habitats include hedgerows, arable field margins, rivers, ponds lakes and canals, lowland dry acid grassland and lowland meadow. Species included within the EAP include several farmland birds such as lapwing and yellow wagtail, further farmland seed-eating birds, brown hare, otter, bats, common toad, great crested newt and polecat. Species or feature (e.g. hedgerows) specific policy or guidance is provided within the relevant sections of Technical Appendix 10.1 - Ecology Baseline Report which should be read in conjunction with this chapter.

10.47 The principles of British Standard 42020:2013 'Code of practice for planning and development'¹⁵ have been followed where appropriate in this assessment. Chartered Institute of Ecology and Environmental Management (CIEEM)'s Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland: Terrestrial, Freshwater and Coastal (2016)¹⁶

¹³ South Staffordshire Council (2012) Core Strategy Development Plan Document Adopted 11th December 2012

¹⁴ pers comm. Karen Richards Staffordshire District Council

¹⁵ BSI, (2013); BS 42020:2013 Biodiversity. Code of Practice for Planning and Development

¹⁶ Chartered Institute of Ecology and Environmental Management, 2016. Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland: Terrestrial, Freshwater and Coastal. CIEEM, London

have also been used to inform the assessment. Where deviations from standard guidance have been made, the reason for deviation has been stated.

Assessment Methodology

Baseline Characterisation

Desk Study

10.48 The purpose of the desk study was to collect existing baseline data about the Site and the surrounding area, such as the location of designated sites or other natural features of potential ecological importance (e.g. woodland and ponds). The following Zone of Influence (ZoI) has been considered:

- All statutory internationally designated sites up to 10 km from the Site, including inter alia SAC, SPA and Ramsar Sites;
- All statutory nationally designated sites up to 2km from the Site including inter alia NNR, SSSI;
- All statutory locally designated sites – Local Nature Reserves (LNR) within 2km of the Site;
- Non-statutory designated sites: Local Wildlife Site (LWS) up to 2 km from the Site;
- Sites of Special Scientific Interest (SSSI) designated for bats within a 10 km radius of the Site;
- All SSSIs, SAC (SCIs or cSACs), SPA, pSPAs and Ramsar Sites within 200 m of affected road links. Affected roads being those that meet the following criteria:
 - Road alignment changes by more than 5 m;
 - Daily traffic flows change by more than 1,000 Annual Average Daily Traffic (AADT);
 - Heavy Duty Vehicle (HDV) flows change by more than 200 AADT;
 - Daily average speed changes by 10 km/hr or more; and
 - Peak hour speed changes by 20 km/hr or more.
- Records of notable and protected species up to 2 km of the Site.

10.49 Staffordshire Ecological Records Centre (SERC) was contacted to provide details of non-statutory designated sites and protected species within 2 km of the Site. The SERC report is appended to ES and relevant records are summarised in Technical Appendix 10.1 – Ecology Baseline Report which should be read in conjunction with this chapter.

10.50 In addition, the Multi Agency Geographic Information for the Countryside (MAGIC) website¹⁷ was searched for information on statutory designated sites. Supplementary information on the Site and its surroundings were obtained from Ordnance Survey maps, as well as aerial images available from GoogleTM Earth Pro.

10.51 Additional records of notable and protected species were obtained from a number of previously published reports associated with recent nearby developments: Calf Heath Quarry (located within the Site's boundaries), an Energy Recovery Facility located to the south of the Site, and a consented warehouse development located off-site on land adjacent to the Site (a former factory site and part of Calf Heath Wood). The reviewed reports included the following:

- A protected species survey report produced in relation to the planning application for Calf Heath Quarry (CSa Environmental Planning, 2011)¹⁸;
- A hedge survey of Calf Heath Quarry (Pleydell Smithyman Limited, 2007)¹⁹;
- An environmental statement for a warehouse development, completed by Drivers Jonas, dated July 2007²⁰ an earlier application for the 'Bericote Development';

- A Landscape and Biodiversity Management Plan produced for the Bericote Development (Ecology Solutions, 2014)²¹; and
- An Environmental Statement for an Energy Recovery Facility located to the south of the Site (Scott Wilson, 2010)²².

Field Survey

10.52 A comprehensive suite of ecological field surveys have been undertaken in 2016 and 2017. The surveys undertaken and species considered are summarised below in Table 10.1. Technical Appendix 10.1 – Ecology Baseline Report provides full details of all survey methodologies employed where applicable and should be read in conjunction with this ES.

10.53 The designated sites within 200 m of an affected road were surveyed by Ramboll Ecologists on 8th November to establish the habitats present and whether those habitats present are likely to be sensitive to air quality changes.

Table 10.1: Summary of Field Surveys Undertaken and Species Considered and Location Within Technical Appendix 10.1

Receptor	Surveys Undertaken / Species Considered	Location in Technical Appendix 10.1
Habitats	Phase 1 Habitat Survey and Targeted Botanical Surveys	Section 3
	Hedgerow survey	Section 3.6 and Appendix 10.1.2
Species	Amphibians: Great Crested Newt Survey	Section 4.1
	Reptile Survey	Section 4.2
	Other Aquatic Species	Section 4.3
	Bird Survey	Section 4.4
	Invertebrate Survey	Section 4.5
	Bat Survey	Section 4.6
	Badger Survey	N/A (Confidential Technical Appendix 10.2)
	Water Vole Survey	Section 4.8
	Otter Survey	Section 4.9
	Other Mammals e.g. Harvest Mouse, Polecat, Brown Hare	Section 4.10

¹⁷ Magic Interactive Maps. [online] Available at: www.magic.gov.uk, [Accessed 01/12/2015 and 04/03/2016]

¹⁸ CSa Environmental Planning (2011) Calf Heath Quarry, Four Ashes, Staffordshire: Phases 1 & 2 - Protected Species Survey Report

¹⁹ Pleydell Smithyman Limited (2007) Hedge Survey, drawing number MOS133.20

²⁰ Drivers Jonas (2007) Warehouse Development at Four Ashes, South Staffordshire: Environmental Statement

²¹ Ecology Solutions (2014)

²² Scott Wilson (2010) Environmental Statement: Project W2R: Energy Recovery Facility

Comments Received During EIA Scoping

10.54 Consideration has been given in this assessment to the EIA Scoping Request Opinion comments provided by the SoS and other consultees relevant to 'Ecology' in respect to the Proposed Development at the Site as summarised in Table 10.2.

Table 10.2: Comments Received During EIA Scoping		
Consultee	Comments Raised	Response to Comments
Secretary of State Scoping Opinion	Surveys submitted with the ES to take account of other development proposed in the vicinity.	Other developments are considered in the cumulative impact assessment.
	The Applicant should demonstrate that traffic effects arising from the Proposed Development (including increased emissions and deterioration in runoff) could not give rise to effects on European sites close to, but outside of, the 10 km study area e.g. Cannock Extension Canal SAC. The assessment should consider the potential impact of nitrogen deposition on these sites arising from construction and operational traffic.	Considered in the No Significant Effects Report (NSER) presented in Technical Appendix 10.3.
	The Applicant should provide evidence of agreement with Natural England regarding the study area/s used to identify European sites which could potentially be affected by the Proposed Development.	Agreement provided in Stage 2 Consultation Letter received dated 30/08/2017 which states " <i>We agree that the 3 designated sites included in the NSER cover the possible sites of international importance that may be affected (indirectly) by the proposal</i> ".
	The ES should include a full assessment of the direct and indirect effects of the proposed Scoping Opinion for West Midlands Interchange development on the features of special interest within these SSSIs (Four Ashes Pit SSSI in respect of drainage and hydrogeology issues in Belvide Reservoir SSSI in respect of air quality changes) and should identify such mitigation measures as may be required in order to avoid, minimise or reduce any adverse significant effects.	Four Ashes Pit SSSI is a geological SSSI and is covered in Ground Conditions Chapter 11. Impacts on Belvide Reservoir SSSI are considered in this chapter of the ES.
	Reference is made to 'good practice guidelines for invertebrate surveys' - the specific guidelines are not referenced and appropriate	Surveys have been undertaken in line with Natural England guidance document 'Surveying terrestrial and freshwater invertebrates for conservation evaluation' NERR005

Table 10.2: Comments Received During EIA Scoping		
	references should be included in the ES.	(2007) ²³ . Invertebrate results are presented in Section 4.5 of Technical Appendix 10.1 and are considered in this ES as an 'Important Ecological Feature'.
	(Invertebrate) Surveys are limited to Calf Heath Wood – the Applicant should confirm that there are no other pockets of woodland within the site that are suitable for invertebrates.	A scoping study was undertaken by an invertebrate specialist to focus the survey on habitats with most potential value. Other woodland areas were considered in this scoping study. Surveys were extended to include Calf Heath Quarry and general sampling across the wider landscape to represent the range of habitats present.
	Given that the potential for hazel dormouse to be present has not been ruled out, the need for dormouse surveys should be agreed with the local council's ecology officer based on local knowledge.	The assessment area is close to the edge of the northern range of the species in the UK. SERC provided no records of the species within 2 km. Dormice have only recently been rediscovered in Staffordshire, having been thought extinct in the county. The population is unknown, but appear concentrated in the west and north-west of Staffordshire. No concerns have been raised by the SCC Ecologist with respect to dormice during consultation and meetings.
	Bat trapping is proposed in June/ July and in August. The Secretary of State notes that the BCT Guidelines consider June/ July to be a suboptimal period for surveys due to the risk of catching heavily pregnant bats or bats with dependent young and suggests that further justification is given for the June/ July rather than May survey period. The BCT guidelines regarding minimum survey effort should be followed.	A specific project Licence for works has been granted by Natural England highlighting that the regulatory authority was satisfied with the timing and scope proposed and did not identify any concerns with respect to bat welfare. The key objective was to locate important breeding populations, to satisfy this aim surveys were undertaken in June/July/August subject to conditions to limit impact on breeding bats. The aim of the guidance provided in BCT guidelines was to ensure general trapping work (i.e. under a class licence) was appropriately managed. Controls to limit impact on breeding bats, whilst achieving the survey outcomes included; avoiding tagging female bats in advanced stages of pregnancy, only tagging

²³ Drake C M et al. (2007) NERR005. Surveying terrestrial and freshwater invertebrates for conservation evaluation. Natural England

		lactating bats if they met the target weight and were in good condition and not tagging early lactating bats. The surveyor undertaking the survey authored the appropriate chapter of the Bat Conservation Trust Guidelines and is considered an authority on this subject.
	Limited reference is made to Calf Heath Reservoir as a standing water body. The Applicant should assess the potential for effects on water vole populations and wintering bird species that may be associated with the reservoir. The Secretary of State recommends that need for a wintering bird survey at Calf Heath Reservoir is agreed with the local council's ecology officer.	Wintering bird surveys of Calf Heath Reservoir were undertaken between November 2016 and March 2017 and are reported in this ES. Water vole surveys were not undertaken at Calf Heath Reservoir as no direct or indirect effects are considered likely. Water vole are considered absent from the Site and the adjacent stretch of the Staffordshire and Worcestershire Canal based on surveys undertaken.
	The Secretary of State supports the Applicant's comments regarding the need for detailed vegetation surveys and recommends that these are undertaken during the relevant survey window.	A Phase 1 Habitat Verification Survey was undertaken in July 2016. Further targeted botanical surveys of areas demonstrating botanical interest as identified during the Phase 1 Habitat Survey were undertaken on 18 May 2017 and are reported in this ES.
	Accurate mapping and description of veteran trees within the site should be provided. The Secretary of State notes Staffordshire County Council's comments in this respect.	A tree survey was undertaken by FPCR in 2016. Veteran trees have been identified and mapped and are shown in Technical Appendix 12.7. Veteran trees are also shown on Figure 10.1.005 supporting the Baseline Ecology Report Technical Appendix 10.1.
	The Secretary of States notes from paragraph 6.5.92 of the Scoping Report that the Applicant does not intend to undertake otter surveys. The Applicant's attention is drawn to the CRT's consultation response, which indicates that the Staffordshire and Worcestershire Canal provides important habitat for otter. Consideration should also be given to impacts on the ditch network and the potential effect on otters commuting between waterbodies on or close to the site. The Secretary of State	Surveys for otter and water vole were undertaken of ditches present on-site. Discussions with the Environment Agency, Staffordshire County Council and Natural England indicated that otters are known and should be considered as present. Water vole and otter surveys of the canal were undertaken in May and July 2017 and findings are reported in this ES. Otters are considered in Section 4.9 of Technical Appendix 10.1 and in this ES.

	requests that the Applicant discuss and agree the need for otter surveys with local council's ecology officer in consultation with the CRT.	
	The Secretary of State recommends that the proposals should address fully the needs of protecting and enhancing biodiversity. The assessment should cover habitats, species and processes with the sites and surroundings. It is recommended that draft construction and operational mitigation plans/strategies are submitted with the ES.	An Outline Demolition and Construction Environmental Management Plan (ODCEMP) is included in the ES as Technical Appendix 2.3. A Framework Ecological Mitigation and Management Plan is included in the ES as Technical Appendix 10.4.
	The ES should describe the proposed ecological mitigation proposals for the site with particular focus on the potential to minimise fragmentation, design layouts to minimise hedgerow loss, severance of habitats and disturbance for the range of species present within the site. The Applicant's proposals for conservation of ancient woodland and veteran trees should be set out, or the reasons for their loss if unavoidable (in accordance with NPSNN paragraph 5.32).	The ES details design avoidance of receptors that has been possible and embedded and other mitigation. The green infrastructure parameters plan (Document 2.7) includes 2 community parks and ecological corridors. Mitigation proposals are summarised on Figure 10.002. Trees are considered in the FPCR Report (Technical Appendix 12.7).
	The Applicant should also consider the potential to deliver mitigation through improvement of existing but degraded sites within the local area (e.g. LWSs).	Mitigation is provided on-site in green infrastructure and community parks and off-site mitigation for farmland birds is provided within 1 km as shown on Figure 10.004.
	The assessment should cross reference to the air quality, noise and vibration, water quality and landscape and visual (in respect to light spill) assessments as appropriate.	Reference is made as applicable.
Canal and River Trust (CRT)	The Scoping document acknowledges the Staffordshire & Worcestershire Canal and identifies its location within the application site. Reference is also made to the Calf Heath reservoir. Whilst the document does make reference to the canal, reservoirs and associated infrastructure throughout it is considered that in setting baselines for the EIA these should be more clearly and consistently referenced throughout.	Standing water including the stated waterbodies is referenced in this chapter of the ES.

	It is not clear within this section whether the presence of the canal within the site or the connectivity to other habitat areas in the vicinity, such as Calf Heath reservoir have been fully considered.	Standing waterbodies including the canal and Calf Heath Reservoir are considered in this chapter of the ES.
	The Staffordshire & Worcestershire Canal is a significantly important canal for the regional conservation status of the European otter, several species of bats, water voles and white clawed crayfish. Both layout options for the Rail interchange include the canal within the site boundary and with potential road/rail crossings has the potential for significant impacts on the canal and connected habitats. It is therefore considered that the Ecology section should be reviewed to ensure the correct baselines are set, potential impacts correctly identified and recommendations for further survey work based on a full assessment of the current site status.	Surveys and consideration has been given in the ES and supporting Technical Appendix 10.1 for European otter (Section 4.9), bats (Section 4.6), water voles (Section 4.8) and white clawed crayfish (Section 4.3). Otter and water vole surveys were undertaken in May and July 2017 on the canal to complement those on-site surveys undertaken in 2016.
	In assessing the impact of the development the EIA should also identify any opportunities to improve the canal corridor to enhance biodiversity. The existing offside of the canal is extensively sheet piled and environmental improvements such as the installation of coir roll (or similar) habitat should be considered when assessing the potential impact of the development.	Artificial otter holts are proposed along the canal corridor in the south of the Site. These measures are presented in Table 10.10 Embedded Mitigation and secured in the FEMMP.
	At present the towpath in the vicinity of the site is mostly grass. The EIA should fully assess the impact from increased use of the towpath resulting from the development and any resurfacing works necessary to support additional footfall on the ecological function of the canal corridor.	Other than publicly accessible areas, the canal is to be fenced off during construction to prevent unauthorised access. The canal would be accessible only from existing access points in the construction phase with the exception of specific localised works. In the operational phase access would be possible via the community parks and new bridge over the canal though proposals have been made to manage visitor pressure. Impacts on bats and otter from increased footfall are considered in the operational phase assessment.

	The document identifies light spillage as a non-significant issue. The Trust would advise that waterside lighting affects how the waterway corridor is perceived, particularly when viewed from the water, the towpath and neighbouring land, for example waterside lighting can lead to unnecessary glare and light pollution if it is not carefully designed. Lighting should also show consideration for bat and other species who utilise the canal corridor for foraging. The Trust consider the lighting strategies for Proposed Development can therefore have a significant impact on the waterway and should be afforded sufficient weight in any assessment.	A Lighting Strategy and Assessment (ES Technical Appendix 12.8) has been prepared and has been developed with ecological input taking into consideration sensitive ecological receptors. A full assessment of lighting impacts on habitats and protected / notable species is undertaken in this chapter of the ES. The canal will be retained as a dark corridor.
Natural England e-mail to Planning Inspectorate 14 October 2016	Internationally and nationally designated sites: The ES should thoroughly assess the potential for the proposal to affect designated sites. European sites (e.g. designated Special Areas of Conservation and Special Protection Areas) fall within the scope of the Conservation of Habitats and Species Regulations 2010.	International designated sites are considered in the No Significant Effects Report (NSER) presented in Technical Appendix 10.3 and in the Information for Habitat Regulations Assessment (HRA) section in this chapter of the ES. Nationally designated sites are considered in this chapter.
	Belvide Reservoir SSSI lies west of the application site along the A5. Depending on the routes used by traffic during the construction and operation phases of the scheme significant effects on air quality are thought capable of having significant impacts on this SSSI. The ES should include a full assessment of the direct and indirect effects of the development on the features of special interest within these SSSIs and should identify such mitigation measures as may be required in order to avoid, minimise or reduce any adverse significant effects.	Belvide Reservoir and the potential for air quality impacts are considered in Chapter 7 of this ES.
	In this case the proposal is not directly connected with, or necessary to, the management of a European site. In our view it is likely that it will have a significant effect on internationally designated sites and	Considered in the No Significant Effects Report (NSER) (Technical Appendix 10.3) and in the Information for Habitat Regulations Assessment (HRA) section in this ES.

Table 10.2: Comments Received During EIA Scoping		
	therefore will require assessment under the Habitats Regulations. We recommend that there should be a separate section of the Environmental Statement to address impacts upon European and Ramsar sites entitled 'Information for Habitats Regulations Assessment'.	
	In respect of the operational phase we note the proposed use of IAQM and EPUK guidance and criteria. 6.3.26 goes on to state that impacts from rail traffic will be dependent on the final chosen layout. As for the construction phase we would welcome clarity regarding suitability of the assessment methodology for ecological receptors such as designated sites.	A qualitative assessment of rail impacts has been undertaken in line with 7.18 and 7.19 of the DEFRA LAQM Technical Guidance (TG16). Construction dust has been assessed in line with IAQM Guidance on the assessment of dust from demolition and construction. Refer to Chapter 7: Air Quality.
Staffordshire County Council	Given the scale of the proposal and the lengthy time over which the full scheme will be built out it will be fundamental for the EIA to consider the phasing of the scheme and how this affects impacts and the effectiveness of mitigation. The applicant should also set out at what point the rail terminal will be constructed during the scheme and when it will become operational.	Phasing has been considered in the ES where relevant for assessment purposes e.g. for effectiveness of mitigation.
	s.6.1.4 mentions climate change and flood alleviation (connecting these in a rather surprising way). In accordance with the National Planning Policy Framework (NPPF) s.109 the ES should consider ecosystem services in a more holistic way, including as well as the regulating services related to climate change/CO2 and flood alleviation, other ecosystem services including provisioning, such as the production of food and timber; supporting, such as biological diversity and pollination; and cultural, such as spiritual and recreational benefits. Climate change and other impacts should be clearly distinguished, s.6.1.4 and 6.1.5 rather confuse other impacts with climate change.	Further detail provided in Chapter 16: Water and Flood Risk.
	s.6.1.6 refers to a Construction and Environmental Management Plan	Preparation of a Framework Ecological Management and

Table 10.2: Comments Received During EIA Scoping		
	(CEMP) to manage environmental impacts. While a CEMP will be appropriate to manage construction impacts it is not an appropriate mechanism for management of operational impacts. The applicants should consider the framework for minimisation management and monitoring of operational impacts following the construction phase.	Mitigation Plan (FEMMP) included as Technical Appendix 10.4.
	Air Quality: This section fails to recognise the potential need to assess impacts of the proposal on Natura 2000 sites. Cannock Extension Canal SAC is found approximately 9 km to the east of the site on the A5. Impacts of additional freight traffic on the A5 need to be considered. Potential for impacts on Cannock Chase SAC 7.4 km to the northeast may also need to be considered, subject to Natural England advice. Cannock Chase SAC habitats are known to be vulnerable to nitrogen deposition and acidification. The APIS Air Pollution Information System is a useful resource not referred to in the Scoping report. Assessment of operational impacts should include assessment of impacts on ecological receptors as well as human receptors. Cumulative impacts will need to be considered.	Ecological receptors including Natura 2000 sites are included in the modelling of air quality impacts and are reported in this Chapter and the No Significant Effects Report (NSER) provided in Technical Appendix 10.3.
	s.6.5.4 should refer to Cannock Extension Canal SAC approximately 9 km to the east in addition to the two SACs mentioned. Highways run-off has been identified in the past as an issue for the SAC.	Considered in the No Significant Effects Report (NSER) and in the Information for Habitat Regulations Assessment (HRA) section in this chapter.
	Standing Water fails to include the canal or the adjacent reservoirs. S.6.5.46 also fails to reference the canal in assessment of the suitability of the site for water vole despite past records of this species.	Standing Water now includes consideration of the canal and reservoirs. Water voles are considered absent from the Site based on surveys to date. Water vole surveys of the Staffordshire and Worcestershire Canal were undertaken in May and July 2017 and are reported in this ES.
	In assessment of use of the site by otters there should be consideration of the potential of ditches to be used by otters to move through the	Otters are considered as an 'Important Ecological Feature' in the ES including their movement through the landscape.

	landscape. How otters might move to and from the reservoirs should be considered so that works can mitigate road casualty risk.	
	s.6.5.3 states that a phase 1 habitat survey of the assessment area was carried out on 23 and 24 November 2015 and 24 and 25 February 2016. These periods are outside of the recommended period for habitat survey and therefore, in addition to survey of the land south of Vicarage Road, the surveys should be supplemented during May-September so that rare plant species that cannot be seen outside summer months such as certain aquatic plants and ephemeral and annual arable species, can be identified if present, as can invasive species such as Himalayan balsam and giant hogweed. S.6.5.78 recommends this but fails to consider arable field margins and aquatic habitats.	Phase 1 verification surveys were undertaken in July 2016 and observations noted as part of other fieldwork. Further targeted botanical surveys of areas demonstrating botanical interest as identified during the Phase 1 Habitat Survey were undertaken on 18 May 2017 and are reported in this ES.
	We are aware that hedgerow survey has been carried out. It does not however, appear to have informed site layout as most important hedgerows identified would be lost to either of the two current layouts.	Hedgerows identified as ecologically 'important' will be translocated or replacement hedgerows planted. Hedgerows will be retained where possible but due to size of buildings and associated infrastructure it is not possible to retain more hedgerows. FPCR Figure 7121-L-11 shows vegetation to be retained and lost and is presented in Technical Appendix 12.9: Green Infrastructure – Planting and Habitats: Summary Schedule of Areas.
	Most species surveys proposed are appropriate. Given the several important wintering bird species recorded on the site and the adjacent reservoirs it is recommended that wintering bird survey be included so that impacts can be assessed. Wintering and breeding bird surveys should include the adjacent reservoir.	Wintering bird surveys of the Site and Calf Heath Reservoir have been undertaken between November 2016 and March 2017 and are reported in this ES.
	Proposed water vole survey should include the canal.	Water voles are considered absent from the Site based on surveys to date. Surveys for water vole have been undertaken in May and July 2017 of the Staffordshire and

		Worcestershire Canal and are reported in this ES.
	While the canal may not be directly affected by the proposals information on how otters use the landscape will be important in designing out road casualty risk.	Otters are considered as an 'Important Ecological Feature' in the ES including their movement through the landscape.
	There appear to be no recommended surveys for the southern part of the site south of Vicarage Road. Clearly this area should be subject to the same suite of surveys.	A comprehensive range of surveys have been undertaken for land south of Vicarage Road and are reported in this ES. Surveys undertaken included; bat activity surveys, advanced bat survey techniques (radio tracking), emergence and re-entry bat surveys, invertebrate surveys, hedgerow surveys, breeding bird surveys, reptile surveys and great crested newt surveys.
	In describing the site and assessing impacts a holistic approach should be taken to the site as a network of habitats, supporting species, rather than the reductive approach of only considering each habitat type separately which fails to address the overall ecological connectivity of a site and how it contributes to how the local landscape supports wildlife species.	The landscape context has been considered in the assessment of effects on species which are supported by the range and extent of habitats present in line with the Chartered Institute of Ecological and Environmental Assessment (CIEEM) (2016) Guidelines for Ecological Impact Assessment in The UK and Ireland.
	Given the large scale of this proposal habitat survey should include land (and water) adjacent to the site. In particular this will assist in determining impacts related to ecological connectivity, the use of the site and surroundings by protected and priority species and impacts of the proposal of the ability of these species to persist in the area.	Surveys have included land adjacent for mobile species, for example radio-tracking of bats, bird surveys of Gailey Reservoirs and bait marking to establish badger territories (evidence of off-site interaction with setts identified on-site) and are reported in this ES.
	Potential Impacts. In addition to the impacts identified in s.6.5.96 and 6.5.97 the following should be considered; wintering birds, other species of farmland such as brown hare, harvest mouse and impacts of increased highways use by HGVs on adjacent habitats and on species.	Wintering bird surveys of the Site and Gailey Reservoirs were undertaken between November 2016 and March 2017 and are reported in the ES. Brown hare, harvest mice and polecat are considered in the ES.
	The Appendix 1 Phase 1 Habitat Survey and Tree and Building Bat	FPCR have undertaken a full tree survey which has included the

Table 10.2: Comments Received During EIA Scoping

	<p>Roost Potential drawings do not show all trees on the site. For example a significant over mature/ veteran oak adjacent to the canal, one of the most significant tree specimens on the site, is not mapped. It is important that trees such as these are accurately mapped so that proposals, such as the canal over-bridge, can be designed to avoid or minimise impacts. An arboricultural survey is required to inform impacts on trees.</p>	<p>mapping of all over-mature and veteran trees. Details are presented in the FPCR Report (Technical Appendix 12.7)</p>
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- 10.59 The scope of the assessment has been informed by the Scoping Opinion received, dated October 2016, and the results of the suite of ecological surveys that have been undertaken, identified as necessary by an extended Phase 1 Habitat Survey.
- 10.60 This chapter should be read in conjunction with Technical Appendix 10.1 – Ecology Baseline Report.

Assessment Methodology

- 10.61 Assessment methodology follows that of the Chartered Institute of Ecological and Environmental Assessment (CIEEM) (2016) Guidelines for Ecological Impact Assessment in The UK and Ireland²⁴. This guidance discourages the use of a 'traditional' matrix approach to impact assessment. The approach set out within the CIEEM guidance has been applied as far as possible to enable decision-makers to understand the evidence base, however, effort has been made to include the terminology and methods consistent with the ES where possible.

Importance of Ecological Features

- 10.62 The ecological importance of existing habitats and species has been determined using the eight-point evaluation scale below, whereby receptors are assessed for their importance in a geographical context:
- International and European;
 - National (i.e. England);
 - Regional (i.e. Midlands);
 - County;
 - District (i.e. South Staffordshire);
 - Local; (i.e. 2.5 km radius around the Site);
 - Site (Zone of Influence); and
 - Negligible.
- 10.63 Various characteristics contribute to the importance of ecological features. These include recognised and published criteria (e.g. Ratcliffe, 1977²⁵, Wray et al 2010²⁶) where the ecological features are assessed in relation to their size, diversity, naturalness, rarity, fragility, typicalness, connectivity with surroundings, intrinsic value, recorded history and potential value.
- 10.64 A wide range of sources can be used to assign importance to ecological features, including legislation, policy, published methods, or professional judgment. In the case of designated sites, their importance reflects the geographic context of the designation.
- 10.65 In line with section 4.1 of the CIEEM guidelines, this assessment only considers effects on 'Important Ecological Features' as defined in Table 10.3 (if present). Effects on 'Other Ecological Receptors' are excluded from the assessment as effects on these receptors would not be considered to result in significant impacts (this is because these receptors are not sufficiently important for consideration and therefore any effects on them would not be material to the planning decision i.e. significant).

Method of Assessment

Scope of the Assessment

Spatial Scope (Zone of Influence)

- 10.55 This Ecological Impact Assessment (EclIA) has focused on a 'Zone(s) of Influence' approach. The Zone(s) of Influence (ZoI) is defined as the area over which a project or its activities can have an influence on resources, and will vary for different ecological features depending on their sensitivity to an environmental change.
- 10.56 In this case, the ZoI(s) and, therefore, the study area have been defined as the Site and a 200 m radius around it, in addition to:
- SSSIs, SAC (SCIs or cSACs), SPA, pSPAs and Ramsar Sites within 200 m of road links which could reasonably expect an increase in traffic as a result of the Proposed Development (See Chapter 15: Transport of this ES for further information on affected transport links);
 - Habitats within 500 m of the Site for Great Crested Newt (GCN);
 - Locally designated sites within 1 km;
 - Nationally designated sites within 2 km; and
 - Internationally designated sites within 10 km of the Site boundary.

Temporal Scope

- 10.57 This assessment identifies the baseline ecological conditions in the ZoI, and makes suggestions for a likely future baseline. It is anticipated that, subject to the granting of the DCO, the enabling works for the construction phase of development would commence in 2019. It should still be recognised that ecology is temporally variable and the findings and impact assessment of this chapter are based on observations made and data available at the time of survey and assessment.
- 10.58 The scope of the assessment includes all works associated with the development from site preparation to the lifetime of the Proposed Development and decommissioning/closure. The lifetime of the project is estimated to be 25 years for warehouse buildings and 120 years for infrastructure.

Technical Scope

²⁴ CIEEM (2016) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd edition*. Chartered Institute of Ecology and Environmental Management, Winchester

²⁵ Ratcliffe, D.A. (Ed). 1977. *A Nature Conservation Review*. 2 vols. Cambridge University Press

²⁶ Wray S, Wells D, Long E, Mitchell-Jones T, 2010. Valuing Bats in Ecological Impact Assessment, CIEEM In-Practice. 23-25

Receptor	Description
Important ecological features	<ul style="list-style-type: none"> Designated sites* Country biodiversity list: Habitats and species of principal importance for the conservation of biodiversity: England and Wales UK BAP priority habitats and priority species Local BAP priority habitats and priority species Red listed, rare or legally protected species
Other ecological features	Any sites, habitats or species not listed in the categories above

* SAC, SPA, RAMSAR, SSSI (Ecological not Geological), NNR, LNR and LWS
Air Quality Assessment

10.66 An air quality assessment using the ADMS Roads dispersion model (Version 4.1, February 2017) has been undertaken to predict nitrogen oxides (NO_x), nitrogen deposition and acid deposition from traffic emissions due to the increase in vehicles numbers (HDV and Light Duty Vehicle (LDV)) from the Proposed Development which has potential to impact sensitive ecological sites.

10.67 A scoping exercise was undertaken to determine which sites to consider in detail in the impact assessment in line with methodology as agreed with Natural England via e-mail (Antony Muller, personal communication, 19 October 2017) The results of the scoping exercise are shown in Table 10.4 below.

Site	Distance from Affected Road (m)	LDV Change	HDV Change	Description of Habitats within 200 m of link	Scoped in/out?
Cannock Extension Canal SAC, SSSI	< 200m	16	113	Extensive inland waterway system. The uneven canal bottom and low volume of boat traffic have allowed a diverse aquatic flora to develop including floating water-plantain (<i>Luronium natans</i>) at the eastern limit of the plant's natural distribution in England. A very large population of the species occurs in the Canal, which has a diverse aquatic flora and rich dragonfly fauna, indicative of good water quality.	Out – change in LDV and HDV fall below DMRB criteria

Site	Distance from Affected Road (m)	LDV Change	HDV Change	Description of Habitats within 200 m of link	Scoped in/out?
Mottey Meadows SAC, SSSI	>200m	-	-	Lowland hay meadows including meadow foxtail (<i>Alopecurus pratensis</i>) and great burnet (<i>Sanguisorba officinalis</i>). The SAC contains grassland with limited influence of agricultural intensification and so demonstrates good conservation of structure and function. There are transitions to other dry and wet grassland types. The site is important for a range of rare meadow species, including fritillary (<i>Fritillaria meleagris</i>) at its most northerly native locality.	Out – over 200 m from nearest road
Cannock Chase SAC, SSSI	<200m	65	44	The lowland heathland at Cannock Chase is the most extensive in the Midlands. Dry heathland communities belong to National Vegetation Classification (NVC) types H8 <i>Calluna vulgaris</i> – <i>Ulex gallii</i> and H9 <i>Calluna vulgaris</i> – <i>Deschampsia flexuosa</i> heaths. Within the heathland, species of northern latitudes occur, such as cowberry (<i>Vaccinium vitis-idaea</i>) and crowberry (<i>Empetrum nigrum</i>). Cannock Chase has the main British population of the hybrid bilberry (<i>Vaccinium intermedium</i>), a plant of restricted occurrence.	Out– change in LDV and HDV fall below DMRB criteria
Belvide Reservoir SSSI	<200m A5	690	474*	The reservoir is primarily designated for its bird interest and as such, a significant effect on the main qualifying feature for its designation is not predicted. The small scale changes are likely to be much less significant than changes due other factors such as management regime, fertiliser runoff and rainfall.	In – change in AADT and HDV fall above the DMRB criteria
Doxey and Tillington	<200m M6 (between	756	750*	Lowland grazed marshy grassland dominated by <i>Juncus</i> sp. Further plants with a range	In – change in

Site Name	Location	Distance from Road	Other	Ecological Description	Impact Assessment
Marshes SSSI	Junction 13 and 14)			of plants characteristic of marshy conditions are present including gypsywort, creeping-jenny, marsh-marigold, marsh pennywort, tubular water-dropwort, lesser spearwort and marsh arrowgrass. The site is buffered from the M6 by highways planting on an embankment (woodland and semi-improved grassland). A reed bed was noted and a wet ditch with typha, water-plantain, lesser waterparsnip, celery-leaved buttercup and brooklime. Particularly important as a habitat for breeding and wintering birds. The River Sow and its tributaries, man-made lagoons with their inundation Zones and overgrown hedges, trees and scrub are also present.	AADT and HDV fall above the DMRB criteria
Stowe Pool and Walk Mill Clay Pit SSSI	M6 not included (>200 from other roads)	-	-	Designated for white-clawed crayfish population. The habitats adjacent to the road comprise scrubby woodland. Species present include; goat willow, alder, oak, birch, ash and bramble. These are not considered to be sensitive to air quality impacts. The water body does not include any appreciable marginal vegetation. Two areas of emergent vegetation were noted (reeds) to the north and south.	Out – change in LDV and HDV fall below the DMRB criteria
Chasewater and the Southern Staffordsire Coalfield Heaths SSSI	<200m	16	113	A 'trotting track' is present adjacent the M6. This comprises acid grassland and dense gorse within the track. Chasewater was considered to be of low value with no emergent vegetation. The waterbody is a very popular and heavily used amenity site. Signs warning of blue green algae suggest existing water quality is poor. The water body is not considered to be	Out – change in LDV and HDV fall below the DMRB criteria

				sensitive. An area in the east of the northern portion of the SSSI (at Anglesey Wharf) comprises areas of heath with a pond and birch scrub woodland. The area opposite this on the other side of the M6 and adjacent to the A5195 was not accessed but had the appearance of woodland with heathy open glade areas. Species noted included willow, oak, broom and gorse.	
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* denotes values greater than the scoping level for an affected road.

- 10.68 To assess the impact of NO_x, nitrogen deposition and acid deposition on ecological sites which have been scoped in (Belvide Reservoir SSSI and Doxey and Tillington Marshes SSSI), a number of receptors were modelled at locations within 200 m of roads where it is anticipated that an increase in vehicles as a result of the Proposed Development are likely (Daily traffic flows change by > 1,000 AADT and/or HDV flows change by >200 AADT). Modelled receptors were at a set distance from the closest road link at the following distances: 0 m, 5 m, 10 m, 15 m, 20 m, 35 m, 50 m, 75 m, 100 m, 150 m and 200 m.
- 10.69 The model used the latest available emissions data (EFT2017_V8.0) to predict concentrations in 2021 (when the development is 25% operational), 2028 (when it is 50% operational) and 2036 (when 100% operational) using the relevant year emission factors.
- 10.70 The predicted NO_x emissions have been added to background concentrations obtained from the APIS website²⁷ to compare the total NO_x concentration at each site under the baseline and under the 'do something' scenarios.
- 10.71 The predicted NO_x concentrations have been used to calculate nutrient nitrogen deposition and acid nitrogen deposition at each receptor and the results have been compared to the relevant critical loads obtained from APIS.
- 10.72 Where the predicted impact of the development falls below 1% of the Critical Level (CL) or Critical Load (CLO) the impact has been considered as insignificant. However, where the impact is calculated to be above 1%, further consideration of the potential impacts is provided within this Chapter.
- 10.73 Full details of the air quality assessment methodology are provided in Chapter 7 – Air Quality.

Significance Criteria

- 10.74 The significance of effects has been assessed with reference to the ecological structure and function of the feature in question, for instance the fragility/stability of an ecosystem and its connectivity to other features or available resources (territory/foraging habitat) for species.
- 10.75 The following parameters have been referred to in assessing effects on ecological structure and function:
- Beneficial or adverse – whether the change improves or reduces the quality of the environment;
 - Magnitude (severity) – the degree of change or intensity e.g. percentage decline in a species, increase in artificial lighting intensity;

²⁷ Air Pollution Information System (APIS). Available online: <http://www.apis.ac.uk/> [Accessed 07.12.2017]

- Extent – the spatial extent over which the impact occurs e.g. radius 500 m of the source, 0.2 ha of woodland;
- Duration – temporal longevity of the impact (not just the duration of the activity) e.g. five weeks, breeding season, medium-term (where defined);
- Reversibility – whether spontaneous recovery is possible or will be enabled through mitigation; and
- Timing and frequency – the number of times an activity, and resulting impact will occur over a phase.

10.76 The assessment only describes those characteristics relevant to the ecological effect. For example, the timing of when a habitat is destroyed may not be relevant to the assessment of the effect on that habitat. However, it may be relevant for assessing the impact to the species that occur within the habitat (e.g. roosting bats/breeding birds).

10.77 Table 10.5 relates the CIEEM guidelines used above and in this EclA to the terminology of this ES.

Magnitude of Impact	Description
Major	The Proposed Development would cause a major change to existing environmental conditions. The impact would give weight to a judgement or undermine or support conservation objectives.
Moderate	The Proposed Development would cause a noticeable change to existing environmental conditions but would not give weight to a judgement or undermine or support conservation objectives.
Minor	The Proposed Development would cause a small change to existing environmental conditions but would not affect conservation objectives.
Negligible	The Proposed Development would cause no discernible change to existing environmental conditions and would not affect conservation objectives.

10.78 An effect that either enhances or undermines the conservation status or conservation objectives of an Important Ecological Feature is significant (for that feature). The ecological importance of the feature determines the weight that should be given to the predicted change. Conservation objectives may be specific (e.g. for a designated site), or broad (e.g. national conservation policy).

10.79 In accordance with CIEEM guidance, each impact was assessed as having a significant effect or not having a significant effect upon each Important Ecological Feature qualified with reference to the appropriate geographic scale, which may be based on the importance of the affected feature.

10.80 An effect on an Important Ecological Feature that affects the integrity of the resource or enhances/undermines conservation objectives is considered significant and as such is described as a significant effect.

10.81 Table 10.6 presents the significance 'matrix' for the assessment of ecological effects. This assessment has used the approach defined in the CIEEM guidelines (and outlined above, notably in Table 10.5 where a major impact is defined as one causing a change which would give weight to a judgement or undermine or support conservation status or conservation objectives). The matrix determines whether effects are significant, and if so, at which scale.

The CIEEM Guidelines for Ecological Impact Assessment (2016) acknowledges in Section 5.28 that the scale of significance of an effect may not be the same as the geographic context in which the feature is considered important. For example, an effect on a species which is on a national list of species of principal importance for biodiversity may not have a significant effect on its national population. This approach has been applied where relevant within the assessment. Following this, the comparison within Table 10.6 below has been applied for consistency with non-ecological assessment methods within this ES.

Receptor Sensitivity/Importance	Impact Magnitude			
	Major	Moderate	Minor	Negligible
International Importance	Significant effect at the international level	No significant effect		
National Importance	Significant effect at the national level	No significant effect		
Regional Importance (Midlands)	Significant effect at the regional level	No significant effect		
County Importance (Staffordshire)	Significant effect at the county level	No significant effect		
District (South Staffordshire)	Significant effect at the district level	No significant effect		
Local Importance (Gailey / Four Ashes)	Significant effect at the local level	No significant effect		
Site Importance	Significant effect at the site level	No significant effect		
Negligible Importance	No significant effect	No significant effect		

Assumptions and Limitations

10.82 The findings and opinions in this chapter are based upon information derived from a variety of information sources. Ramboll does not accept any liability for the accuracy or otherwise of any information derived from third party sources. However, reasonable endeavours have been made to verify the information obtained in this way. The availability and quality of the data obtained during desk studies is reliant on third party responses. This varies from region to

region and for different species groups. Furthermore, the comprehensiveness of data often depends on the level of coverage, the expertise and experience of the recorder and the submission of records to the local recorder.

- 10.83 Whilst every effort has been made to provide complete coverage, no site survey can ensure the complete characterisation and species of the Site.
- 10.84 Details of any survey specific assumptions or limitations are presented in Technical Appendix 10.1 – Ecology Baseline Report which should be read in conjunction with this ES chapter.

Information for Habitat Regulation Assessment (HRA)

- 10.85 This section will provide full details to fulfil the requirements of Regulation 5 (2) (g) of The Infrastructure Planning (Applications: Prescribed Forms and Procedures) Regulation 2009 as amended (SI 2009 No. 2264)²⁸, as specified in Advice Note Ten: Habitat Regulations Assessment relevant to nationally significant infrastructure projects (Planning Inspectorate, 2016)²⁹.
- 10.86 Three European Sites within 10 km of the Proposed Development have been identified. The 10 km search area also reflects the maximum likely distance over which impacts could reasonably be foreseen to occur (e.g. Environment Agency Guidance on assessment of air quality impacts from emissions):
- Cannock Chase SAC (UK0030107);
 - Motte Meadows SAC (UK0030051); and
 - Cannock Extension Canal SAC (UK0012672).
- 10.87 An assessment has been completed for 'Likely Significant Effects' (LSE) on the qualifying features of the identified European Sites. The assessment considered the potential LSE's from the following potential impacts:
- Direct physical effects, habitat loss / fragmentation / displacement;
 - Disturbance from noise (all sources);
 - Changes in ambient air quality – direct (NO₂, NO_x, SO₂ and dust) and indirect (Nitrogen and acid deposition), for instance from traffic and site operations;
 - Changes to water quality, for instance from road run off; and
 - In combination effects.
- 10.88 An assessment of LSE's is provided in the No Significant Effects Report (Technical Appendix 10.3).
- 10.89 The NSER assessment indicates that there would be no LSEs on any European site, either alone or in-combination, and therefore an Appropriate Assessment is not required. As such, European Sites are not considered further in this Chapter.

Baseline Conditions

Current Baseline

- 10.90 This section summarises the characteristics of the existing Ecological conditions of the Site and the surrounding area.

Desk Study

Landscape Context

- 10.91 The Site is located in the Shropshire, Cheshire and Staffordshire Plain National Character Area (NCA), as defined by Natural England³⁰. The Natural Character Area is characterised by an expanse of flat or gently undulating, lush, pastoral farmland.
- 10.92 The Site is located approximately 10km north of Wolverhampton and lies immediately west of Junction 12 of the M6. The immediate surroundings of the Site largely reflect the wider NCA and comprise a mixed farming landscape, albeit with several roads, rail and scattered settlements spread through the area. The surrounding area supports several small woodlands, as well as standing waterbodies. The Site is large and has an irregularly shaped boundary. It is bounded to the north by the A5 dual carriageway (several small light industrial units and commercial properties are located along the A5, including a petrol filling station and a garden centre). Calf Heath Reservoir is also situated on the north-eastern boundary of the Site. The M6 motorway passes the Site at its north-east corner. Vicarage Road and Straight Mile Road dissect the southern portion of the Site. The Site is bounded to the South by the Staffordshire and Worcestershire Canal. Four Ashes Industrial Estate is partly surrounded by the Site, situated within the central area of the southern boundary. The A449 (Stafford Road) forms the western Site boundary.

Designated Sites

- 10.93 There are no SPAs or Ramsar Sites within 10 km of the Proposed Development. Motte Meadows SAC is 7.5km to the west-north-west and comprises lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) and is considered to be one of the best such areas in the United Kingdom. The SAC contains grassland with limited influence of agricultural intensification and so demonstrates good conservation of structure and function. There are transitions to other dry and wet grassland types. The site is important for a range of rare meadow species, including fritillary (*Fritillaria meleagris*) at its most northerly native locality.
- 10.94 Cannock Chase SAC is 7.4 km to the north-east of the Site. Annex 1 habitats present that are the primary reason for selection of the SAC are European Dry heaths. The lowland heathland at Cannock Chase is the most extensive in the Midlands. Dry heathland communities belong to National Vegetation Classification (NVC) types H8 Calluna vulgaris – Ulex gallii and H9 Calluna vulgaris – Deschampsia flexuosa heaths. Within the heathland, species of northern latitudes occur, such as cowberry (*Vaccinium vitis-idaea*) and crowberry (*Empetrum nigrum*). Cannock Chase has the main British population of the hybrid bilberry (*Vaccinium intermedium*), a plant of restricted occurrence. There are important populations of butterflies and beetles, as well as European nightjar (*Caprimulgus europaeus*) and five species of bats. North Atlantic wet heaths with Erica tetralix Annex 1 habitats are also present as qualifying feature but are not the primary reason for selection of the SAC.
- 10.95 Cannock Extension Canal SAC is approximately 10 km to the south-east of the Site. Cannock Extension Canal is an example of anthropogenic, lowland habitat supporting floating water-plantain (*Luronium natans*) at the eastern limit of the plant's natural distribution in England. A very large population of the species occurs in the Canal, which has a diverse aquatic flora and rich dragonfly fauna, indicative of good water quality. There is a low volume of boat traffic on this terminal branch of the Wyrley and Essington Canal which has allowed open-water plants, including floating water-plantain, to flourish, while depressing the growth of emergent vegetation.
- 10.96 There are no other European or International sites within 10km of the Proposed Development.
- 10.97 Belvide Reservoir Site of Special Scientific Interest (SSSI) is a canal feeder reservoir located approximately 4.5 km west of the Site. The relatively undisturbed character of the site

²⁸ The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009. Available online: <http://www.legislation.gov.uk/uksi/2009/2264/contents/made> [Accessed 25.01.2017]

²⁹ The Planning Inspectorate (2016) Habitat Regulations Assessment Advice Note Ten: Habitat Regulations Assessment relevant to nationally significant infrastructure projects. January 2016, Version 7.

³⁰ <http://publications.naturalengland.org.uk/file/6497812007092224>

provides a secluded refuge for many species of water birds. It is particularly important as a wintering site for shoveler (*Anas clypeata*), and of regional importance for large numbers of moulting and wintering water-birds. It is also noted for its breeding birds and ability to attract a great variety of migrants and rare vagrants. Two small woodlands of pedunculate oak (*Quercus robur*) and ash (*Fraxinus excelsior*) and a well-developed boundary hedgerow provide shelter, food, and nest-sites.

- 10.98 Doxey and Tillington Marshes SSSI is an extensive area of low-lying damp grassland, marsh, swamp and pools in the flood plain of the River Sow. Doxey and Tillington Marshes is approximately 13 km to the north of the Site in Stafford and has been included within this assessment as it lies within 200 m of the M6 (between Junction 13 and 14). The site is of ornithological importance all year round and has special significance for the numbers of breeding snipe (*Gallinago gallinago*). Drier parts of the site are cattle grazed producing short, open pastures. Tall fen and swamp has developed over much of the area where the water table is at or near the surface and grazing is light or absent. The River Sow and its tributaries, the man-made lagoons with their inundation zones and overgrown hedges, trees and scrub complete the range of habitats represented on the site. All contribute substantially to the ornithological interest and are particularly important as a habitat for breeding and wintering birds.
- 10.99 Four Ashes Pit SSSI lies within 135 m of the Proposed Development; this site is a geological SSSI and it is therefore not discussed in this chapter further, but is considered in the Ground Conditions chapter (Chapter 11 of this ES). There are no other SSSI sites within 5 km of the Proposed Development.
- 10.100 There are 13 Local Wildlife Sites (LWS) within 1 km (Zone of Influence) of the Site:
- Gailey Reservoirs: This is an important area for water birds (located immediately to the north-east of the Site) for which there is no citation, this is awaiting review);
 - Calf Heath Bridge (east of): comprises of a section of the Staffordshire and Worcester Canal (10 m south of the Site);
 - Somerford Wood: a species rich woodland ground flora, which retains a mix of ancient woodland indicator species (250 m west of the Site);
 - Land at Four Ashes: a settling pond and five parallel ditches, native broad-leaved trees, ponds, wet woodland, dense scrub and swamp (240 m south of the Site);
 - Watling Street Plantation: broad-leaved woodland believed to be a failed plantation (170 m east of the Site);
 - Crateford Wood: a small woodland, half of which is dominated by a coniferous plantation (380 m west of the Site);
 - Gailey Old Reservoir: designated for its wet woodland and its associated wetland plants, which have colonised the edges of the pools (740 m east of the Site);
 - Pennymore Hay Farm: comprises of a mosaic of wet ditches and pools supporting wetland vegetation, associated areas of marshy grassland and swamp habitat surrounded by pockets of willow carr (130 m south of the Site);
 - Boggs Marsh consists of drying out swamp and largely unmanaged marshy grassland surrounded by water-loving trees (620 m north of the Site);
 - Water Eaton Coppice: a semi-natural area of broad-leaved woodland (800 m northwest of the Site);
 - Rodbaston Wood: a small wet woodland on Rodbaston Farm (850 m north of the Site);
 - Hatherton Bridge: a small rough field found alongside the northern bank of the Hatherton Branch Canal (310 m south east of the Site); and
 - Deepmore Farm: a field containing a created pond and a wildflower mix sown onto it (660 m south of the Site).
- 10.101 The nearest ancient woodland (Fullmoor Wood) is located approximately 1.4 km to the north-east of the Site. This is ancient replanted woodland.

10.102 The designated sites considered in this assessment are shown on Figure 10.001 of the ES.

Desk Study – Species Records

- 10.103 Desk study records of species of conservation interest relevant to the Proposed Development identified within 2 km of the Site boundary are presented in detail in Technical Appendix 10.1 – Ecology Baseline Report which should be read in conjunction with this ES chapter.
- 10.104 It is important to note that an absence of species records does not necessarily mean those species are not present within the search area, only that they have not been observed and/or the record has not been submitted to the relevant repository.

Field Survey

Habitats

- 10.105 The majority of the Site is occupied by agricultural fields that are a mixture of arable and grazed pastures. Several of the fields in the north-east portion of the Site are subject to ongoing quarrying activity. A number of broad-leaved and mixed woodlands are scattered across the Site, the largest of which is located in the centre of the Site (Calf Heath Wood). Calf Heath Wood is used for the release of game birds for shooting. The fields are surrounded by a network of interconnecting hedgerows and drainage ditches. Numerous mature trees, as well as ponds are located along the lengths of hedgerows. The western portion of the Site is bisected by a railway line and the Staffordshire and Worcestershire Canal, both of which run approximately north-south through the Site. The Staffordshire and Worcestershire Canal is also adjacent to the southern boundary running in a broad west-east direction. The habitats recorded on-site in approximate descending order of size include:
- Arable;
 - Improved grassland;
 - Quarry;
 - Poor semi-improved grassland;
 - Mixed plantation woodland;
 - Semi-improved grassland;
 - Broad-leaved plantation woodland;
 - Broad-leaved semi-natural woodland;
 - Hedgerows;
 - Individual trees;
 - Standing water;
 - Running water;
 - Scrub; and
 - Buildings and hardstanding.
- 10.106 The Phase 1 Habitat Survey identified the presence of Japanese knotweed (*Fallopia japonica*) on the railway embankments immediately north and south of the A5 and Himalayan balsam (*Impatiens glandulifera*) was observed on the Site boundary by a ditch running along the south of the wet woodland adjacent Straight Mile.
- 10.107 Rhododendron was present extensively through Calf Heath Wood and dominated the understorey.
- 10.108 The above mentioned plants are non-native species listed on Schedule 9 (Part 2) of the Wildlife and Countryside Act 1981 (as amended).
- 10.109 Full habitat descriptions are provided in Section 3 of Technical Appendix 10.1 – Ecology Baseline Report which should be read in conjunction with this ES chapter.
- 10.110 The Ecology Baseline Report assigns ecological values to the habitats present and the following 'Important Ecological Features' have been identified from the habitats present at the Site:

- Semi-improved grassland;
- Hedgerows;
- Woodland (including mixed plantation, broad-leaved plantation woodland and broad-leaved semi-natural woodland);
- Individual trees including a native black poplar (*Populus nigra*); and
- Standing water.

- 10.111 The hedgerow survey recorded 128 hedgerows as present on the Site, 11 were considered 'Important' under the Hedgerow Regulations 1997 with respect to their ecological value. These are shown on Figure 10.1.005 of Technical Appendix 10.1 – Ecology Baseline Report. A further six hedgerows were considered 'Borderline Important', as a result of failing to reach the requisite number of associated features for consideration as 'important' by one. The majority of hedgerows did not meet the criteria. Using HEGS assessment methodology for hedgerows south of Vicarage Road, 15 of the 31 hedgerows assessed were evaluated as *Moderately* high to *High* value. Full details of the hedgerow survey are presented in Section 3 and Annex 10.1.2 of Appendix 10.1 – Ecology Baseline Report.
- 10.112 All hedgerows are a habitat of principal importance and form an extensive network across the Site. Hedgerows are considered to be of value in a local context and to be 'Important Ecological Features' for the purpose of this assessment.

Species

Amphibians – Great Crested Newt

- 10.113 Section 4.1 of Appendix 10.1 – Ecology Baseline Report presents the Amphibian survey findings for the Site and adjacent habitats that was carried out between May and June 2016 and March and May 2017 to inform this assessment.
- 10.114 A total of 35 static waterbodies were identified on the Site and within a 500 m buffer of the Site boundary. Of the off-site ponds within 500 m of the Site, ten ponds were not considered for further survey as there was a physical barrier to amphibian movement between them and the Site or were heavily impacted by stocked fish and wildfowl. Three ponds were dry and one pond was located on private land where no access was permitted. The remaining ponds (either on the Site or within 500 m of Site) were considered to have the potential to support GCN and all were categorised under a habitat suitability index (HSI) assessment and tested for GCN DNA using the e-DNA technique or were surveyed using traditional survey methods. Ten ponds within the study area returned positive e-DNA results for GCN and were surveyed via traditional methods, six times each. A further four ponds were surveyed four times in 2017 using traditional methods only.
- 10.115 The ponds which returned negative e-DNA results in 2016 were tested again via e-DNA in 2017. All ponds tested negative again (4, 15, 20 and 27) with the exception of pond 17 which tested positive. Pond 17 is hydrologically linked to pond 16 which was confirmed to support low numbers of GCN in 2016. Ponds 15, 16 and 17 form a 'pond complex'. As such, no further survey was undertaken on this pond. Both ponds are off-site.
- 10.116 Four amphibian species were identified over the course of the amphibian and reptile survey visits, namely common frog (*Rana temporaria*), common toad (*Bufo bufo*), smooth newt (*Lissotriton vulgaris*) and great crested newt (*Triturus cristatus*). Of these species, the great crested newt and common toad are s41 species and are therefore species of principal importance for the conservation of biodiversity in England while the great crested newt is a European Protected Species (EPS). Technical Appendix 10.1 – Ecology Baseline Report details the legislative protection and conservation status of amphibian species in the UK.
- 10.117 Smooth newts were the amphibian species found in the greatest number of ponds within the study area, being present in thirteen out of fourteen ponds surveyed. Common frogs (peak count of six) and large numbers of common frog tadpoles were observed in all but five ponds over the course of the surveys. Three common toads were observed over the course of the

surveys and common toad tadpoles were noted in one pond. A total of three great crested newt were observed within the study area in bottle traps (peak count of two) but these were off-site, in one pond (complex). One of the GCN was a gravid female indicating that this is a breeding pond.

- 10.118 Incidental records of amphibians were made during the reptile survey. Records included common toads recorded under reptile refugia on six out of seven reptile surveys in 2016 (not found on Survey 3) and four out of seven reptile surveys in 2017. A peak count of 18 toads were found on survey 7 in 2017. Over the seven reptile surveys a total of 56 toad records were made in 2016 and 6 in 2017. Three common frogs were found under reptile refugia over the course of the reptile surveys (2016-2017). The results of the amphibian survey show that smooth newt, common frog and the s41 common toad are confirmed as being present on the Site. The s41 and legally protected (European Protected Species) great crested newt (GCN) was found off-site in Pond 16 (and 17 via repeated e-DNA), approximately 270 m from the south-western edge of the Site boundary beyond the busy Station Drive.
- 10.119 A disparity exists between the GCN e-DNA results and the surveys undertaken utilising traditional survey methods whereby GCN were only physically confirmed as present through use of traditional techniques in one of the ten ponds that returned positive e-DNA results. Results gained via e-DNA tests do not provide a population size class assessment (i.e. newt abundance). The positive e-DNA results indicate that GCN are present within the landscape. The surveys undertaken using traditional methods indicate that whilst present within the landscape they are present in low (undetected using traditional population estimate techniques) numbers with the exception of the pond complex including Pond 16 off-site.
- 10.120 The amphibians including GCN and common toad in the landscape are considered to be an 'Important Ecological Feature' at a Local scale and this feature is included in this assessment.
- 10.121 The presence of common frog and smooth newt are considered to be an 'Other Ecological Feature' of Site importance. As such, common frog and smooth newt are not considered further within this assessment (although mitigation measures for the Important Ecological Feature amphibians would also benefit these species).

Reptiles

- 10.122 Section 4.2 of Appendix 10.1 – Ecology Baseline Report presents the reptile survey findings for the Site and adjacent habitats that was carried out between May and September 2016 and between April and September 2017 to inform this assessment.
- 10.123 No reptiles were recorded during the seven survey visits or any direct observations made during any of the other field work undertaken on the Site in 2016 or 2017. Anecdotal evidence of presence of adder (*Vipera berus*) at Gailey Magazine was received from the facilities manager of these buildings. This area was subject to a targeted search for this species with corrugated Coraline sheets being added to supplement the bitumen refugia already laid. No adders were encountered and habitats were generally considered sub-optimal comprising mown grass on the edge of an arable field with some dense scrub. A survey undertaken in 2015 for the adjacent Bericote Development identified common lizard as present (peak count of two). The habitat in this location was of superior quality for reptiles to that present on-site.
- 10.124 The results of the reptile survey suggest that reptiles are likely to be absent from the Site, or else with a low enough local population so as to be below detectable levels. This is thought to be for several reasons including a very high number of pheasants in the area which would be likely to predate reptile species. Large fluctuations in the local water table were also evident on-site over the course of the surveys with the Site being inundated with standing water at times. This would impact the potential for reptiles to be present on-site as they would ordinarily seek out areas with better drainage. Similarly, the habitats on site are not ideal for the majority of reptile species with large areas either being given over to arable fields or else being heavily shaded by trees and tall vegetation.

- 10.125 Reptiles are considered likely absent, or present in very low (undetected) numbers, as such, reptiles are not considered further within this assessment other than to define mitigation to consider the event of reptiles being encountered in Site clearance activities.
- 10.126 While no reptiles were found, several common toads (s41) toads and small mammals were found under the refugia over the course of the survey.

Other Aquatic Species

- 10.127 Section 4.3 of Appendix 10.1 – Ecology Baseline Report presents the baseline assessment of ‘Other aquatic species’ such as white-clawed crayfish and fish. Key findings are presented below.
- 10.128 Records of white-clawed crayfish (*Austropotamobius pallipes*) exist for the River Penk and Watershed Brook (1.4 km south-west of the Site) and Saredon Brook (750 m south of the Site). No specific survey has been undertaken for crayfish. Although the canal has good connectivity to the wider landscape, the habitat suitability for crayfish refuges is considered to be low due to the lack of refuge features and the presence of hard, engineered banks along much of the canal. The record of white-clawed crayfish is considered to be of County value but is outside of the Zol. This species is not considered an Important Ecological Feature within this assessment and is not considered further in the ES but working methods to ensure biosecurity and protection of unanticipated individuals present is discussed.
- 10.129 The Staffordshire and Worcester Canal supports a range of coarse and game fish (see Section 4.3 of Appendix 10.1 – Ecology Baseline Report). During newt surveys, two ponds within the Site were found to support three-spined stickleback (*Gasterosteus gymnaurus*). Great diving beetle (*Dytiscus marginalis*) larvae and adults were also observed throughout the ponds. Since no conservation action has been targeted for these species (three-spined stickleback is listed on the global red list of least concern status), they are not considered an Important Ecological Feature within the ES.

Birds

- 10.130 Section 4.4 of Appendix 10.1 – Ecology Baseline Report presents the breeding bird survey findings for the Site and adjacent habitats that was carried out between April and June 2016 and March to June 2017, and the results of the wintering bird survey carried out between November 2016 and March 2017 to inform this assessment.

Breeding Birds - The Site

- 10.131 Sixty-two species of birds were recorded in the survey of the Site, of which there were 12 UKBAP/s41 species of principal importance, 10 Red List species (all of which except mistle thrush are listed in s41) and 12 Amber List species. There are eight Staffordshire BAP species of which five form part of the Action Plan for Farmland Seed Eating Birds. The only species on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) recorded was hobby which is considered to be breeding off-site.
- 10.132 The breeding bird assemblage on the Site includes the s41/Red List/LBAP farmland birds lapwing (*Vanellus vanellus*), skylark (*Alauda arvensis*), yellow wagtail (*Motacilla flava*), linnets (*Linaria cannabina*), yellowhammer (*Emberiza citrinella*) and reed bunting (*Emberiza schoeniclus*) reflecting the agricultural landscape present.
- 10.133 Dunnock (*Prunella modularis*), song thrush (*Turdus philomelos*), mistle thrush (*Turdus viscivorus*) and willow warbler (*Phylloscopus trochilus*) were associated with woodland or hedgerows across the Site. Stock dove (*Columba oenas*) (Amber List) was found largely associated with woodland edges and the old trees in Calf Heath Wood. Bullfinch (*Pyrrhula pyrrhula*) was recorded in two locations on the edge of the Site and may breed on the site margins, but more likely off-site.
- 10.134 The hole nesting house sparrow (*Passer domesticus*), starling (*Sturnus vulgaris*) (both s41 and Red List) and swallow (*Hirundo rustica*) (Amber List) were found associated with buildings on and off-site and one pair of kestrel (*Falco tinnunculus*) (Amber List) was recorded near a building in Woodside Farm and is possibly nesting there.

- 10.135 A single barn owl (Schedule 1 WCA) was recorded on two occasions (5th and 6th July 2017) hunting over a grass field south of Station Road by surveyors carrying out bat surveys. Barn owl is not suspected of breeding on Site. Tawny owl (*Strix aluco*) (Amber List) was recorded in one location and the flashy and periodically wet nature of the Site along with numerous ponds explains the presence of mallard (Amber List) across the site. It is hard to determine the breeding status of cuckoo (*Cuculus canorus*) (s41 and Red List) although two seen together suggests possible breeding.
- 10.136 Breeding evidence or confirmed breeding on the Site or in the vicinity was recorded for several widespread species.
- 10.137 The birds breeding on-site need to be considered in the context of the surrounding landscape which has similar habitats present to those on-site (i.e. areas of buildings, arable, pasture, woodland, watercourses, waterbodies and quarries). The habitats and birds present are not unique or particularly noteworthy in the local area.

Breeding Birds – Calf Heath Reservoir (off-site)

- 10.138 A kingfisher (Schedule 1) was seen on two occasions in the western side of the reservoir (where there are low earth banks that provide some limited nesting habitat). This species may nest at this location, although it is busy with anglers on occasion and the banks may not be sufficiently high to prevent predation of any nests attempted by mammal predators.
- 10.139 The reservoir is used by breeding waterbirds, notably mallard (16 males maximum and at least three pairs confirmed breeding) and great crested grebe (up to four pairs displaying and up to three family groups with chicks). Coot was also confirmed breeding and the Amber List lesser-black backed gull, black-headed gull and common tern were recorded on or over the reservoir.
- 10.140 Other waterbirds recorded in the survey were feral/hybrid mallard, cormorant, moorhen and tufted duck.
- 10.141 Birds recorded around the margins of the reservoir and in woodland did not include any species of conservation concern or additional to those recorded in the breeding bird survey for the Site.

Wintering Birds

- 10.142 The reservoirs to the north-east of the Site held the expected waterbirds, notably a flock of pink-footed geese (*Anser brachyrhynchus*) on Gailey Lower Reservoir on one date, Canada goose (*Branta canadensis*), greylag goose (*Anser anser*), mallard (*Anas platyrhynchos*) (also on the main site, for instance 16 mallard on flooded gravel workings) and large numbers of tufted duck (*Aythya fuligula*) on both Gailey Reservoirs. Species and numbers of birds recorded were consistent with WeBS counts for the Gailey Pools. Four records of the Schedule 1 kingfisher (*Alcedo atthis*) were made on Gailey Reservoirs and single oystercatcher (*Haematopus ostralegus*) records were made on the Site on three occasions.
- 10.143 In terms of farmland birds, a flock of 50 lapwings was recorded over the Gailey Reservoirs in the February 2017 visit, however the largest number recorded on the main site during the wintering bird survey was five (also February 2017). A flock of 40 lapwing was recorded in the north of the Site during fieldwork for a bat survey in October 2017. There were no records of skylark flocks and no records of yellowhammer at all; a flock of 17 linnets was one of the four winter records of this species from the main site. Records of one or two reed buntings were made from the Site with similar numbers from the Gailey Reservoir.
- 10.144 Wintering thrush flocks were recorded on the Site, for instance flocks of 100, 70 and several flocks of 30 or fewer fieldfare (*Turdus pilaris*) and up to 20 redwing (*Turdus iliacus*) (although a flock of 40 redwing was recorded off-site to the east of the Site by the M6 motorway). Groups of up to three song thrushes were recorded on the Site.
- 10.145 Of the more commensal species, house sparrows were noted on the Site in flocks of up to 30, notably around Gailey Wharf, Four Ashes Industrial Estate and the houses south of Station

Road. Starling flocks of between 10 and 20 birds were recorded in several places, notably around Gailey, Calf Heath Wood and close to Woodside Farm/Heath Farm.

- 10.146 The farmland bird assemblage of birds of conservation concern/listed on s41 or forming part of the local BAP is of importance at the County scale (due to the significant proportion of the county population of yellow wagtails that breed on-site). This value is largely due to the breeding bird assemblage; the birds using the Site in the winter do so in numbers unremarkable in a county context. The assemblage of other birds of conservation concern (including those nesting in buildings or associated with woodland and scrub) are of value at the Local scale, again as a result of the breeding birds present. These are therefore considered as Important Ecological Features. The other birds are of importance at the Site scale and thus considered as Other Ecological Features and are not considered further in the ES.
- 10.147 The findings of the breeding bird survey of Calf Heath Reservoir support the evaluation of this part of the designated site (Gailey Reservoirs) as being of County importance.

Invertebrates

- 10.148 Section 4.5 and Annex 10.1.5 of Technical Appendix 10.1 – Ecology Baseline Report presents the invertebrate survey findings for the Site that were carried out between May and September 2016 and May to July 2017 to inform this assessment.
- 10.149 A total of 420 species were recorded during the invertebrate surveys.
- 10.150 Of the total 420 species recorded, 133 invertebrate species from the target groups were recorded in Calf Heath Wood, 90 species were recorded from the quarry, 172 species were recorded across the wider Calf Heath landscape and 179 species were recorded in the Land south of Vicarage Road (Sample areas 4 and 5).
- 10.151 The habitat diversity is broadly poor in terms of invertebrate assemblage types. The principal assemblages relate to woodland, wood edge and trees, bare ground and early succession and wetlands. The niches of value are few and not particularly well-developed.
- 10.152 Eight species of importance were identified as presented in Table 10.7 (seven Nationally Scarce (NS) or s41) and one group of species are of County, Staffordshire importance. The habitats identified are largely populated by common and localised species indicative of a broad suite of preferences rather than a specialised set of habitat criteria. The habitats present on-site are replicated in the local area.

Scientific Name	Vernacular Name	National Status	Habitat Preferences and Species Notes	Sample Location
<i>Rhamphomyia micropyga</i>	A dancefly	NS	Shaded woodland floor	Specific to sample area 4
<i>Rhaphium albomaculatum</i>	A dolyfly	NS	Wetlands on peat	Specific to sample area 4
<i>Rhaphium lanceolatum</i>	A dolyfly	NS	Wetlands on peat	Specific to sample area 4
<i>Tyria jacobaeae</i>	Cinnabar	s41	Open habitats where there is ragwort	Found across the landscape
<i>Aculeate hymenoptera</i>	Ground-nesting solitary bees and wasps	Staffordshire Biodiversity Action Plan (SBAP)	Bare ground and flowery swards. Structured sites	Quarry (19 sp – all common or local) and, to a lesser extent, landscape (six species – all common or local)

- 10.153 The invertebrate assemblage on-site is considered to be an ‘Important Ecological Feature’ at a Local scale and is included in this assessment.

Bats

- 10.154 Section 4.6 of Appendix 10.1 – Ecology Baseline Report presents the bat survey findings for the Site and adjacent habitats that were carried out between May and October in 2016 and 2017 to inform this assessment.
- 10.155 Ten species of bat were confirmed to be present in the survey area. As an assemblage of bats this species presence is considered significant as there are 12 species recorded in Staffordshire (SER, 2016) and the Site appears to support to a greater or lesser extent the majority of these species. Species recorded on-site include:
- Common pipistrelle (*Pipistrellus pipistrellus*);
 - Soprano pipistrelle (*Pipistrellus pygmaeus*);
 - Nathusius Pipistrelle (*Pipistrellus nathusii*);
 - Noctule (*Nyctalus noctula*);
 - Daubenton’s (*Myotis daubentonii*);
 - Whiskered (*Myotis mystacinus*);
 - Brandt’s (*Myotis brandtii*);
 - Serotine (*Eptesicus serotinus*);
 - Brown long-eared (*Plecotus auritus*); and
 - Natterer’s (*Myotis nattereri*).
- 10.156 Only lesser horseshoe (*Rhinolophus hipposideros*) and Leisler’s bat (*Nyctalus leisleri*) which have been recorded in Staffordshire were not captured on the Site. Some calls were recorded with the appearance of Leisler’s bat, however, as acknowledged in the limitations of Section 4 of Technical Appendix 10.1 the calls of ‘big bats’ are variable and are very difficult (sometimes impossible) to distinguish from each other, particularly in woodland, when the peak frequency is raised and the distinctive rhythms tend to disappear.

Scientific Name	Vernacular Name	National Status	Habitat Preferences and Species Notes	Sample Location
<i>Bombus rupestris</i>	A cuckoo bumblebee	NS B	No specific habitat preferences. More common than status suggests	Calf Heath Wood
<i>Chiasmia clathrata</i>	Latticed heath	s41	Dry grassland, brown-fields and heaths with trefoils	Found across the landscape along sparse, fine-leaved grass track verges with trefoils. Specifically, along the edges of arable fields.
<i>Diogma glabrata</i>	A crane fly	NS	Damp woodlands	Calf Heath wood

10.157 A total of twenty-two roosts were identified. Nine bat roosts were identified in 2016 and 13 bat roosts were identified in 2017 via a combination of survey methods. Six of these were on-site and sixteen were off-site. Of the sixteen off-site roosts, seven were identified within 100 m of the Site boundary. Nine tree roosts and thirteen building roosts were identified. The roosts identified are summarised below in Table 10.8 and presented in Figures 10.1.635 to 10.1.641 in Appendix 10.1 – Ecology Baseline Report:

Roost Name	Distance and Orientation from Site	Species	Roost Classification
Gailey Magazine	On-site	Common pipistrelle Soprano pipistrelle	Day roost
Woodside Barn	On-site	Natterer's Common pipistrelle Soprano pipistrelle Brown long-eared	Day roost Night roost Probable feeding perch
Mile End Cottage	On-site	Common pipistrelle	Day roost
Croft House	On-site	Common pipistrelle	Day roost
Heath Farm – Main Farmhouse	On-site	Brown long-eared	Day roost
T97 – Oak	On-site	Soprano pipistrelle	Day roost
Calf Heath Wood Birch 2 Roost 2	Approximately 20 m west	Daubenton's	Day roost
Woodview Cottage Roost 3	20 m south	Brown long-eared	Maternity roost or satellite roost
Stable Lane Building Roost 13	25 m east	Brown long-eared	Day roost
Tree Roost 15	40 m south	Noctule	Maternity roost
Tree Roost 10	45 m south	Whiskered/brandt's	Night roost
Calf Heath Wood Birch 1 Roost 1	Approximately 80 m west	Daubenton's	Day roost
Tree Roost 9	90 m south	Daubenton's	Day roost
Bungalow – Stable Lane Roost 7	120 m east	Brown long-eared	Day roost
Stable Lane Building Roost 11	200 m east	Whiskered/brandt's	Day roost

Standeford Barn Conversion Roost 8	1000 m south	Natterer's	Maternity roost
Somerford Grange Farm Roost 4	1250 m west	Natterer's	Day roost
Quarry Tree Roost 16	1300 m south-east	Daubenton's	Maternity roost
Somerford Tree Roost 14	1400 m west	Noctule	Maternity roost
Woodland north of Laches Wood Outdoor Education Centre – Birch. Roost 6	1500 m south-west	Whiskered/brandt's	Day roost
Slade Heath Building Roost 12	2100 m south-west	Whiskered/brandt's	Day roost / Possible maternity roost
House – Old Stafford Road Roost 5	2350 m south-west	Whiskered/brandt's	Day roost

10.158 Levels of bat activity (from the static detectors) were greatest in May. Levels of activity were relatively consistent between June and August. Reduced levels of activity were recorded in September and October. Common pipistrelles were the most frequently encountered species and accounted for approximately 67% of the registered passes on the static automated detectors. Soprano pipistrelle were the second most frequently recorded species accounting for approximately 15% of the registered passes on the static detectors. A further 2% of calls were pipistrelle social calls. Myotis and noctule were also frequently encountered. These species made up approximately 6.5% and 5.5% of the total registered passes on the static detectors respectively. 96 bat passes were classified a 'Big bat', this equates to approximately 0.4% of total registrations on the static detectors. Common and soprano pipistrelle, *Myotis* species, brown long-eared and noctule bats were recorded on every transect (1-6). Brown long-eared bats accounted for approximately 3% of the total registered passes on the static detectors. Two nathusius pipistrelle bats were recorded in May. Summaries of bat activity (from static detectors) and composition are provided in Figures 10.1618 to 10.1.623 of Technical Appendix 10.1 - Ecology Baseline Report.

10.159 Significant noctule activity was recorded on both the manual and static automated bat activity surveys in July 2016. Approximately 66% of all noctule calls recorded on the static detectors were obtained in this month. The apparent inter-seasonal differences in activity may be caused by the weather and the species biology; juvenile noctule bats may have been present (several were captured during trapping in August 2016). Their presence would increase the number of recorded individuals. The temperature during the July bat activity surveys was also the highest of any month (Between 21°C and 26°C) which may have positively influenced the food supply targeted by this species such as moths, beetles (mainly chafer and dung beetles) and winged ants which are most plentiful in July.

10.160 Bat activity was recorded across the Site; however, the following key commuting and foraging areas were noted and as shown on Figure 10.1.634 of Appendix 10.1 – Ecology Baseline Report. These have been revised since the draft ES was issued where areas of greatest activity were presented by transect. Some of these areas whilst having the most commuting or foraging activity on a given transect are not considered to be key areas for bats given levels of activity were still generally limited when considering with the baseline established across

the Site and not just on a given transect. This is particularly true of Transect 1 in the west of the Site:

- Staffordshire and Worcestershire Canal;
- Calf Heath Wood (Interior and woodland edge);
- Ditch / hedgerow past Gailey Magazine linking the Staffordshire and Worcestershire Canal and Calf Heath Wood;
- Access track past Woodside Farm leading into the wayleave/track running north west – south east in Calf Heath Wood;
- Hedgerow running east to west in centre of Transect 4 including Point Count 4.11;
- Hedge / tree line running southwest to northeast between Calf Heath Woodland and Reservoir;
- Hedgerow running north-west to south-east between Vicarage Road and Straight Mile;
- Hedgerow / bund running north to south in the far south-west of the Site between the canal and Straight Mile;
- Hedge / treeline in location of Pond 24;
- Wet woodland in south of the Site adjacent Straight Mile and the tree line extending north from this to the wooded copse off Woodlands Lane; and
- The canal and woodland habitats in the south of the Site have been shown to support foraging, commuting and roost sites for a range of species.

10.161 The number of bats captured and the range of species suggests a locally important role of the habitat for the species present, including foraging, roosting and potentially other social related behaviour including mating.

10.162 No maternity roosts were identified on-site, however five maternity roosts were identified off-site for four species (Noctule, brown long-eared, natterer's and Daubenton's) and the bats were recorded using the Site for foraging and or commuting. Two of these maternity roosts were located within 100 m of the Site boundary (Noctule in a tree 40 m south and brown long-eared in a building 20 m south). A further possible maternity roost for whiskered/brandt's was identified in a building approximately 2 km to the south-west. Common pipistrelle and soprano pipistrelle were also confirmed as breeding in the locality based on observations made during trapping.

10.163 The bat assemblage on site is considered to be an 'Important Ecological Feature' at a District i.e. South Staffordshire scale and is included in this assessment.

Badger

10.164 Appendix 10.2 –Confidential Badger Report presents the badger (*Meles meles*) survey findings for the Site based on observations undertaken from November 2015 to October 2016 and a bait marking survey undertaken in February and March 2017 to inform this assessment.

10.165 The presence of badgers in the landscape is considered to be an 'Important Ecological Feature' at a Local scale and the assessment of effects on badgers is presented in the confidential Technical Appendix 10.2.

Water Vole

10.166 Section 4.8 of Appendix 10.1 – Ecology Baseline Report presents the water vole (*Arvicola amphibius*) survey findings for the Site that was carried out in late-March 2016, and October 2016, May 2017 and July 2017 to inform this assessment.

10.167 Four ditches and ponds present across the Site, and the length of the Staffordshire and Worcestershire Canal intersecting the Site were surveyed for water vole field signs. Three of the four ditches were found to hold shallow depths of water (<5cm) at the time of the October 2016 survey, and the remaining ditch was adjacent to a layby and was observed to be heavily

influenced by human disturbance, litter and pollution. Although field signs and direct observations of other mammal species (including brown rat (*Rattus norvegicus*), bank vole (*Myodes glareolus*) and field vole (*Microtus agrestis*) were noted, no water vole field signs were noted within the ditches, ponds or the canal during surveys.

10.168 The 2017 surveys of the Staffordshire and Worcestershire Canal found that approximately 85-90% of the canal bank was formed of intact sheet piling; any areas of degraded or silted sheet piling were inspected. The remaining 10-15% of the banks which were noted to offer some, albeit limited suitability for this species did not show signs of water vole. Direct evidence of brown rat was however observed. The survey showed that the canal banks beyond the northern boundary of the Site were more naturalised, included more emergent vegetation and offered better habitat suitability for water vole. Biological records exist for the canal (on the northern boundary of the Site) from 1998. No record of water vole has been made for the area within 2 km of the Site in the last ten years, this may be associated with the presence on the non-native predator, the American mink (*Neovison vison*), which has been recorded in the region (10 km grid square) in the last ten years.

10.169 Water voles are considered likely to be absent from the Site and are therefore not considered further within this assessment.

Otter

10.170 Section 4.9 of Technical Appendix 10.1 – Ecology Baseline Report presents the findings of otter (*Lutra lutra*) surveys of the Site that were carried out in late March 2016, October 2016, May 2017 and July 2017 to inform this assessment. These surveys comprised surveys of ditches and ponds within the Site and a survey of the section of the Staffordshire and Worcestershire Canal that intersects the Site in 2017. The broad-leaved woodland habitats on-site that adjoin the canal to the south are suitable for otter resting up, although the hard engineered sides of the canal potentially reduce the amount of access for otters into the adjacent areas.

10.171 No otter holts were identified during the Phase 1 Habitat Survey of the Site or in any further targeted species surveys undertaken. Inspections of the Gravelly Way road bridge and the Gravelly way footbridge were undertaken monthly from May to October 2016 (following bat activity transects) and identified staining possibly caused by aged otter spraint in May, with no fresh signs for the following months. An otter footprint was observed in the very north of the Site during the badger survey; it was by the ditch south of the A5, approximately 100 m east of the Staffordshire and Worcestershire canal in March 2017. There are known records of otter within and around the Site from the last ten years³¹ and consultation comments from the Canal and River Trust confirm that the Staffordshire and Worcestershire Canal provides important habitat for otter³² as noted in Table 10.2 – Consultee Comments. Therefore, it is considered the canal forms part of an otter territory, and otters are likely to use the stretch of canal that passes through the Site, using the terrestrial parts of the Site on occasion. Otters can travel over large areas, using 20 km or more of river / watercourse habitat³³, changes to a single otter's home range may influence the species' distribution at a district scale.

10.172 The otters in the landscape are considered to be an 'Important Ecological Feature' at a District scale and this species is included in this assessment.

Other Mammals

10.173 Section 4.10 of Appendix 10.1 – Ecology Baseline Report presents the baseline assessment of brown hare (*Lepus europaeus*), polecat (*Mustela putorius*), West European hedgehog (*Erinaceus europaeus*) and harvest mouse (*Micromys minutus*). Key findings are presented below.

10.174 Brown hare: No specific brown hare survey was undertaken, but ecologists undertook more than 300 hours active field surveys across the Site during 2016 and 2017 (including both night

³¹ Staffordshire Ecological Record (2016) Data Search: Four Ashes (revised boundary) 2km buffer. Ref: SER/16/392, 11 August 2016

³² The Planning Inspectorate (2016) Scoping Opinion: Proposed West Midlands Interchange. Ref TR050005, October 2016

³³ The Mammal Society. Species Factsheet: The Otter (*Lutra lutra*). Available online: http://www.mammal.org.uk/sites/default/files/factsheets/otter_complete.pdf [Accessed 19.10.2017]

and day time surveys, but excluding highly focussed work such bat emergence/re-entry surveys), in which time it is considered likely that hares would have been encountered if present. Due to the lack of known records and field observations within the Site brown hares are considered to be likely absent from the Site and are not considered further within this assessment.

- 10.175 Polecat:** A polecat (or possible polecat-ferret) was encountered approximately 200 m north-east of the Site in June 2016; it was seen crossing the A5 near the M6 junction. It is likely that at least one polecat (or polecat-ferret) territory overlaps with the Site, specifically the north-east section. The West Midlands is a stronghold for polecat and the species is now more widespread in Britain than at any time in the last 100 years, but ecological records in the study area indicate that it is susceptible to road collisions (all nine records held by SERC were road casualties). The polecat(s) on Site are assumed to be native rather than hybrid (in order to present a worst case for this assessment) and are considered to be an 'Important Ecological Feature' at the Local scale, and are therefore included in this assessment.
- 10.176** Four hedgehog sightings were made across the Site in total during the 2016 and 2017 surveys. Two hedgehog sightings were made within the central-northern section of the site on 16 and 17 May 2016. This section is fragmented from the rest of the Site as it is bounded by the canal to the east and the south and the railway to the west. The two remaining hedgehog sightings were made via infra-red cameras deployed in the small woodland in the very south-east of the Site (by Straight Mile) in August 2017. SERC records relate to an area approximately 1 km north of the Site only. The population of hedgehogs on-site is considered to be small, and within the species' core range. Therefore, hedgehogs(s) on Site are considered to be an 'Important Ecological Feature' at the Local scale and are included in this assessment.
- 10.177 Harvest mice:** Records are available for this species in the region in the last ten years, but there are no known records from the last five years. The probability of encountering harvest mice field signs during the ecological surveys was low as the surveys were not targeted for harvest mice. Therefore, the surveys were not appropriate for determining presence or likely absence. It is assumed that harvest mice remain in the landscape and, due to the similarities of the habitats on-site to those in the wider region, at similar densities to those in the wider landscape. Therefore, harvest mice are an 'Important Ecological Feature' at the Local scale.
- 10.178** Table 10.9 below provides a summary of 'Important' and 'Other' Ecological Features. 'Other' receptors are not considered further in this assessment with the exception of where mitigation intended for an important ecological feature e.g. GCN and common frog (embedded mitigation or other measures) would also serve to benefit 'Other Ecological Features' such as smooth newt and common frog in their provision.

Table 10.9: Summary of 'Important' and 'Other' Ecological Features		
Ecological Feature	Receptor Sensitivity / Importance	Classification
Designated Sites		
Mottey Meadows SAC	International	Important Ecological Feature – Considered in the No Significant Effects Report (NSER) (Technical Appendix 10.3) and in the Information for Habitat Regulations Assessment (HRA) section in this ES.

Table 10.9: Summary of 'Important' and 'Other' Ecological Features		
Cannock Chase SAC	International	Important Ecological Feature – Considered in NSER and in the Information for Habitat Regulations Assessment (HRA) section in this ES.
Cannock Extension Canal SAC	International	Important Ecological Feature – Considered in NSER and in the Information for Habitat Regulations Assessment (HRA) section in this ES.
Belvide Reservoir SSSI	National	Important Ecological Feature
Doxey and Tillington Marshes SSSI	National	Important Ecological Feature
Gailey Reservoirs	County	Important Ecological Feature
Calf Heath Bridge	County	Important Ecological Feature
Somerford Wood	County	Important Ecological Feature
Land at Four Ashes	County	Important Ecological Feature
Watling Street Plantation	County	Important Ecological Feature
Crateford Wood	County	Important Ecological Feature
Gailey Old Reservoir	County	Important Ecological Feature
Pennymore Hay Farm	County	Important Ecological Feature
Boggs Marsh	County	Important Ecological Feature
Water Eaton Coppice	County	Important Ecological Feature
Rodbaston Wood	County	Important Ecological Feature
Hatherton Bridge	County	Important Ecological Feature
Deepmore Farm	County	Important Ecological Feature
Habitats		
Arable	Site	Other Ecological Feature
Improved Grassland	Site	Other Ecological Feature

Table 10.9: Summary of 'Important' and 'Other' Ecological Features		
Poor Semi-Improved Grassland	Site	Other Ecological Feature
Semi-Improved Grassland	Local	Important Ecological Feature
Woodland (including Mixed Plantation, Broad-Leaved Plantation Woodland and Broad-Leaved Semi-Natural Woodland)	Local	Important Ecological Feature
Scrub	Site	Other Ecological Feature
Individual Trees	Local	Important Ecological Feature
Individual Tree – Native black poplar	County	Important Ecological Feature
Standing Water	Local	Important Ecological Feature
Running Water	Site	Other Ecological Feature
Buildings	Site	Other Ecological Feature
Quarry	Negligible	Other Ecological Feature
Hedgerows	Local	Important Ecological Feature
Species		
Amphibians - GCN	Local	Important Ecological Feature
Amphibians – Common Toad	Local	Important Ecological Feature
Amphibians – Smooth Newt	Site	Other Ecological Feature
Amphibians – Common Frog	Site	Other Ecological Feature
Reptiles	Absent	Not considered further in this assessment
Other Aquatic Species – White Clawed Crayfish	County	Other Ecological Feature (Outside of Zone of Influence)
Other Aquatic Species - Fish	Negligible	Other Ecological Feature

Table 10.9: Summary of 'Important' and 'Other' Ecological Features		
Badger	Local	Important Ecological Feature
Bats	District	Important Ecological Feature
Birds	County	Important Ecological Feature
Invertebrates	Local	Important Ecological Feature
Otter	District	Important Ecological Feature
Other Mammals – Brown hare	Absent	Not considered further in this assessment
Other Mammals – Polecat	Local	Important Ecological Feature
Other Mammals – Hedgehog	Local	Important Ecological Feature
Other Mammals – Harvest mice	Local	Important Ecological Feature
Water Vole	Absent	Not considered further in this assessment

Future Baseline

- 10.179 For the purpose of this section the 'do nothing' scenario assumes that in the absence of development, existing land management and farming practices would persist. The section is written presenting the anticipated future baseline in twenty years' time in the absence of development. The exception to this is where reference is made to veteran trees and long term maturation of woodland but this is included for completeness.
- 10.180 In a 'do nothing' scenario the baseline conditions in the Site would largely remain the same as established in the baseline habitat, flora and fauna surveys undertaken. This is particularly true of the arable, improved grassland, standing water and hedgerow habitats where existing land management and farming practices would continue.
- 10.181 Calf Heath Wood would, in the absence of management in the 'do nothing' scenario deteriorate in condition and value with continued dominance of rhododendron and presence of pheasants for commercial shooting (also present also in the wider landscape). The presence and widespread distribution of each species would continue to adversely affect the ground flora and associated species assemblages, for example invertebrate communities. In the 'do nothing' scenario in the medium to long term the mature trees present would continue to mature and over time potentially attain veteran status whereby they would be of increased value to a range of fauna such as bats and saproxylic invertebrates. This would also be true of individual trees present across the Site. The existing wayleaves for power lines, dominated by bracken, bramble scrub and rushes would continue to be managed as in the existing situation. Other woodlands, namely plantation woodlands would, in the absence of management eventually develop a more natural or 'old growth' structure with a moderate proportion of deadwood present of value to saproxylic invertebrates. Natural disturbance such as windthrow may create gaps within woodland which will then pass through the dense shrubby 'young growth' stage before becoming mature woodland.

10.182 The Site is characterised by a large area of sand and gravel mineral extraction within the east known as Calf Heath Quarry (Application Ref: SS.07/19/681). Calf Heath Quarry covers an approximate area of 40 hectares (ha) with approximately 32 ha that are/will be subject to extraction. The extraction is phased (six phases) and is timetabled to run for a period of thirteen years. At the time of writing this ES extractions have been progressed for approximately five years. At the end of the extraction timetable the quarry will be subject to restoration in line with Pleydell Smithyman Limited's Outline Management Plan (Issue 3)³⁴. The habitats will be restored/enhanced as summarised below. These will be taken as the existing baseline for the purpose of this assessment:

- Hedgerow retention and restoration i.e. Infilling of any gaps with native species such as hawthorn (*Crataegus monogyna*) elm (*Ulmus spp.*) wild plum (*Prunus domestica*) and dog rose (*Rosa canina*) and provision of standard trees (English Oak (*Quercus robur*) and Common Ash (*Fraxinus excelsior*));
- A 30 m wide woodland block will be planted outside of the quarry boundary but within the Site, adjacent to the Staffordshire and Worcestershire Canal;
- Creation of pond complexes or multiple pools for the benefit of wildlife;
- Provision of deadwood and brash piles to provide potential hibernacula and shading for reptiles and amphibians;
- Provision of nectar source via a wildflower seed mix which is intended to be sown around the created pond areas;
- Sandy mound to be provided for the benefit of invertebrates;
- The extraction areas will be backfilled with inert material once the mineral has been excavated and buffer strips approximately 10 metres wide will be created between field margins and restored agricultural fields;
- The cropping programme is proposed to be a short/medium-term grass ley for years one to three followed by a long-term ley of cereals;
- Planting of small woodland block around quarry access off the A5; and
- Bird and bat boxes to be installed on retained trees/in areas of established woodland.

10.183 The restored and / or enhanced habitats will be subject to a five year aftercare management plan.

10.184 Enabling and construction works associated with the adjacent Bericote Development commenced in 2016. The Bericote Development is anticipated to be operational in 2018. A series of ecological mitigation and enhancement measures are proposed to be delivered as part of this development as summarised below relevant to the assessment:

- Provision of a parcel of land in the south of the development site adjacent Vicarage Road to be managed for the benefit of wildlife to be sown with wildflower seed;
- Woodland management of the retained area of Calf Heath Wood within the Bericote Development i.e. selective felling and coppicing, removal of non-native species such as rhododendron and retention of standing deadwood;
- Provision of a wet attenuation pond in the southern land parcel;
- Provision of hibernacula in southern land parcel;
- Provision of owl and other bird boxes; and
- Provision of ten bat boxes in retained section of Calf Heath Wood.

10.185 In summary, the habitats present on-site are considered to remain broadly similar, therefore the range of species supported would also remain the same. In the case of the quarry habitats these would be re-instated and enhanced. The habitats would be contiguous with those elsewhere on-site and the species assemblage would be similar.

Embedded Mitigation

10.186 A Framework Ecological Mitigation and Management Plan (FEMMP) has been prepared for both the construction and operational phases of the Proposed Development and is provided in Technical Appendix 10.4. The plan details measures intended to mitigate the impact of the Proposed Development on habitats and species present within the study area. The FEMMP will be supported by Ecological Mitigation and Management Plans (EMMP) prepared for each phase of development to reflect site conditions and guidance applicable at the specific time (to ensure any changes in baseline are adequately reflected). Wherever EMMP is mentioned in this ES it is a collective term and includes multiple versions for differing phases of development. The EMMP will include provisions for the management of invasive non-native species (INNS), including general biosecurity measures, INNS management and ongoing treatment and monitoring.

10.187 Embedded mitigation and standard practice techniques/measures for demolition and construction are outlined in the ODCEMP (Technical Appendix 2.3).

10.188 Embedded mitigation that has been fully integrated into the Proposed Development to limit any otherwise potentially adverse effects on sensitive receptors is summarised below and is presented in outline in Figure 10.002 of this ES. These measures have been informed by significant survey effort and in consultation with relevant stakeholders. The impact assessment presented in Paragraph 10.194 onwards of this Chapter is undertaken assuming the incorporation of measures set out below, it is anticipated that these will be secured by a suitably worded DCO Requirement giving high confidence that these measures will be implemented.

10.189 The embedded mitigation measures and references how these measures will be secured are detailed below in Table 10.10.

Table 10.10: Summary of Embedded Mitigation and How Secured		
Mitigating Impacts On	Mitigation	Where Mitigation is Secured
Habitats (Protection)	To prevent damage caused by construction activities, retained habitats will be protected with clearly defined fencing at the outset of construction works to prevent Site activity encroaching beyond the plot boundaries. All plots will have a security fence installed around their boundary prior to operation starting to prevent operational activities spreading beyond the plot.	FEMMP
Habitats	Habitat loss of the most valuable habitats has been minimised through design (for instance to retain ponds, woodland, hedges or veteran trees where possible). These features are the basis for ecological corridors incorporated into the Parameters Plans and which will provide habitat for a range of species including birds providing habitat in which birds can nest and forage.	Parameters Plans
Habitats	Retention of 'Important' hedgerows as identified for ecological reasons under the Hedgerow Regulations within the scheme (Hedgerows 26, 45 & 72) and translocation of hedgerows where retention is not	FEMMP

³⁴ Pleydell Smithyman Limited (2007) Hedge Survey, drawing number MOS133.20

Table 10.10: Summary of Embedded Mitigation and How Secured		
	possible to areas of green infrastructure (Hedgerows 56, 57, 58, 5, 9, 92, 83 & 86).	
Habitats	Commitment to deliver a biodiversity net gain for woodlands in area terms (native broadleaved) and hedgerows in terms of linear metres (native species rich). Wherever possible these features will be linked together and with existing retained habitats.	FEMMP
Habitats	The retained portion of Calf Heath Wood will be managed to complement that in the adjoining portion of the woodland being managed in a similar manner as part of the Bericote Development to promote a diverse woodland including trees of a range of ages. Enhanced via restoration of the coniferous or mixed plantation areas to native broadleaved woodland over time and selective felling and coppicing, removal of non-native species such as rhododendron (phased) and retention of standing deadwood. Measures will be employed to ensure there would be no unauthorised access to Calf Heath Wood in order that this can be maintained as a reserve for nature conservation.	FEMMP
Habitats	Following felling of part of Calf Heath Wood a screen of native shrubs will be planted along the new boundary of the wood exposed by Site clearance, in order that this can screen the retained woodland adjacent as it grows.	FEMMP
Habitats	Individual tree planting to be planned so that a proportion of planted trees can be retained and be allowed to grow to maturity/overmaturity with no potential for conflict from nearby land uses (i.e. in the timescales of hundreds of years) to become future veteran trees.	FEMMP
Habitats	A comprehensive mitigation strategy will be produced for continuation of native black poplar on-site and is referenced in the Arboricultural Assessment report (Technical Appendix 12.7). In outline, the mitigation will consist of harvesting and propagating material from the specimen, growing of the material in a small nursery area and when ready, planting out in various suitable locations around the Site. The provision will be managed appropriately to ensure success in the long term.	Arboricultural Assessment report (Technical Appendix 12.7)
Habitats	Planting of a key wildlife corridor linking the retained portion of Calf Heath Wood to Calf Heath Reservoir will be completed within 5 years of the commencement of the authorised development, or prior to commencement of development at Development Zones A4a or A4b, whichever is sooner and then safeguarded through future development phases to aid establishment and functionality.	FEMMP
Habitats	Croft Lane Community Park will be completed within 5 years of the commencement of the authorised development as embedded mitigation. The south of Calf Heath Community Park will be completed prior to the	FEMMP

Table 10.10: Summary of Embedded Mitigation and How Secured		
	commencement of development at Development Zones A4b and retained as 'Core green infrastructure' i.e. created and then safeguarded through future development. The north of Calf Heath Community Park will be provided in the latter stages of the development. The Community Parks will be designed to provide a range of native habitats including substantial areas of open water, species rich grassland (lowland meadow), native woodland, hedges and scrub. This would address the aims of the LBAP and provide valuable habitat for a range of other species including bats.	
Habitats	The EMMP will provide long term management prescriptions for habitats (created and retained) for the operational phase.	FEMMP
Aquatic habitats and species	Inclusion of petrol interceptors or equivalent alternative biological treatment measures prior to any outfall to watercourses.	ODCEMP and FEMMP
Species – notably birds and bats	Acoustic noise bunds, as shown on the Green Infrastructure Plan (Document 2.7), will be included along the boundaries of development plots and around the Community Parks to minimise noise disturbance.	Parameters Plans
Species – notably bats	No lighting is to be provided within the Community Parks.	FEMMP
Species - Amphibians	A risk-based precautionary method statement will be adopted as detailed within the FEMMP to works within 500m of the off-site GCN breeding pond.	FEMMP
Species - Amphibians	Retention of waterbodies where possible and provision of permanent and ephemeral surface water features (for attenuation but also of biodiversity value) providing 'stepping stones' across the Site and a variety of wetland habitats. New ponds will be provided as compensation for any ponds lost as a result of the Proposed Development.	FEMMP
Species - Amphibians	In addition to ponds provided as compensation, a minimum of 10 waterbodies will be provided as enhancement whereby the primary aim is to increase biodiversity and offer suitable breeding habitat for GCN to include a range of depths, bank profiles, aquatic planting and shade regimes.	FEMMP
Species - Amphibians	Use of amphibian friendly gully pots, ladders and amphibian wildlife kerbs across the Site as a standard design specification.	FEMMP
Species – Amphibians and Reptiles	Provision of hibernation habitat e.g. logs piles, hibernation features incorporated into bunds or standalone.	FEMMP

Species – Amphibians and Reptiles	Provision of extensive areas of rough grassland/wildflower meadow in parks and green infrastructure corridors.	FEMMP
Species Birds	<p>Provision in FEMMP to manage nesting birds during site clearance for construction including:</p> <ul style="list-style-type: none"> • Where possible avoiding the bird nesting season (March – August). • Where avoiding the nesting season is not possible an Ecological Clerk of Works (ECoW) will check that no nests of birds are present or disturbed, or their nests destroyed. • Undertake checks of any stockpile areas that have been present should also take place because such features may be attractive to ground nesting birds such as lapwing or skylark. • Tool box talks for all site workers on their obligations to report sightings or suspicions of birds' nests within the site and their legal obligations in avoiding damage or destruction to these areas. • What to do if a bird nest of any species is discovered e.g. temporary suspension of works, visually marking out a no-go area around the nest or use of less disturbing machinery in the vicinity of the nest, until the young have fledged and no longer rely on the nest. • Construction phase noise will be controlled such that effects beyond the Site boundary are minimised. Appropriate measures may include temporary noise barriers (for instance where development plots adjoin sensitive habitats such as the canal or woodland areas). 	FEMMP
Species Birds	Enhancement and management of 12 ha of existing intensively managed arable farmland off-site (within 1 km) dedicated for the benefit of farmland birds. The land to be subject to enhancement and management (for a period of 15 years) is shown in Figure 10.004. Enhancement measures across the 12 ha will include a buffer to Saredon Brook, wider headlands and margins, management including rotation and use of seed mixes intended to be of benefit for farmland birds, provision of skylark plots and planting of new hedgerows in place of or in addition to existing fences.	FEMMP
Species Birds	An element of the Community Parks will include habitat that can be tilled to emulate arable habitats lost in construction. This area will provide a diversity of habitat and in particular foraging opportunities for seed eating farmland birds. A defined parcel of land has been identified for this provision in Calf Heath Community Park adjacent to Straight Mile and will be managed by periodic	FEMMP

	harrowing or ploughing. This area will be sown with a seed-bearing crop including a cereal and kale, linseed or quinoa to maximise the habitat value to birds. This would address the aims of the LBAP to expand the area of arable field margins to include cultivated low-input field margins, wild bird seed, flower-rich field margins and permanent grass margins.	
Species Birds	Provision of wetland features for the benefit of water birds e.g. provision of swales and reed beds.	FEMMP
Species Birds	Provision of deadwood (stumps) to create standing deadwood or ring bark a proportion of mature trees to provide nesting habitat for species such as woodpeckers, marsh tit and willow tit.	FEMMP
Species Birds	<p>Bird boxes will be provided in suitable areas across the Site to include:</p> <ul style="list-style-type: none"> • Boxes on the new bridge crossing the canal targeted toward grey wagtail; • Boxes provided on buildings or suitable north or east facing retaining structures for house sparrow, starling, house martin and swift; • Boxes to be provided on suitably mature retained trees for stock dove, kestrel and generalist species; and • Sand martin colonies or kingfisher tubes will be created in the Croft Lane Community Park. <p>The condition of the bird boxes will be monitored to establish whether any replacement or additional boxes are required.</p>	FEMMP
Species Birds	A Site wide breeding bird survey will be carried out periodically in the operational phase (for instance every five years). This will include the green infrastructure, community parks and operational parcels of the Site in order that baseline conditions can be understood and facilities and landscape management can be adapted to reflect any findings of the monitoring.	
Species - Invertebrates	A sensitive outline lighting strategy is provided providing dark corridors and extensive areas of dark habitat in the Community Parks where which will not be subject to any lighting and no increase in lighting levels will be experienced in these locations. The results of the embedded lighting mitigation measures are shown on Figure 10.003 of the ES. Lighting will be maintained so that it performs to the design specifications in order to minimise disturbance to invertebrates.	FEMMP
Species - Invertebrates	Masterplan design has enabled 7 of 11 veteran trees to be retained retaining habitat for saproxylic invertebrates.	Parameters Plans

Species - Invertebrates	Creation of standing deadwood and log/brush piles within new ecological corridor to be provided between Calf Heath Wood and Calf Heath Reservoir using existing deadwood where this cannot be retained elsewhere on-site providing habitat for saproxylic invertebrates and providing immediate structure to these created habitats.	FEMMP
Species - Invertebrates	Provision of shallow ephemeral ponds and ponds managed for biodiversity with lush vegetated (native) margins and ponds that retain some water all year round to support the range of species currently found across the landscape and make provision to increase the diversity of species present. A minimal number of trees will be provided around the ponds to allow light onto the water.	FEMMP
Species - Invertebrates	Provision of species rich grassland using an appropriate proprietary seed mix (to be determined during detailed design) of value for foraging invertebrates. A range of species will be incorporated providing a variety of structure such as flat-daisy type flowers to deep corolla-types such as trefoils and labiates.	FEMMP
Species - Invertebrates	Provide south facing, bare sandy exposures adjacent foraging areas for ground-nesting bees and wasps. These will be designed to be exposed to full sun between the hours of 10:00-16:00.	FEMMP
Species - Invertebrates	Areas of green infrastructure will be managed in the long term to maintain and where possible continue to enhance their value for invertebrates. This will be delivered through the FEMMP which will for example include details of how to provide a succession of old trees across the landscape to benefit saproxylic (deadwood) species and the management of areas of wildflower whereby these areas will be cut after the flowering plants have set seed but leaving some areas of vegetation uncut every year to provide overwintering habitat.	FEMMP
Species - Bats	Retention of important commuting /foraging areas so far as is possible.	Parameters Plans
Species - Bats (and other species)	Sensitive lighting strategy. The results of the embedded lighting mitigation measures are shown on Figure 10.003 of the ES. and have been verified by illustrative modelling. The following parameters will be provided: <ul style="list-style-type: none"> No increase in lighting in Community Park Areas (Calf Heath and Croft Lane) as a result of the Proposed Development; The existing dark canal corridor will be maintained. No increase in lighting as a result of the Proposed Development; and 	FEMMP & European Protected Species Mitigation Licence (EPSML)

	<ul style="list-style-type: none"> Dark ecological corridors where lighting levels are below 1 Lux at ground level (shown by shaded areas on Figure 10.003 of the ES). <p>Lighting will be maintained to ensure it continues to operate in accordance with the design intent.</p>	
Species - Bats	<p>Bats – Specific lighting mitigation measures to be provided where the ecological corridors intersect with roads:</p> <ul style="list-style-type: none"> Corridor linking retained portion of Calf Heath Wood and Calf Heath Reservoir to be a width of 100m with lighting mitigation providing a dark corridor with light levels below 1 lux at ground level. Provision of bat hop-overs where the green infrastructure interfaces with roads (Locations of proposed bat hopovers are shown on Figure 10.002 of the ES.). A hop-over consists of tall vegetation planted on either side of a road with overhanging branches that create a continuous canopy over the road gap. The aim is to guide bats across roads at a safe height. Lighting mitigation includes vegetated bunds, fencing, reduced lighting levels, lowest practical mounting height, luminaires with sharp light cut-off, cowls/shield/louvres/hoods to block unwanted light, additional screening in the form of dense hedgerow planting. During detailed design of car parking, plot specific landscaping or SuDS will be provided adjacent sensitive ecological areas/corridors/parks in preference to service yards where operationally possible (because lighting columns can be much shorter and also required lighting levels are lower). Detailed lighting design would focus on areas of ecological sensitivity e.g. design lighting in sensitive areas first and then 'work outwards' to avoid conflict and maximise the ecological value of the lighting strategy. The development of detailed lighting designs will take place in conjunction with an ecologist and such designs will be subject to the approval of Staffordshire County Council's ecologist. Where adoptable lighting is of necessity non-standard, appropriate arrangements will be put in place to ensure that it is maintained and continues to operate in accordance with the design intent. 	FEMMP & EPSML
Species - Bats	A comprehensive range of bat boxes to be provided on retained suitably mature trees and in woodland. A minimum of 80 bat boxes will be provided. The following Schwegler (or similar subject to availability) would be appropriate: General Purpose Bat Box 2F, Bat Box 1FF,	FEMMP & EPSML

	Bat Box 1FW and Bat Box 1FD. Schwegler 1FW will be provided to offer hibernation habitat for bats. The boxes would be fixed at a minimum height of 3m to help prevent predation and disturbance from contractors during demolition and construction and each bat box will be sited based on its proximity to suitable foraging habitat and its connectivity to the surrounding area. The boxes would be placed in clusters, in close proximity to one another at the same height around the tree providing a variety of aspects, ideally facing south-east, south-west and south. Clusters of three bat boxes to a tree is targeted where appropriate. Hibernation boxes will be north facing. The boxes will be affixed clear of obstacles (e.g. over-hanging branches) so the bats have easy access and exit, though not in an overly exposed position. Boxes will be attached to the tree using an aluminium nail or tied in position using wire/leather.	
Species - Bats	Provision of roosting enhancements on/in retained buildings e.g. Buildings at Gravelly Way adjacent the canal completed. The Farmhouse is the only one of these buildings which includes a roof void, which would be cleared of any stored materials to allow use by bats. Access for bats will be provided to the roof void, for example via purpose built roof tiles, holes made in the wall or by access points made under ridge tiles or soffits where present. Aspects of the buildings will be clad, for example with tile hung or feather boarded elevations. Traditional bitumen lining would be used within the roofs. Enhancements would be suitable for crevice and roof-void dwellers. Serotine roost provision will be provided. This will be provided through suitable access points into the Gravelly Way buildings and augmented with provision of suitable bat boxes such as the Schwegler 1WQ Summer & Winter Bat Roost or equivalent. The EMMP (phase specific) will include measures for appropriate management of these buildings that considers legal implications of roosting bats.	FEMMP & EPSML
Species - Bats	The draft EPSML and FEMMP acknowledge that on-going monitoring and survey is required to inform mitigation measures and ensure legal compliance. This approach has been agreed with Natural England and a Letter of No Impediment has been issued stating that Natural England see no impediment to a licence being issued should the DCO be granted.	EPSML
Species - Bats	The draft EPSML details a precautionary method of working with respect to works affecting known bat roosts. In summary, these measures include; emergence or re-entry surveys to be undertaken of each building with a confirmed roost the evening/morning prior to demolition, an internal inspection will be undertaken immediately prior to works commencing, a tool box talk	EPSML

	provided to all operatives, buildings demolition to be supervised by a licensed bat ecologist, features suitable for use by roosting bats will be inspected and removed by hand by the licensed ecologist. Any bats captured by hand will be transferred to a bat box on Site or taken into care and released in the same location at dusk. Building specific measures are defined in detail within the EPSML.	
Species - Bats	Monitoring / checks of bat boxes and buildings enhanced to promote roosting will be carried out every five years from installation for a period of 20 years within the active season (May to September)). This will reflect the phasing of the delivery of mitigation. This is considered an appropriate frequency given the low numbers of common species identified within the roosts to be lost.	FEMMP & EPSML
Species - Bats	The proposed planting schedule will include extensive habitats that can provide benefit for bats either by providing a food source for insects or roost potential. The Appendix in the Bat Conservation (BCT) publication 'Landscape and Urban Design for Bats and Biodiversity' ³⁵ provides a plant list for encouraging bats and this will be incorporated into the landscape design.	FEMMP
Species - Badger and Other Mammals	Mammal tunnels under new roads parallel to / dissecting areas of green infrastructure. Proposed locations are shown on Figure 10.002 of the ES.	FEMMP
Species - Notably Badger and Otter	Site speed limit of 30 mph to minimise potential for wildlife road casualties.	FEMMP
Species - Otter	Mammal crossings to be provided at interfaces of new roads and blue / green infrastructure.	FEMMP
Species - Otter	Provision of otter holt(s) within woodland along the canal in the south of Calf Heath Community Park.	FEMMP

Sensitive Receptors

Existing Sensitive Receptors

10.190 The baseline section confirms the following sensitive receptors that require consideration within the assessment of the Proposed Development:

³⁵ Gunnell K, Grant G and Williams C. 2012. Landscape and urban design for bats and biodiversity. Bat Conservation Trust

- Motte Meadows SAC - Considered in the No Significant Effects Report (NSER) and in the Information for Habitat Regulations Assessment (HRA) section in this ES;
- Cannock Chase SAC - Considered in NSER and in the Information for Habitat Regulations Assessment (HRA) section in this chapter;
- Cannock Extension Canal SAC - Considered in NSER and in the Information for Habitat Regulations Assessment (HRA) section in this chapter;
- Belvide Reservoir SSSI;
- Doxey and Tillington Marshes SSSI;
- Gailey Reservoirs LWS;
- Calf Heath Bridge LWS;
- Somerford Wood LWS;
- Land at Four Ashes LWS;
- Watling Street Plantation LWS;
- Crateford Wood LWS;
- Gailey Old Reservoir LWS;
- Pennymore Hay Farm LWS;
- Boggs Marsh LWS;
- Water Eaton Coppice LWS;
- Rodbaston Wood LWS;
- Hatherton Bridge LWS;
- Deepmore Farm LWS;
- Semi-improved grassland;
- Hedgerows;
- Woodland (including mixed plantation, broad-leaved plantation woodland and broad-leaved semi-natural woodland);
- Individual trees;
- Standing water;
- Amphibians - GCN;
- Amphibians – Common Toad;
- Badger;
- Bats;
- Birds;
- Invertebrates;
- Otter;
- Polecat;
- Hedgehog; and
- Harvest Mouse.

New Sensitive Receptors

- 10.191 Future sensitive receptors introduced to the Site by the Proposed Development, would include habitats created as part of the development landscaping, drainage design and mitigation proposals and species attracted to the scheme in operation (for instance protected s41 or notable species attracted to the landscaped parts of the site).
- 10.192 The species likely to be attracted to the developed Site would be those already present in the study area (and may include relocated receptors, for instance if an artificial badger sett is constructed to mitigate loss of an existing sett). It is possible that the Proposed Development may attract additional species that may constitute sensitive receptors.

10.193 The operational impact on receptors (species) in the redeveloped Site is considered in the operational phase assessment. The habitats created and species which they are designed to support would be managed for the benefit of wildlife in the long-term. The prescriptions for this are provided in the FEMMP. The FEMMP will be supplemented by EMMPs prepared for each phase of development to reflect Site conditions and guidance applicable at the specific time (to ensure any changes in baseline are adequately reflected). The EMMPs would reflect any additional species attracted to the Site which could be deemed as sensitive receptors requiring consideration or management in the operational phase.

Potential Effects

- 10.194 The assessment of potential effects is undertaken with reference to the Parameter Plans.
- 10.195 Where 'Infrastructure Development' is referred to with respect to potential effects in the demolition, construction and operational phases this should be taken to include the following as shown on the Building Development Plan (Parameters Plan – Development Zone Plan Document 2.5):
- Zones A1-A7 Development Areas;
 - Zone B – Rail interchange, container storage, parking area and associated welfare facilities;
 - Zone C – Rail corridor including new rail lines; and
 - New road infrastructure and improvements to existing infrastructure.
- 10.196 For the purpose of this assessment these areas are assumed to be predominantly buildings and/or hardstanding. These will however, likely comprise elements of landscaping but the assessment has been progressed on a 'worst case' basis.

Demolition and Construction

10.197 The demolition and construction stage of the Proposed Development is expected to generate some potential significant direct and indirect ecological impacts, with temporary and permanent effects.

Designated Sites

Belvide Reservoir SSSI

10.198 Belvide Reservoir SSSI is outside of the 2 km study area for nationally designated sites. However, the potential for air quality impacts to arise as a result of increased vehicular traffic in the construction phase on the adjacent A5 has been assessed. A negligible impact on annual mean NO₂ concentrations is predicted at Belvide Reservoir SSSI as a result of construction traffic.

Doxey and Tillington Marshes SSSI

10.199 Doxey and Tillington Marshes SSSI is outside of the 2 km study area for nationally designated sites. However, the potential for air quality impacts to arise as a result of increased vehicular traffic in the construction phase on the adjacent M6 has been assessed. A negligible impact on annual mean NO₂ concentrations is predicted at Doxey and Tillington Marshes SSSI as a result of construction traffic.

Gailey Reservoirs LWS

10.200 Gailey Reservoirs are important for water birds and Calf Heath Reservoir which forms part of the LWS is located immediately adjacent the north-east Site boundary. There is no citation for the LWS and so conservation objectives are not defined. For the purposes of this assessment the conservation objectives are considered to be to maintain the range, structure

and function of habitats present and to maintain the conservation status of water birds in the LWS.

- 10.201 Demolition and construction works will not result in any direct effects, for example from plant. The relevant LWS boundary will be fenced with Heras fencing or similar to prevent accidental or other unwanted access.
- 10.202 Demolition and construction works are likely to cause a degree of temporary disturbance for the duration of construction (i.e. in the timescale of years for construction works in the northern parts of Zones A4 and A5) from noise from construction plant and activity. This applies to the nearest reservoir, Calf Heath Reservoir. Gailey Lower Reservoir and Gailey Upper Reservoir are located on the far side of the M6, approximately 400 m to the north-east at their closest point. As such, given their distance away and existing proximity to the noisy and busy M6 and A5 roads, disturbance effects from demolition or construction noise are considered unlikely at these two reservoirs. Existing daytime ambient noise levels at Calf Heath Reservoir in the baseline are approximately 52 dB LAeq,T based on measured levels undertaken as part of the noise assessment which may be noisy enough to affect breeding density. Certain bird species present (but not all) will, to a degree be habituated to noise. There is sufficient habitat resource available across the three reservoirs to allow birds to move to less disturbed areas in the locality i.e. Gailey Upper and Lower Reservoirs from Calf Heath Reservoir in response to construction noise and disturbance.
- 10.203 No particular disturbance from visual effect of Site activity (construction workers activity, movement of vehicles and materials) is anticipated at any of the three reservoirs. Calf Heath Reservoir is well screened in the most part by woodland which is to be retained (and birds there, including the Schedule 1 kingfisher and the waterbirds such as great-crested grebe and mallard are accustomed to the movement of quarry machinery and noise of quarry operations) and Gailey Lower Reservoir and Gailey Upper Reservoir are on the far side of the M6 with no direct lines of sight to the Site present.
- 10.204 Disturbance (which is temporary) would only partially disrupt bird activity and is unlikely to affect the conservation status of bird populations on the reservoirs given its temporary nature (albeit that works in the plots closest to Gailey Reservoir would take a number of years). It is anticipated that no piling works would take place, with the exception of small scale piling associated with bridge abutments. The wintering birds present likely use the three reservoirs in the LWS as well as other waterbodies in the vicinity over the course of a season dependent on local prevailing conditions and disturbance events, and this network of local foraging/roosting/loafing sites would all be available throughout the construction phase. Disturbance is unlikely to be significant.
- 10.205 The ODCEMP (Technical Appendix 2.3) sets out measures which will be adopted throughout the construction period. With the implementation of the measures outlined in the ODCEMP, the risk of pollution to Gailey Reservoirs LWS is considered unlikely. There remains a risk of disturbance; however, given the available local resource a significant adverse effect at the County scale on the integrity or function of the Gailey Reservoirs LWS is unlikely. A temporary significant effect for the duration of construction works in the northern parts of Zones A4 and A5, at the Local scale is predicted.

Calf Heath Bridge LWS

- 10.206 Calf Heath Bridge LWS comprises of a section of the Staffordshire and Worcester Canal approximately 10 m south of the Site.
- 10.207 The ODCEMP sets out measures which will be adopted throughout the construction period. With the implementation of these measures, the risk of pollution to the canal and Calf Heath Bridge LWS is considered unlikely.
- 10.208 Demolition and construction works will not result in any direct effects, for example from plant. The requirement for a method statement for works over water for the demolition of redundant bridges spanning the canal will be included within the relevant phase-specific DCCEMP. The

relevant boundary of the LWS will be fenced with Heras fencing or similar to prevent accidental or other unwanted access.

- 10.209 As such, it is extremely unlikely that there would be a significant adverse effect at the County scale due to disturbance or a pollution incident on the integrity or function of the Calf Heath Bridge LWS.

Somerford Wood LWS

- 10.210 Somerford Wood is located approximately 250 m west of the Site at its closest point and comprises a species rich woodland ground flora, which retains a mix of ancient woodland indicator species. It is considered extremely unlikely that the construction of the Proposed Development will have any significant direct (e.g. land take) or indirect effects (e.g. dust deposition) on this LWS at the County scale (or any other scale) with mitigation as presented in the ODCEMP in place (i.e. best practice construction measures).

Land at Four Ashes LWS

- 10.211 Land at Four Ashes LWS is located approximately 240 m south of the Site at its closest point and comprises a settling pond and five parallel ditches, native broad-leaved trees, ponds, wet woodland, dense scrub and swamp. A direct or indirect adverse effect on Land at Four Ashes LWS at the County scale (or any other scale) is considered extremely unlikely with best practice construction measures as defined in the ODCEMP in place, due to the distance of this designated site from the Site.

Watling Street Plantation

- 10.212 Watling Street Plantation LWS is broad-leaved woodland believed to be a failed plantation now dominated by downy birch (*Betula pubescens*) with a ground flora largely of wavy hair grass (*Deschampsia flexuosa*) located 170 m east of the Site. A direct or indirect adverse effect on Land at Four Ashes LWS at the County scale (or any other scale) is considered extremely unlikely with mitigation as proposed in the ODCEMP in place, and due to the distance of this designated site from the Site.

Crateford Wood

- 10.213 Crateford Wood LWS is a small woodland located approximately 380 m west of the Site at its closest point. A direct or indirect adverse effect on Crateford Wood LWS at the County scale (or any other scale) is considered extremely unlikely due to the distance from the Site.

Gailey Old Reservoir

- 10.214 Gailey Old Reservoir LWS is designated for its wet woodland and its associated wetland plants and is located approximately 740 m east of the Site at its closest point. A direct or indirect adverse effect on Gailey Old Reservoir LWS at the County scale (or any other scale) is considered extremely unlikely due to the distance away from the Site.

Pennymore Hay Farm

- 10.215 Pennymore Hay Farm LWS comprises of a mosaic of wet ditches and pools supporting wetland vegetation, associated areas of marshy grassland and swamp habitat surrounded by pockets of willow carr. The LWS is located approximately 130 m south of the Site at its closest point on the far side of the Staffordshire and Worcestershire Canal. A direct or indirect adverse effect on Pennymore Hay Farm LWS at the County scale (or any other scale) is considered extremely unlikely with mitigation as proposed to be presented in the ODCEMP in place (i.e. best practice construction measures), due to the distance of this designated site from the Site.

Boggs Marsh

- 10.216 Boggs Marsh LWS consists of drying out swamp and largely unmanaged marshy grassland and is located approximately 620 m north of the Site at its closest point. A direct or indirect adverse effect on Boggs Marsh LWS at the County scale (or any other scale) is considered extremely unlikely due to the distance from the Site.

Water Eaton Coppice

10.217 Water Eaton Coppice is an area of semi-natural broad-leaved woodland located approximately 800 m north-west of the Site at its closest point. A direct or indirect adverse effect on Water Eaton Coppice LWS at the County scale (or any other scale) is considered extremely unlikely due to the distance from the Site.

Rodbaston Wood

10.218 Rodbaston Wood is a small wet woodland on Rodbaston Farm located approximately 850 m north of the Site. A direct or indirect adverse effect on Rodbaston Wood LWS at the County scale (or any other scale) is considered extremely unlikely due to the distance from the Site.

Hatherton Bridge

10.219 Hatherton Bridge is a small rough field adjacent the Hatherton Branch Canal on the northern bank and is located approximately 310 m south-east of the Site. A direct or indirect adverse effect on Hatherton Bridge LWS at the County scale (or any other scale) is considered extremely unlikely due to the distance from the Site.

Deepmore Farm

10.220 Deepmore Farm LWS is a field sown with a wildflower mix containing a pond located approximately 660 m south of the Site. A direct or indirect adverse effect on Deepmore Farm LWS at the county scale (or any other scale) is considered extremely unlikely due to the distance from the Site.

Habitats

10.221 This section considers all habitats identified as 'Important Ecological Features'. Effects on habitats, including those considered as 'Other Ecological Features' have been considered holistically with respect to the species that the network of habitats support e.g. birds, bats and badger in the relevant sections below. Consideration of the assemblage of habitats and their value to different species groups is provided under the Species section of this impact assessment.

Habitat loss and fragmentation

10.222 The site clearance and groundworks required would result in the loss of semi-natural habitat and managed farmland across much of the Site (in areas proposed for development, Zones A1-A7, Zone B, Zone C and new roads as per the Parameter Plans). This is an adverse effect which will result in the loss of ecosystem integrity across the affected areas. The impact will be permanent in areas to be developed.

10.223 The baseline report (Technical Appendix 10.1) has assigned ecological value to the habitats present in a geographical context and determined which habitats are 'Important Ecological Features' for this assessment. The effects on habitats that are 'Important Ecological Features' are assessed in this section and direct effects of habitat loss under the scheme footprint are summarised in Table 10.11. FPCR Figure 7121-L-11 shows vegetation to be retained and lost and is presented in Technical Appendix 12.9: Green Infrastructure – Planting and Habitats: Summary Schedule of Areas. These areas and quantities are based on the Green Infrastructure Parameters Plan with the exception of hedgerows and individual trees which are based upon the Illustrative Green Infrastructure Plan.

Table 10.11: Summary of Habitat Loss: Important Ecological Features

Habitat	Total area / length / number	Area / length / number removed	% of total removed	Compensation habitats to be provided	Balance
Semi-improved grassland	20.43 ha	16.15 ha	79%	17.42 ha of species rich grassland as compensation predominantly conversion of arable in Croft Lane Community Park and enhancement of improved grassland in Calf Heath Community Park.	+ 1.27 ha
Hedgerows	23.196 km	8.857 km	38.2%	10.694 km	+1.837 km
Woodland (including mixed plantation, broad-leaved plantation woodland and broad-leaved semi-natural woodland)	25.47 ha	15.57 ha	61.13%	34.10 ha	+18.53 ha
Individual trees	300 trees, 141 groups of trees	129 trees, 56 groups lost in total or in part	43% of trees and 39.7% of groups of trees.	912 trees	+783 individual trees -56 tree groups
Standing water (ponds and ditches)	17 ponds 0.37 ha	6 ponds 0.21 ha	35.3% of ponds (No 56.8 % by area	6 ponds in compensation. Minimum of 10 ponds provided for biodiversity as enhancement. Extensive SUDS incorporating	+ 10 ponds minimum +0.98 ha permanent water +6 ha maximum capacity

Table 10.11: Summary of Habitat Loss: Important Ecological Features				
				swales across the Site.
				Permanent water 1.19 ha
				Max capacity 6.22 ha

- 10.224 Loss of habitat would not occur all at once; it would be spread over the duration of the construction works from 2020 to 2035, and would occur in phases.
- 10.225 The loss of valuable habitat has been minimised in the Parameters Plans as part of embedded mitigation measures/design development and as a result significant areas of habitat would be retained in the green infrastructure areas of the Proposed Development including semi-improved grassland, woodland, trees, hedgerows and open water. These areas would be protected from construction effects by fencing.
- 10.226 The Community Parks will be designed to provide a range of native habitats including substantial areas of open water, species rich grassland, native woodland, hedges and scrub. The Staffordshire Central Farmland Ecosystem Action Plan (EAP; a local BAP) applies to the area which includes the Site. The EAP states that opportunities to create wetland, grassland and woodland habitat mosaics need to be taken in order to diversify the area. The EAP states that grasslands are particularly important, with an emphasis on lowland dry acid grassland and lowland meadow³⁶. As such, the embedded mitigation has taken into account the aims of the EAP. Habitat creation or enhancement in the construction phase aims to maximise the ecological value of habitats and these habitats are proposed to be managed (via the FEMMP) in the operational development phase to maintain this value.
- 10.227 The Green Infrastructure equates to approximately 107 ha or 36% of the Site. Croft Lane Community Park and Calf Heath Community Park are approximately 21 ha and 23 ha in area respectively. Due to the phased approach, habitats created as part of the first phases would be established or maturing prior to all habitat loss being realised. Croft Lane Community Park will be completed within 5 years of the commencement of the authorised development and the key ecological corridor linking Calf Heath Wood and Calf Heath Reservoir is to be completed within 5 years of the commencement of the authorised development, or prior to commencement of development at Development Zones A4a or A4b, whichever is sooner as embedded mitigation. The south of Calf Heath Community Park will be completed prior to the commencement of development at Development Zones A4b. These areas will be retained as 'Core Green Infrastructure' i.e. created and then safeguarded through subsequent development phases.
- 10.228 Recovery from habitat loss would not be possible in areas taken into the operational/built footprint, but areas temporarily cleared to facilitate the construction could be restored or would develop semi-natural vegetation following the works phase. Recovery would be quicker for grassland habitat than for woodland.
- 10.229 The impacts of habitat loss through demolition and site clearance on amphibians, birds, invertebrates, bats, badger, otter, polecat, hedgehog and harvest mouse are assessed in later sections of this chapter.
- 10.230 There would be loss of 16.15 ha of the semi-improved grassland on the Site (79% of this habitat on the Site). This is a certain, direct, adverse, permanent effect, though this would be largely mitigated due to the creation of species rich grassland habitat as part of the

embedded mitigation. These meadows will be designed to maximise their biodiversity value. The bulk of this compensatory habitat (lowland meadow) would be provided within Croft Lane Community Park which currently comprises arable fields. Further habitat enhancement would be provided on existing improved grassland within Calf Heath Community Park. As a result, this habitat loss would not be significant at the Local scale.

- 10.231 The Proposed Development would involve the loss of 38.2% of the hedgerows on the Site (8.857 km of the 23.196 km total of this s41 habitat). 'Important' hedgerows are retained where possible. A total length of approximately 1136 m of ecologically 'Important' hedgerows will be translocated which are not possible to retain. A commitment has been made for the delivery of a net gain of native species rich hedgerows (in terms of linear metres) as embedded mitigation. The loss of hedgerows when considered in light of the total length of hedgerows within Staffordshire would be a very small proportion of the total hedgerows within the County and is not significant at a County scale. The long-term distribution and retention of the hedgerow habitat in South Staffordshire is unlikely to be affected by the Proposed Development and so this is not considered to be a significant adverse effect at the District scale. There is a high proportion of habitat lost in the local context but this is offset by translocation of ecologically 'Important' hedgerows and the commitment to deliver a net gain in hedgerows on-site. A temporary effect is anticipated while vegetation matures and establishes, however, this is not considered to be significant at the Local scale.
- 10.232 Woodland would be removed to facilitate development of the Site. This would result in the loss of structure and function of 15.57 ha of habitat of mixed and broad-leaved plantation and broad-leaved semi-natural woodland of Local value (61.13% of this habitat within the Site boundary). The main area of Calf Heath Wood lost to the Proposed Development is woodland plantation with a high proportion of pines and so does not fit the UKBAP description for Lowland Mixed Deciduous Woodland³⁷ well. No areas of ancient woodland are present within the Site boundary. A significant proportion of Calf Heath Wood would be lost and the area of woodland margin has potential to be opened up to edge effects, though this is largely mitigated through embedded mitigation including fencing of development plots and the planting of a screen of native shrubs along the new boundary of Calf Heath Wood exposed by Site clearance. Embedded mitigation measures also include management of the retained areas of Calf Heath Wood (following felling of part of Calf Heath Wood) to complement that in the adjoining portion of the woodland being managed in a similar manner as part of the Bericote Development. In the long term the proportion of pines in Calf Heath Wood will be reduced through appropriate silvicultural practices to promote native trees such as oak, birch and ash to promote a diverse woodland including trees of a range of ages and removal of non-native species such as rhododendron (phased). The embedded mitigation measures include the creation of new areas of biodiverse native broadleaved woodland (in area terms). A commitment has been made to deliver a biodiversity net gain for native broadleaved woodlands and these will wherever possible be linked to hedges (retained or new) and existing retained woodland. The Proposed Development would have a certain, direct, adverse effect on woodlands due to the long time required for this habitat to develop, however with embedded mitigation provided this habitat loss would not be significant at the Local scale.
- 10.233 Individual trees in fields not forming part of woodland or in areas of retained habitat would be lost as a result of Site clearance within the areas proposed for infrastructure development. It is anticipated that 129 trees (of 300 present) would be lost, 56 groups (of 141 present) would be lost in full or lost in part including mature trees. Approximately 900 individual trees will be planted including native trees such as oaks within areas of green infrastructure. As part of embedded mitigation, the planting will be planned so that a proportion of the planted trees can be retained and allowed to grow to maturity/overmaturity with no potential for conflict from nearby land uses (i.e. in the timescales of hundreds of years) to become future veteran trees. Seven veteran trees would be retained and four would be lost as a result of the Proposed Development (design evolution has minimised losses of such trees). There are estimated to be more than four million trees outside woodland in Staffordshire and so the loss

³⁶ Staffordshire Biodiversity Action Plan. [Online]: <http://www.sbp.org.uk/actionplan/eap/index.php?eap=CFM> [Accessed 19/12/16]

³⁷ JNCC. [Online] Available at: http://jncc.defra.gov.uk/PDF/UKBAP_PriorityHabitatDesc-Rev2011.pdf [Accessed 22/12/2016]

of these trees would represent a very small proportion of the county total³⁸, but this would be significant at the Local scale due to the loss of veteran and mature trees.

- 10.234 A black poplar (*Populus nigra*) tree has been identified as present in the north-east of the Site. This has been confirmed via DNA analysis. Native black poplar is a Staffordshire BAP species and has declined nationally with an estimated 8,000 individuals in the UK (of which only 400 are female). This individual specimen has been noted to be in extensive decline. This individual would be lost as a result of the Proposed Development. However, embedded mitigation includes a comprehensive mitigation strategy for continuation of native black poplar on-site and is referenced in the Arboricultural Assessment report (Technical Appendix 12.7). As such, in the short term (decades) this represents a certain, direct, adverse effect on this SBAP species but with embedded mitigation in place, this is not considered to be of significance at the County scale.
- 10.235 There would be no loss of canal habitat in construction and this habitat would be protected from construction operations. There would be loss of six ponds (35.3% of the total number of ponds). The proposals include significant areas of open water designed for the purposes of site drainage but which would also be designed to maximise their biodiversity value. Embedded mitigation measures include provision of six ponds in compensation and a minimum of ten ponds to be created as enhancement specifically for biodiversity. These will be in contrast to the often ephemeral/poor quality ponds with little or no aquatic vegetation that are currently found on Site. The new waterbodies provided for Site drainage would include areas where water would be temporary and levels would vary including ephemeral swales and ponds (and these would emulate the ponds and ditches on site at present which often dry out). The created open water features would also include overdeepened areas where water can remain permanently, diversifying the open water characteristics and providing a net increase in permanent water compared to the baseline and addressing the aim of biodiversity action plans for ponds. The net effect on open water would be a permanent beneficial effect, significant at the Local scale, due to new waterbodies being constructed in the soft landscape parts of the Site.

Pollution Effects on Habitats

- 10.236 Pollution impacts on retained habitats or those of future phases, adjacent watercourses and ponds needs to be considered in terms of ecosystem integrity. The ODCEMP defines the measures to be adopted to ensure effects of dust generation and risks of a pollution incident are minimised, nevertheless there would still be limited potential for a pollution spill in construction. Such an impact could affect the nature and structure of the habitats involved, for instance, through sediment smothering or phytotoxic chemicals killing aquatic vegetation.
- 10.237 Typical construction plant will be used in the Site preparation works, potential contaminants therefore include chemicals such as diesel and hydraulic fluid. Ecosystem function and processes could be impaired by such pollutants. Chapter 16: Water Environment considers the contamination impacts on surface water and Chapter 11: Ground Conditions considers impacts on groundwater.
- 10.238 Any pollution events in the construction phase (whilst unlikely due to controls defined in the ODCEMP) could impact on biological receptors, but this is considered a temporary impact from which the watercourses and ponds could recover (in months) through flushing, and their integrity would therefore not change in the long term (years).
- 10.239 Pollution incidents would have a direct, temporary adverse effect but this would not be significant at the Local level due to ODCEMP controls (though effects may be localised and significant in parts of the Site). Impacts on receptors downstream are considered extremely unlikely as a result of dilution effects and the likely limited nature of pollution events.

Species

Amphibians – Great Crested Newt

- 10.240 The amphibian surveys indicated that while GCN are present on the Site (confirmed by positive e-DNA results) and in the wider landscape within 500 m (confirmed by identification during traditional survey and from ecological records), the numbers of GCN on the Site are so low as to be undetectable through use of traditional survey methods. This is despite six surveys of on-site e-DNA positive waterbodies being carried out rather than the four recommended for presence/absence purposes. The sole GCN breeding pond detected through traditional survey methods was approximately 270 m to the south-west of the Site boundary at the nearest point. The Site is therefore not considered to form a key area of habitat in close proximity to GCN breeding ponds. The breeding pond identified is also separated from the Site by a busy road (Station Drive) which is considered to be, to a degree, a barrier to movement towards the Site. The vast majority of the Site is further than 500 m from the identified breeding pond, reinforcing the findings that the Site does not form a key GCN habitat area.
- 10.241 Common toads were encountered on Site, though in relatively low numbers given the large size of the survey area. As GCN and common toad have been identified as being present on Site or in the landscape, effects on these species are possible during the construction phase of the Proposed Development.
- 10.242 Demolition has potential to kill or injure amphibians that may be sheltering in or nearby structures on-site. The risk to amphibians from demolition activities includes being killed or injured by collapsing buildings and by the movement of demolition plant. There is also the potential that spoil or rubble piles created by demolition activities could be used by amphibians as a place of shelter and that they would be killed or injured when the spoil piles are moved subsequently.
- 10.243 Similarly, groundworks have the potential to kill or injure amphibians through Site clearance, enabling works and excavations on Site. Amphibians could be killed/injured by earth movements and earth moving plant. There is also the potential for amphibians to fall into and become trapped in excavations on-site.
- 10.244 The construction phase of the Proposed Development will result in the permanent loss of suitable habitat for amphibians across the Site. This will include the loss of waterbodies and terrestrial habitats. Six waterbodies of the 17 present on Site would be lost as a result of the Proposed Development. However, a greater number (and area) of ponds will be provided within Croft Lane Community Park to be completed within 5 years of the commencement of the authorised development and within other green infrastructure than are lost. As such, the loss of these ponds would not reduce the areas available for amphibian breeding on-site during the construction phase (although surveys in 2016 and 2017 did not detect any evidence of GCN breeding in any on-site ponds) and will allow local amphibian populations to survive and maintain numbers through into the operational phase of the Proposed Development.
- 10.245 Terrestrial habitats of value to amphibians will also be lost as a result of the Proposed Development, amounting to approximately 31.72 ha in total of habitat such as semi-improved grassland, woodland areas and 8.8 km of hedgerows. The loss of the most valuable amphibian habitat has been minimised in the Parameters Plans so far as possible as part of embedded mitigation measures and as a result, waterbodies, areas of woodland and hedgerows will be retained. These areas will continue to provide shelter and habitat for amphibians on-site and aid in safeguarding current populations as far as possible. Given the phased nature of the Proposed Development, a proportion of compensation habitats will be provided and be in place on completion of one phase prior to commencement of construction of the subsequent phase. This serves to limit the effects of habitat loss across the Site in any given construction phase. Amphibian friendly gully pots, ladders and amphibian wildlife kerbs will be installed across the Site as a standard design specification and will be operational in completed phases of

³⁸ Forestry Commission (2002) National Inventory of Woodland and Trees – England. County Report for Staffordshire. [Online]. Available at: [http://www.forestry.gov.uk/pdf/staffordshire.pdf/\\$FILE/staffordshire.pdf](http://www.forestry.gov.uk/pdf/staffordshire.pdf/$FILE/staffordshire.pdf) [Accessed 19/12/16]

development during construction of subsequent phases. This will help to limit so far as possible fragmentation of habitat and severance of linear features that may be used by amphibians, for instance hedge lines and woodland edges during construction within a given phase. A degree of fragmentation will however be unavoidable which will hinder the movement and dispersal of amphibians across the Site within individual development phases in the short term (years during works) and will increase the risk of killing or injury through vehicle accident or predation.

- 10.246 The construction phase is likely to cause some measure of disturbance to amphibians on-site through the movement and operations of construction plant and staff over the course of the works. This may disturb amphibians from their usual activities and prompt movement around the Site which would expose them to the risk of predation or death/injury through Site traffic movements and operations.
- 10.247 Risk of killing or injury to European Protected Species (EPS) such as GCN and the s41 common toad will be controlled through the implementation of the FEMMP and subsequent EMMP which will include a risk-based precautionary method statement. This will include measures to inform Site staff of potential GCN and common toad presence, ensure excavations are capped or have means to prevent trapping animals, timing and conditions when works can be undertaken, what to do in the event of a GCN being discovered and measures to mitigate potential for spillages of fuel oils and other potentially harmful liquids on-site and clean up any pollution incidents.
- 10.248 With the embedded mitigation in place and implementation of the FEMMP and subsequent EMMP the risk of significant construction phase impacts on amphibians on-site is considered low. Should impacts occur e.g. in the unlikely event of a spill, these are considered to be temporary in nature (one year) when considering the population. No significant adverse effects from construction on amphibians are anticipated or considered likely.

Birds

Effects on Birds in Buildings – Demolition

- 10.249 The 'Important Ecological Features' being considered are house sparrow, starling, kestrel, swallow and stock dove (i.e. species that have been recorded in the survey and that habitually nest in buildings or have been shown to do so on-site). The Amber List swift is a building nesting species and was also recorded in the survey. No suggestion of breeding by this species on-site was recorded and so it is not a receptor in the assessment, but the mitigation proposed for the other listed species would also consider swift.
- 10.250 Demolition of buildings would result in the removal of all breeding habitat for building nesting bird species on-site with the exception of the buildings at Gravelly Way and Straight Mile Farm and if carried out in the breeding season could result in killing or injury of birds and damage/destruction of nests (offences under the WCA 1981).
- 10.251 Demolition would occur in each of the phases, and so not all habitat would be removed at once, with the final effect only being realised potentially after approximately 13 breeding seasons. Buildings constructed in early phases would likely be in place prior to demolition of buildings in later phases.
- 10.252 Demolition would result in noise which could disturb nesting birds beyond the habitat directly affected (for instance in nearby fields, hedges, trees or woodland). No Schedule 1 species have been recorded breeding on-site and as a result demolition disturbance would not contravene legislation. Properties to be demolished are situated on busy roads or working farms and as such the birds present in the breeding season or wintering on the Site would be conditioned to activity and noise.
- 10.253 The species affected would be expected to adapt to the Proposed Development and nest in suitable locations in boxes on buildings in the developed Site. The presence of suitable habitat likely used by these species to nest outside but adjacent to the Site means that effects would be restricted to the Site scale and a significant adverse effect is unlikely.

Effects on birds – Construction

- 10.254 It is likely that habitat loss during site preparation will affect most of the 62 species of birds foraging and/or breeding on-site. Habitat loss would also influence the birds wintering on the Site, although no significant concentrations of wintering birds use the Site. The loss of habitat will also result in fragmentation of remaining habitat and severance of linear features that may be used by birds, for instance hedge lines and woodland edges.
- 10.255 The impact will take place in phases from 2020 to 2035, but the actual clearance works in each phase, will only take one breeding season. Nevertheless, the result of clearance of approximately 64% (192 ha) of the land for development will be permanent or longer term, assuming the preparation stage of works is followed by construction. The permanent impact will be in areas proposed for development (Zones A1-A7, Zone B, Zone C and new roads as per Parameter Plan – Development Zone Plan Document 2.5). Areas where semi-natural habitat is to be created or enhanced, for instance in Community Park areas, will retain suitability for some species through the works phase and will be suitable for nesting and foraging for other bird species currently present, once landscaping is mature. These impacts are to a degree mitigated by the provision of 12 ha of existing intensively managed arable farmland off-site (within 1 km) which will be enhanced and managed for the benefit of farmland birds. Further on-site mitigation for farmland birds will be provided when construction commences on development Zone A7(a,b,c) (based on the Parameters Plan – Development Zone Plan) in the north of Calf Heath Community Park and will be managed by periodic harrowing or ploughing. This area will be sown with a seed-bearing crop including a cereal and kale, linseed or quinoa to maximise the habitat value to birds.
- 10.256 As with demolition, if carried out in the breeding season site clearance for construction could also result in killing or injury of birds, damage/destruction of nests and disturbance to birds in adjacent areas (including ground nesting birds). Any loss of a nest or brood would be for one breeding season, and any affected pair could breed again (potentially in the same season); in light of the greater effects of habitat loss on bird populations, direct impacts on nests of any individual birds would not have an adverse effect on bird populations (though would be in contravention of legislation). The FEMMP defines measures that would be adopted throughout the Proposed Development to ensure impacts on nesting birds would be minimised.
- 10.257 Disturbance would be temporary for the duration of construction (i.e. in the timescale of years) from noise from construction plant and activity and from visual effect of site activity (construction workers activity, movement of vehicles and materials) or construction lighting, although it should be noted that receptors beyond and within the Site boundaries are in close proximity to noisy, busy features such as the M6, A5 and A449 roads and the railway line. Parts of the Site have recorded ambient noise levels in the baseline of in excess of 50 or 60 dB LAeq,T which may be noisy enough to affect breeding density. Construction noise and activity may deter birds from breeding on undeveloped future phases of the Site but this would not change the ultimate effect of habitat loss in these areas.
- 10.258 Disturbance (which is temporary) would only partially disrupt bird activity and is unlikely to affect the conservation status of bird populations found on and around the Site. Therefore, disturbance effects are unlikely to be significant. No Schedule 1 birds have been recorded breeding on-site and so there are no legal implications of disturbance.
- 10.259 Construction phasing would be over approximately 15 years and although the extent of habitat loss means that this is a negative impact on birds, there may be localised and short term positive effects (for the relevant phase for the duration of the period following site clearance until the start of construction). In addition, it should be noted that the Croft Lane Community Park would be completed within 5 years of the commencement of the authorised development. Numbers of breeding skylark and lapwing may increase locally as a result of the creation of large bare areas and seed eating birds such as yellowhammer and linnet may benefit from any ruderal plant growth in cleared areas created by construction operations. Generally, though there will be an adverse effect that will remove breeding and wintering habitat including buildings, trees, hedges, scrub, arable fields and grassland.

10.260 The impact to birds of habitat loss can be summarised as a permanent and irreversible loss of approximately 192 ha of mixed farmland and woodland habitat on-site, which will remove nesting and foraging habitat for the present bird assemblage including birds of conservation concern and priority species. In the absence of mitigation, the result of this will be that the bird assemblage will lose characteristic and declining species of open farmland in particular, but also woodland, scrub and birds that nest in buildings, and that the reduction in resources will mean fewer pairs of the more generalist species (such as dunnoek, song thrush, starling) breeding on the Site. Impacts on birds, notably farmland birds are to a degree mitigated by embedded mitigation including by the provision of 12 ha of existing intensively managed arable farmland off-site (within 1 km) which will be enhanced and managed for the benefit of farmland birds. This area is complemented by further on-site mitigation for farmland birds which will be provided when construction commences on development Zone A7 (a,b,c) in the north of Calf Heath Community Park.

10.261 Overall, with mitigation measures embedded, effects of construction including habitat loss and disturbance affecting birds would be an adverse effect of Local significance for farmland birds and for other birds of conservation concern.

Invertebrates

10.262 Site clearance on the Site would result in removal of a proportion of a mosaic of habitats shown to be of value for invertebrate assemblages (Woodland, wood edge and trees, arable margins, bare ground and early succession and wetlands). Removal of these habitat features will take place in phases over a period of approximately 15 years and effects will be long term or permanent. The permanent impact will be in areas proposed for infrastructure development. In these locations there would be a consequent loss of all food plants, nectar sources, nest sites and places of shelter for invertebrates.

10.263 The Proposed Development includes the retention of areas of woodland, woodland edge, retention of the majority of veteran trees (seven of 11) and includes areas where semi-natural habitat are to be created or enhanced, for instance in Community Park areas. Embedded mitigation includes the creation of invertebrate habitats e.g. ephemeral ponds, biodiversity ponds, standing deadwood and bare sandy exposures in Croft Lane Community Park to be completed within 5 years of the commencement of the authorised development and within the ecological corridor linking the retained area of Calf Heath Wood and Calf Heath Reservoir to be completed within 5 years of the commencement of the authorised development, or prior to commencement of development at Development Zones A4a or A4b, whichever is sooner. To assist in mitigating the impact at the time it is experienced or prior to this. These areas will retain suitability for invertebrates in the construction phase. The bare ground and early successional habitats identified in the baseline scenario are associated with the quarry which in baseline terms is assumed to have been restored. Two specific areas of enhancement (sand bunds and tree planting) for invertebrates are proposed in the north-east of the Site as part of the quarry restoration. These enhancement areas (sand bund) would be lost as a result of the Proposed Development. Compensation for these two enhancement areas will be provided in Croft Lane Community Park as embedded mitigation.

10.264 Allowing for the areas of retained and compensatory habitat there would be a partial loss of structure of the habitat for the invertebrate assemblage. The impacts in areas proposed for infrastructure development would be subject to a permanent, irreversible, adverse effect. The effect of this loss is to a degree mitigated by the retention of some key habitat areas on-site (and enhancement / compensation provided in others) and the understanding from surveys that the habitats present are largely populated by common and localised species indicative of a broad suite of preferences rather than a specialised set of habitat criteria (i.e. are readily replicable and are present in equivalent nearby habitats in the study area). The groundworks

phase would also provide nesting opportunities of invertebrates of bare ground. This adverse effect is therefore considered to be significant at a Site (but not a Local) scale.

Bats

10.265 Bats have been recorded using areas of woodland, grassland, standing water (canal, ponds and quarry), hedgerows and treelines and, to a lesser extent arable land within the Site. The development proposals will involve the loss of bat roosting, foraging and commuting habitat.

10.266 The Proposed Development will lead to the loss of six roosts on-site in the demolition and construction phase:

- Gailey Magazine – A summer day roost for common and soprano pipistrelle (Maximum of five individuals seen to emerge/re-enter);
- Woodside Barn – A summer day roost for common and soprano pipistrelle, natterer's bat (Maximum of three individuals seen to emerge/re-enter) and brown long-eared. The barn is also used as a night roost/feeding perch for *Myotis* species likely natterer's;
- Mile End Cottage – A summer day roost for common pipistrelle (Maximum of 2 individuals seen to emerge/re-enter);
- Croft House – A summer day roost for common pipistrelle (Maximum of 1 individual seen to emerge/re-enter);
- Heath Farm – Main Farmhouse – A summer day roost for brown long-eared (Maximum of 1 individual likely to have emerged/re-entered); and
- T97 – Oak - A summer day roost for soprano pipistrelle (confirmed via DNA testing of droppings).

10.267 Soprano pipistrelles are a s41 species but populations are considered stable nationally³⁹. Common pipistrelle populations are considered to be increasing and are, as soprano pipistrelle locally common and widespread in Staffordshire⁴⁰. There is significant availability of alternative suitable roost locations for these species in the study area and wider landscape. In the absence of mitigation, the Proposed Development has potential for the killing or injury of individual bats and would lead to a reduction in the roosting resource. The loss of the pipistrelle roosts at Gailey Magazine, Woodside Barn, Mile End Cottage, Croft House and in T97-Oak is considered to represent a direct, long term and permanent adverse effect significant at the Local level.

10.268 Natterer's bat has a wide distribution across Staffordshire⁴¹ and the UK with an increasing population⁴² Natterer's roost in buildings and trees, and there is a widespread roosting resource available in the study area and wider landscape. In the absence of mitigation, the Proposed Development has potential for the killing or injury of individual bats and would lead to a reduction in the roosting resource. The loss of the natterer's day roost and feeding perch/night roost (likely natterer's) is also considered to represent a direct, long term and permanent adverse effect significant at the Local level.

10.269 Brown long-eared are a relatively common species with stable populations, and widespread over the UK and in Staffordshire⁴³. They are generally considered a woodland bat, using trees and a wide variety of building types for roosting. There is a widespread roosting resource available in the study area and wider landscape. In the absence of mitigation, the Proposed Development has potential for the killing or injury of individual bats and would lead to a reduction in the roosting resource. The loss of the two brown long-eared day roosts at Woodside Barn and Heath Farm – Main Farmhouse is considered to represent a direct, long term and permanent adverse effect significant at the Local level.

³⁹ Bat Conservation Trust (2016). National Bat Monitoring Programme Report. London

⁴⁰ Staffordshire Ecological Record (2016). Staffordshire Mammal Atlas. [Online]. Available at: <http://www.staffs-ecology.org.uk/atlas/atlas.php?atlasid=M&page=m-intro&menu=M> [Accessed 20/11/2017]

⁴¹ Bat Conservation Trust (2016). National Bat Monitoring Programme Report. London

⁴² Staffordshire Ecological Record (2016). Staffordshire Mammal Atlas. [Online]. Available at: <http://www.staffs-ecology.org.uk/atlas/atlas.php?atlasid=M&page=m-intro&menu=M> [Accessed 20/11/2017]

⁴³ Staffordshire Ecological Record (2016). Staffordshire Mammal Atlas. [Online]. Available at: <http://www.staffs-ecology.org.uk/atlas/atlas.php?atlasid=M&page=m-intro&menu=M> [Accessed 20/11/2017]

⁴⁴ Bat Conservation Trust (2016). National Bat Monitoring Programme Report. London

10.270 Removal of the roosts identified above would be in contravention of legislation and would require a European Protected Species Mitigation Licence (EPSML) from Natural England (NE). A draft licence has been submitted to Natural England who have issued a 'Letter of no Impediment' stating that Natural England see no impediment to a licence being issued should the DCO be granted. Natural England concluded that *"Based on the current level of bat activity on site, the proposals are considered to maintain the Favourable Conservation Status (FCS) of the bat assemblage and populations present on site"*.

Roosting Impacts

10.271 Seven roosts located off-site but within 100 m of the Site boundary have been identified and have potential to be affected during demolition and construction. These are:

- Calf Heath Wood Birch 1 – A summer day roost for Daubenton's approximately 80 m west of the Site;
- Calf Heath Wood Birch 2 – A summer day roost for Daubenton's approximately 20 m west of the Site;
- Woodview Cottage – A maternity or satellite roost for brown long-eared approximately 20 m south of the Site;
- Stable Lane Building Roost 13 – A summer day roost for brown long-eared approximately 25 m east of the Site;
- Tree Roost 15 – A maternity roost for noctule bats approximately 40 m south of the Site;
- Tree Roost 10 – A night roost for whiskered/brandt's approximately 45 m south of the Site; and
- Tree Roost 9 – A summer day roost for Daubenton's bat approximately 90 m south of the Site.

10.272 For the purpose of this assessment the two Daubenton's summer day roosts identified in Calf Heath Wood are considered together. The results of the surveys suggest that Calf Heath Wood is likely to provide an important roosting resource for this species given the proximity to potential foraging habitats associated with the canal and reservoir locally. Due to the mobility of tree roosting bat species, it is likely that further tree roosts will be used within the Calf Heath Wood area than are currently known (including those of species other than Daubenton's), and it should be assumed that trees within the Site and especially Calf Heath Wood, with suitable roosting cavities are likely to form part of this roosting resource.

10.273 The Proposed Development includes the felling and loss of approximately 15 ha (53%) of Calf Heath Wood (total approximate area: 28 ha). The known roost trees are located in an area of retained woodland off-site associated with the adjacent Bericote development. The felling of the woodland on-site is scheduled to be undertaken in one phase and based on the assumption that all trees within Calf Heath Wood with suitable roosting cavities are likely to form part of this roosting resource, roosts for this species are considered likely to be lost as a result of the Proposed Development in one season (albeit that the two tree roosts identified would be retained). Daubenton's bats are considered relatively common and widespread across the UK, with increasing populations⁴⁵. In Staffordshire, records of this species are numerous and are therefore considered widespread and locally abundant⁴⁶. The Daubenton's bats captured during the trapping exercise at the roosts in Calf Heath Wood were all male adults (Six bats captured in a hand net (of the 24 that emerged) were identified as adult males.) Large aggregations of male roosting bats are relatively uncommon. The nearest Daubenton's maternity roost was identified 1300 m to the south-east of the Site in a tree adjacent a quarry. Full details of this roost are presented within Technical Appendix 10.1 – Baseline Ecology Report. In the absence of mitigation, the Proposed Development, specifically the felling of a proportion of Calf Heath Wood has potential for the killing or injury of individual bats and would lead to a reduction in the available roosting resource for Daubenton's. This is considered

to be a direct, long term and permanent adverse effect significant at the Local level. Whilst not significant beyond the Local scale, the potential removal of a roost would be in contravention of legislation and would require a European Protected Species Mitigation Licence (EPSML) from Natural England. A draft licence has been submitted to Natural England who have issued a 'Letter of no Impediment' stating that Natural England see no impediment to a licence being issued should the DCO be granted.

10.274 Disturbance at the off-site Daubenton's roosts in Calf Heath Wood would be temporary for the duration of construction (i.e. in the timescale of years from noise from construction plant and activity and from lighting). The Daubenton's day roosts in Calf Heath Wood are considered only likely to be subject to disturbance effects during construction of development Zone A4b. The FEMMP details measures to minimise disturbance including control of normal working hours which will be limited to 07:00 to 19:00 Monday to Friday and 07:00 to 13:00 on Saturday, except for emergency works or where agreed with SSDC. Construction activity that creates noise, vibration or emits light within 30 m of known roosts, hedgerows and woodland will cease at sunset between the period March to September inclusive when bats are active to avoid delaying the emergence of locally roosting bats. Construction activity will not commence again until after sunrise to ensure that impacts to bats returning to local roosts does not occur. Construction phase lighting will be designed, installed and maintained to minimise effects on bats outside development plots through avoiding light spill on adjacent habitat. Lighting will only be used when necessary for construction operations or for safety reasons and should be directed within the plot, with no upward directed light and suitable cowls as necessary. Construction phase noise will be controlled through the ODCEMP such that effects beyond the Site boundary are minimised. Appropriate measures may include temporary noise barriers (for instance where development plots adjoin sensitive habitats such as the canal or woodland areas).

10.275 It is considered unlikely that disturbance effects would be experienced in the location of the Daubenton's roosts in Calf Heath Wood in prior or subsequent phases. The roosts identified are all for male bats and as such disturbance would not likely affect their ability to rear or nurture their young and would not affect the local distribution or abundance of the species. When disturbance effects are considered with the proposed modification of adjacent habitats (Felling of approximately 15 ha of Calf Heath Wood) there is potential for abandonment of the roosts. Disturbance effects, while controlled and habitat modification in the vicinity of the roosts is considered likely to result in a direct, temporary, adverse effect significant at the Local scale. Given the plentiful availability of alternative roost locations in the study area a significant effect is not predicted at a scale greater than Local. Disturbance of the roosts identified above would be in contravention of legislation and would require an EPSML from Natural England. A 'Letter of no Impediment' stating that Natural England see no impediment to a licence being issued should the DCO be granted has been obtained.

10.276 A further all male Daubenton's summer day roost was identified via radio tracking of Bat206 in 2017 within a tree supporting 20+ individuals located approximately 90 m south of the Site boundary. However, the nearest construction activities associated within development Zone A7b (based on the development Zone parameters plan, Document 2.5) are approximately 500 m to the north with the intervening part of the Site forming Calf Heath Community Park. The core foraging area for Bat206 was along the canal beyond the south of the Site and over/in adjacent woodland. Given the distance of the day roost from construction activities and the habitats identified as being used for foraging being off-site, proximal to areas to be enhanced to form Calf Heath Community Park, a significant adverse effect on this population is not considered likely at a District or any other level with respect to disturbance or habitat loss during construction. The brown long-eared maternity or satellite roost at Woodview Cottage is within approximately 20 m of the nearest construction activities associated within Development Zone A6 (based on the Development Zone parameters plan, Document 2.5) and within 140 m of demolition and construction activity in development Zone A7. The building is

⁴⁵ Bat Conservation Trust (2016). National Bat Monitoring Programme Report. London

⁴⁶ Staffordshire Ecological Record (2016). Staffordshire Mammal Atlas. [Online]. Available at: <http://www.staffs-ecology.org.uk/atlas/atlas.php?atlasid=M&page=m-intro&menu=M> [Accessed 20/11/2017]

located directly adjacent Vicarage Road (Opposite and south of the Site) and the roost will already be subject to a degree of disturbance from traffic using this road in the baseline scenario and also from building occupiers. The Noise chapter supports this by identifying that baseline ambient noise levels in this approximate location are high at 58 dB LAeq,T, this is by comparison approximately 8 dB LAeq,T higher than those experienced at locations near Fir Tree Cottage adjacent to Stafford Road (A449). The radio tracking of three brown long-eared bats in this population (one breeding [Bat5], one non-breeding [Bat2] and one juvenile [Bat108]) showed use of the Site in Calf Heath Wood and also areas to the south of the roost over the canal (outside of the Site), the bats were assumed to be foraging. The juvenile brown long-eared from this population remained close to the roost south of Vicarage Road. A further brown long-eared roost was identified via radio tracking in a house on Stable Lane (Stable Lane Roost 13). The adult male [Bat406] using Roost 13 was recorded foraging over a woodland block in the east of the Site off Woodlands Lane and over paddocks and gardens with mature trees east of the Site near to the roost. Full details of the radio tracking are provided in Section 4.6 of Technical Appendix 10.1 – Baseline Ecology Report. The felling of 15 ha of Calf Heath Wood would reduce the locally available confirmed foraging resource for this species; however, as demonstrated by the radio tracking data this population is not solely dependent on habitats within the Site. The habitats shown to be used for foraging by the adult male will be retained within Calf Heath Community Park. As such, a significant adverse effect on this population is not considered likely at a District or any other level with respect to disturbance or habitat loss during construction.

10.277 The noctule maternity roost in a tree (Tree Roost 15) is within approximately 40 m of the Site boundary. However, the nearest construction activities associated within development Zone A7b (based on the development Zone parameters plan, Document Reference 2.5) are approximately 500 m to the north with the south of the Site forming Calf Heath Community Park. This maternity roost was identified via radio tracking surveys of a juvenile female [Bat208]. The individual was using this roost and a further maternity roost in a tree in Somerford approximately 1400 m to the west of the Site. Noctule bats are widespread in Staffordshire (SER, 2016), and although they are found throughout the UK, they are likely to be relatively scarce due to the large home ranges they occupy. Noctule bats are considered stable in population⁴⁷. The key foraging areas for this individual were over arable fields and plantation woodland next to the River Penk near Somerford, over woodland and arable fields over Saredon Brook to the immediate south of Four Ashes Industrial Estate, over the canal and woodland south of the Site in close proximity to the maternity roost and within the western portion of Calf Heath Wood. The foraging activity over Calf Heath Wood was predominantly over the retained portion of this woodland associated with the Bericote Development but also in woodland which is to be lost as a result of the Proposed Development. Given the distance of the maternity roost from construction activities and the large geographical extent of habitats used for foraging by the tracked bat (most occurring off-site or in proximity to areas which will become community parks), a significant adverse effect on this population is not considered likely at a District or any other level with respect to disturbance or habitat loss during construction.

10.278 A night roost for whiskered/brandt's was identified via radio tracking approximately 45 m south of the Site boundary south of the canal. However, the nearest construction activities associated within development Zone A7c (based on the development Zone parameters plan, Document 2.5) are approximately 240 m to the north with the intervening part of the Site forming Calf Heath Community Park. This roost was identified by tracking a breeding female [Bat306]. In addition to the night roost within 100 m of the Site boundary, two further roosts were identified via tracking; one in a house on Stable Lane, approximately 200 m east from the Site and the second in a house in Slade Heath, approximately 2.1 km south-west of the Site. The latter is considered likely to be a maternity roost. Whiskered/Brandt's bats have a

wide distribution across the UK with a stable population⁴⁸, whiskered/Brandt's bat is considered one of the 'rarer' bats⁴⁹. Brandt's bat is thought to be slightly less common and widespread than the whiskered bat⁵⁰. The core foraging area for this bat was over Woodlands Lane and Stable Lane and over the south-east of the Site in what is proposed to be Calf Heath Community Park. The second core foraging area for this bat was to the north of Vicarage Road in woodland to the east between Vicarage Road and Calf Heath Reservoir where the access track for the reservoir is located, an area also being retained. Given the distance of the night roost from construction activities and the large geographical extent of habitats used for foraging (most occurring off-site or in areas which will become community parks or be retained), a significant adverse effect on this population is not considered likely at a District or any other level with respect to disturbance or habitat loss during construction.

10.279 A maternity roost was identified for Natterer's during the trapping surveys. This is located in a barn conversion in Standeford 1 km to the south of the Site [Bat106 and Bat308]. Thirty-one individuals were recorded emerging from this property. The core foraging areas for these individuals was over woodland and arable fields over Saredon Brook to the immediate south of Four Ashes Industrial Estate, over the canal, fields and woodland between the energy from waste plant off Enterprise Drive and the eastern extent of the canal south of the Site and within the northern part of Calf Heath Wood. The felling of the northern portion of Calf Heath Wood would lead to a reduction in the available foraging habitat demonstrated to be used by this population. However, tracking has shown that individuals are not solely reliant on habitats within the Site and also use off-site habitats, mainly in the canal corridor and adjacent woodland south of the Site. Other large blocks of woodland are present locally such as Somerford Wood and the habitats within the South of Calf Heath Community Park will be enhanced, including woodland (completed prior to the commencement of development at Development Zones A4b) which will strengthen the existing canal corridor used by this (and other) species. Therefore, a significant adverse effect on this population is not considered likely at a District or any other level with respect to disturbance or habitat loss during construction.

Foraging Impacts

10.280 In the wider Site not associated with the roosts identified and discussed above, the Proposed Development will, in the absence of mitigation in the construction phase result in the loss of foraging and commuting habitat. This loss includes approximately 8.8 km of hedgerows; 129 individual trees (of 300 – 43%), 56 groups of trees (of 141 – 39.7%) not associated with woodland; arable fields, standing water (ponds) and grassland (Improved, poor semi-improved and semi-improved). Many bat species in the UK are reluctant to cross open ground (exceptions include noctule and Leisler's bats) and so usually commute between their foraging areas and roosts following linear features including those being lost including hedgerows, lanes, fence-lines, watercourses and woodland edges⁵¹. Where possible, important areas for foraging and commuting have been retained and strengthened in the case of the link between Calf Heath Wood and Calf Heath Reservoir as embedded mitigation in the Parameters Plans. Where these corridors are interrupted e.g. by the link road, specific embedded mitigation measures have been included to retain connectivity, specifically bat hopovers. The key bat foraging and commuting areas are shown on Figure 10.1.634 of Technical Appendix 10.1. The location of specific mitigation measures e.g. bat hopovers are shown on Figure 10.002 of the ES Retained corridors include:

- The southern extent of Calf Heath Wood and the tree / hedge line connecting this with Calf Heath Reservoir. The existing tree and hedge line will be strengthened creating a 100 m wide ecological corridor (to be completed within 5 years of the commencement of the authorised development, or prior to commencement of development at Development Zones A4a or A4b, whichever is sooner);

⁴⁷ Bat Conservation Trust (2016). National Bat Monitoring Programme Report. London.

⁴⁸ Bat Conservation Trust (2016). National Bat Monitoring Programme Report. London

⁴⁹ Wray S, Wells D and Mitchell-Jones A M. (2010). Valuing Bats in Ecological Impact Assessment. In: In Practice, 70. Institute of Ecology and Environmental Management. Winchester

⁵⁰ Bat Conservation Trust (BCT) Whiskered bat. Species Info Sheet. [Online] Available at:

http://www.bats.org.uk/data/files/Species_Info_sheets/whiskered_bat.pdf [Accessed 21.11.2017]

⁵¹ Limpens H J G A & Kapteyn K. (1991). Bats, their behaviour and linear landscape elements. *Myotis*, 29, 39-48

- Access track past Woodside Farm leading into the wayleave/track running north-west – south-east in Calf Heath Wood – the woodland block off Vicarage Road is being retained and planting strengthened in the current location of Woodside Farm and Barn. A bat hopover has been specified north of Woodside Farm to the retained elements of Calf Heath Wood (associated with the Proposed Development and Bericote Development) and a further hopover to the north of Calf Heath Wood to maintain links with the Staffordshire and Worcestershire Canal;
 - Staffordshire and Worcestershire Canal and adjacent habitats at Croft Lane Community Park and Calf Heath Community Park;
 - Hedgerow running north-west to south-east between Vicarage Road and Straight Mile;
 - Hedgerow / bund running north to south in the far south-west of the Site between the canal and Straight Mile;
 - Hedge / treeline in location of Pond 24;
 - Wet woodland in south of the Site adjacent Straight Mile and the tree line extending north from this to the wooded copse off Woodlands Lane; and
 - Tree and hedge lines in Croft Community Park and Calf Heath Community Park.
- 10.281 Of the key foraging and commuting routes identified the following are not retained and will be lost in the construction phase:
- Northern portion of Calf Heath Wood;
 - Ditch / hedgerow past Gailey Magazine linking the Staffordshire and Worcestershire Canal and Calf Heath Wood; and
- Hedgerow running east to west in centre of Transect 4 including location of bat survey Point Count 4.11.
- 10.282 These commuting and/or foraging areas will be lost as part of the development in Zone A4 (based on the Parameters Plan – Development Zone Plan).
- 10.283 Removal of habitat features not identified as ‘key’ but forming part of the habitat network will take place in stages through the construction period, the result of clearance of 64% (192 ha) of the land for development will be long term or permanent. The permanent impact will be in areas proposed for infrastructure development. Areas where semi-natural habitat is to be created or enhanced, for instance in Community Park areas, will retain suitability for foraging and commuting bats but will, during the construction period be subject to a degree of isolation.
- 10.284 The FEMMP (Provided in Technical Appendix 10.4) includes commitments to deliver areas key to successful mitigation early in the development to allow these habitats to grow and mature and increase their functionality as habitat features during later development phases. These measures include:
- The creation of a 100 m wide ecological corridor strengthening the existing tree line between Calf Heath Wood and Calf Heath Reservoir which will be completed within 5 years of the commencement of the authorised development, or prior to commencement of development at Development Zones A4a or A4b, whichever is sooner;
 - The delivery of Croft Lane Community Park to be completed within 5 years of the commencement of the authorised development as ‘Core GI’ i.e. to be created and then safeguarded through future development phases;
 - Delivery of the southern part of Calf Heath Community Park to be completed prior to the commencement of development at Development Zones A4b and thereafter retained as ‘Core GI’; and
 - Enhancement and planting of the corridor running north from the southern part of Calf Heath Community Park to the retained area of Calf Heath Wood.
- 10.285 The removal of habitat features (namely hedgerows, trees and woodland) in the construction phase would lead to a reduction of available foraging habitat and fragment habitats, this has however been limited as far as possible. This is considered to be a direct, permanent adverse effect. Given consideration of the availability of large areas of equivalent habitat in the locality

suitable for foraging and commuting this is not considered significant at a scale greater than Local i.e. Gailey / Four Ashes scale. The effects predicted are not considered to be significant at a District i.e. South Staffordshire scale.

- 10.286 In summary, with the embedded mitigation measures in place the Proposed Development is likely to result in a temporary, adverse effect on the bat assemblage on or using the Site. This effect, when considering the application of the embedded mitigation and the conservation status of the bat assemblage (i.e. considering legal implications separately) is considered to be significant at the Local scale. Whilst not significant beyond the Local scale, removal of roosts, disturbance of the roosts and habitat fragmentation detailed above would be in contravention of legislation and would require an EPSML from Natural England. A ‘Letter of no Impediment’ stating that Natural England see no impediment to a licence being issued should the DCO be granted has been received from Natural England.

Badger

- 10.287 Appendix 10.2 – Confidential Badger Report presents embedded mitigation measures and the impact assessment with respect to badgers in the demolition and construction phase.
- 10.288 There would be direct impacts on eight badger setts if they are shown to be active at the time of construction – to be ascertained by pre-construction surveys (as defined under the FEMMP).
- 10.289 Appropriate control measures are defined in FEMMP to mitigate potential for impacts to badger during construction e.g. covering excavations / providing mammal ramp(s).
- 10.290 The badger population on-site was found to be of value at the Local Scale. No significant impacts to this population are predicted from construction effects due to the designed in measures and standard procedures that will be applied during construction.

Otter

- 10.291 Approximately 1.6 km of the Staffordshire and Worcestershire Canal is directly adjacent to the Site. The Proposed Development includes the provision of a new road bridge crossing the canal. Otters are largely nocturnal, and significant night-time construction activity is not anticipated. The FEMMP details measures to minimise disturbance including control of normal working hours which will be limited to 07:00 to 19:00 Monday to Friday and 07:00 to 13:00 on Saturday, except for emergency works or where agreed with South Staffordshire District Council (SSDC). No potential otter holts or resting places were identified during the Site wide surveys, and the woodland that form the habitat adjacent to the canal in the south and tree lines adjacent the wider canal will be retained. Therefore, direct disturbance impacts are not likely to occur.
- 10.292 Indirect habitat loss, vegetation clearance and movement/storage of materials will constitute indirect disturbance during the construction period since they could inhibit otter activity, effectively leading to fragmentation of otter habitat, as discussed below.
- 10.293 Given the sensitivity of otters to changes in their environment, construction activities could result in loss or fragmentation of otter habitat, which has potential to affect breeding success if the otters’ home ranges are compromised. The 0.82 ha of existing woodland to the west of the canal in the northern part of the Site (section north of Gravelly way, within the proposed Croft Lane Community Park) and the 1.1 ha of existing woodland at the south of the site (south of Straight Mile, within the proposed Calf Heath Community Park), which are suitable for otter resting places, will be retained and additional areas of woodland will be planted within approximately 150 m of the canal to provide greater linkage and habitat provision. The other habitat types up to 150 m from the canal, which are currently arable fields, semi-improved grassland, or improved grassland will also be enhanced and will provide SuDS water features capable of holding water and potentially supporting otter prey species (though no stocking is proposed). Therefore, there is considered to be a small net gain in suitable habitat, leading to a beneficial effect of habitat change for otter that is not significant at the Local scale.
- 10.294 Further indirect effects may occur through disturbance caused by traffic movements, construction noise and earth movements. The existing risk of road traffic casualties for otter

within the Site is considered to be low due to the lack of formal roads. There are a number of roads that border and surround the Site which present an existing collision risk, evident by road traffic accident observations within 2 km (two out of 31 records of otter were fatalities). It is noted that there was a road traffic casualty on the A449 (850 m north of the Site) in 2013, it is not known whether the otter that was killed held a territory that extended to the Site, but the otter print observed on the northern Site boundary in 2017 indicated that otters persist in the area. The construction phase of the Proposed Development is anticipated to generate additional vehicle journeys. Construction journeys will be mostly be limited to daytime working hours and will be operated at a speed limit suitable for a safe working site, and are therefore unlikely to endanger otters.

- 10.295 Risks to otter will be controlled through the implementation of the FEMMP. This includes measures to inform site staff of potential otter presence, ensure excavations are capped or have means to prevent trapping animals, and to mitigate the noise levels on-site.
- 10.296 Overall, with embedded mitigation in place (including the FEMMP), the adverse effect on otters of construction would not be significant at the District or any other scale.

Other Mammals

- 10.297 Polecats and hedgehogs are mainly nocturnal, so daytime construction works are unlikely to disturb or harm these species while they are active. Harvest mice are also mostly nocturnal but may be active during the day in the summer. Potential permanent construction impacts may occur if daytime resting sites for polecats, hedgehogs and harvest mice are disturbed or destroyed. Mammals are likely to rest and disperse along the more prey-rich and vegetated field boundaries, ditch banks and woodlands rather than across cropped arable areas. Therefore, clearance of these habitats presents the most likely risk of disturbance. Without mitigation, there is potential for disturbance, due to the severity of the potential change (killing or injury and loss of resting place) this is considered to be an effect of moderate magnitude. However, the FEMMP will set out measures which will be adopted throughout the construction period to reduce the likelihood and severity, such as: checking of field margins, ditch boundaries and woodland for these species and, if present (and necessary if animals do not leave the working area of their own accord), moving any animals encountered out of the working area to be placed in suitable cover in a safe area or allowing them to leave the works footprint. As such, a significant adverse effect is not considered likely due to reduced severity (i.e. movement instead of destruction) and reduced likelihood of harm as a result of the procedures that will be implemented.
- 10.298 Habitat fragmentation and loss may occur through the construction of roads, and species such as polecat may suffer from loss of prey habitat or deterrence from the works footprint. However, due to the high carrying capacity/suitability of the wider landscape and the areas to be retained, as well as the mobility of polecat (therefore higher adaptability), this species is predicted to tolerate the changes to the landscape. Hedgehogs are particularly sensitive to road creation as these create barriers and can lead to mortalities. The frequency of mortalities is related to the volume of traffic⁵², which is anticipated to have a low severity during construction given their mainly nocturnal behaviour. The extent of the new road infrastructure and improvements do not overlap with the areas in which hedgehogs were observed, therefore the likelihood of the barrier and road accident effect is reduced, but the extent remains high as it will occur over the majority of the Site and changes will be permanent.
- 10.299 The field margins, hedgerows and dry ditches, and cereal crops are considered suitable habitat for harvest mouse, though limited to narrow linear strips on field margins. Grass cuts in late summer and the intensive farming limit the quality of habitat present on-site. Similar quality habitats are prevalent throughout the region, although those on Site are bounded by linear features such as roads, the railway and the canal which present significant barriers to harvest mice movement and fragment the habitats on Site, lessening their value. Since the likely absence of harvest mice on Site cannot be ruled out, the species is assumed to be present.

Due to the habitats on Site presenting similar or lesser value to those throughout the region, it is considered that no significant concentrations of harvest mouse are likely to occur within the Site compared to the wider region and national range. Harvest mice on-site could be killed or injured during removal of vegetation or ground works, however, with the exception of works to remove hedgerows and field boundaries this is not dissimilar to land management that occurs in the baseline situation. Given that the Proposed Development will be phased and retention of areas of habitat, notably Croft Lane Community Park mean that habitats suitable for this species will be present on-site during all phases of the development and harvest mice will be able to persist on-site.

- 10.300 The overall adverse effect to polecats, hedgehogs and harvest mice is considered to be not significant at the Local scale.

Operational Development

- 10.301 The operational phase of the Proposed Development is expected to generate a range of potential significant direct and indirect ecological impacts, with likely permanent effects.

Belvide Reservoir SSSI

- 10.302 Belvide Reservoir SSSI is outside of the 2 km study area for nationally designated sites. However, the potential for air quality impacts to arise as a result of increased vehicular traffic in the operational phase has been assessed.
- 10.303 The 2021 modelling assessment predicted a change in annual mean NO_x concentrations of less than 1% of the 30 µg/m³ Critical Level at all modelled locations at Belvide Reservoir SSSI. The impact of the Proposed Development is therefore classed as insignificant during 2021.
- 10.304 The 2028 and 2036 modelling assessments predicted a change in annual mean NO_x concentrations of greater than 1% of the Critical Level for 10 m across the assessed transect. The habitats within 10 m of the road are unlikely to be sensitive to changes in air quality comprising hedgerows and a semi improved grassed bund. As such, despite a change greater than the Critical Level this is still considered to be classed as insignificant. In addition, the modelling has shown that overall concentrations in NO_x are predicted to fall at all receptor locations between the base year and the completion of the scheme in 2036.
- 10.305 In all years the Proposed Development would result in a change in nutrient nitrogen deposition of more than 1% of the Critical Load. This impact is predicted to occur within 5 m of the carriageway in 2021, 15 m of the carriageway in 2028 and 20 m of the carriageway in 2036. The habitats in the SSSI present within 20 m of the A5 equate to approximately 0.3 ha or 0.3% of the total area of the SSSI.
- 10.306 The majority of the SSSI is open water and is designated because it is relatively undisturbed and provides a secluded refuge for waterbirds. The mixing and dilution across the large waterbody that is already exposed to traffic exhaust means any small incremental additional air quality effects are unlikely to significantly affect the ecological structure or function of the SSSI. Any limited changes to the water chemistry in the reservoir from air quality effects are unlikely to affect the ability of the site to support the waterbird interest for which it is designated. As a consequence, a significant adverse effect at the National scale is unlikely.

Doxey and Tillington Marshes SSSI

- 10.307 Doxey and Tillington Marshes SSSI is outside of the 2 km study area for nationally designated sites. However, the potential for air quality impacts to arise as a result of increased vehicular traffic in the operational phase has been assessed.
- 10.308 The modelling assessment predicted a change in annual mean NO_x concentrations of less than 1% of the 30 µg/m³ Critical Level at all modelled locations at Doxey and Tillington Marshes

⁵² Spinozzi F, Battisti C, and Bologna M A. (2012) Habitat fragmentation sensitivity in mammals: a target selection for landscape planning comparing two different approaches (bibliographic review and expert based). *Rend. Fis. Acc. Lincei*, **23**, 365-373

SSSI in all years (2021, 2028 and 2036). The impact of the Proposed Development is therefore classed as insignificant.

- 10.309 In 2021 (and modelling years 2028 and 2036) the Proposed Development would result in a change in nutrient nitrogen deposition of less than 1% of the Critical Load at Doxey and Tillington Marshes SSSI. The impact of the scheme on this location can therefore be classed as insignificant in all years. The predicted impacts of changes in acid nitrogen deposition are less than 1% of the Critical Load at Doxey and Tillington Marshes SSSI under all three assessment years.

Gailey Reservoirs LWS

- 10.310 Gailey Reservoirs LWS is predominantly designated for its water bird interest and for the purposes of this assessment this is the focus (see 10.200). Effects on breeding birds of woodland and scrub (habitats present in the LWS) are therefore dealt with in the bird section.
- 10.311 The operational phase would involve rail freight and warehousing operations and associated disturbance. Noise predictions presented in Chapter 13 (Noise and Vibration) include modelled results at six locations in Calf Heath Reservoir and twelve locations within Gailey Lower and Upper Reservoirs. A maximum daytime increase of up to 3 dB LAeq,T is predicted at the bank nearest the Proposed Development at Calf Heath Reservoir. A maximum night time increase of up to 2 dB LAeq,T is predicted at the southern end of the reservoir. Baseline day-time noise levels at Calf Heath Reservoir are around 52 dB LAeq,T (which may already affect breeding density or success).
- 10.312 Certain bird species present (but not all) will, to a degree become habituated to the operational phase noise. There is sufficient habitat resource available across the three reservoirs to allow wintering water birds to temporarily move to less disturbed areas in the locality i.e. Gailey Upper and Lower Reservoirs from Calf Heath Reservoir in response to disturbance events. The wintering birds present likely use the three reservoirs in the LWS as well as other waterbodies in the vicinity over the course of a season dependent on local prevailing conditions and disturbance events, and this network of local foraging/roosting/loafing sites would all be available in the operational phase.
- 10.313 The proposals include removal of a line of pylons and high voltage overhead lines running approximately north-south to the west of Calf Heath Reservoir (the 'Electricity Pylon Works'); whilst the existing effect of collision by birds with these overhead lines has not been quantified, their removal would remove this existing hazard to birds arriving at or leaving the LWS from/to the west, (notably larger birds such as herons and geese).
- 10.314 A maximum daytime increase of up to 1 dB LAeq,T is predicted across the Gailey Lower and Upper Reservoirs. A maximum night time increase of up to 1 dB LAeq,T is predicted in the same locations. Baseline day-time noise levels at Gailey Lower and Upper Reservoirs are 52 dB LAeq,T in the baseline situation. As such, and given their distance away and existing proximity to the noisy and busy M6, disturbance effects from noise in the operational phase are considered unlikely in these parts of the LWS and on features such as the Heronry there (no change in noise levels during the day and +1dB at night).
- 10.315 No disturbance from visual effect of Site activity (rail freight and warehousing operations) is anticipated at any of the three reservoirs. Calf Heath Reservoir is well screened in the most part by woodland which is to be retained and a proposed noise bund and Gailey Lower Reservoir and Gailey Upper Reservoir are the far (eastern) side of the M6 with no direct lines of sight present.
- 10.316 Disturbance in the operational phase is considered likely to partially disrupt bird activity at Gailey Reservoirs LWS.
- 10.317 The operation of the developed Site will not affect the structure or function of the habitats present because drainage will not connect to the LWS and activity will be restricted to within development areas. There will be disturbance to wintering birds, but the conservation status

of these species is unlikely to be affected due to their mobility throughout the Site and use of other sites in the vicinity. Breeding bird success may be affected in a small proportion of the margins of Calf Heath Reservoir where water birds would breed in the LWS where noise levels are elevated by Site operations but this is in the context of existing noise and pressures from sailing activities and fishing which mean that this reservoir is rarely visited by birdwatchers⁵³ (presumably because the disturbance leads to lower numbers of birds being present than at the other Gailey Reservoirs). The breeding bird survey carried out in 2017 has established that breeding waterbirds are present around the closest margins of Calf Heath Reservoir to the Site, but noise calculations predict an increase of +1dB during the day across the reservoir and the same increase at night in all parts of the reservoir except the southern end which would experience a +2dB increase. A 1dB increase is likely to be barely detectible to birds and an increase of 2dB is not predicted to compromise the ability of birds to nest in the LWS, given the baseline levels of 52dB already experienced.

- 10.318 An adverse operational impact on the Gailey Reservoirs LWS significant at the county scale (or any other scale) is unlikely.

Calf Heath Bridge LWS

- 10.319 The Water and Flood Risk Chapter of this ES (Chapter 16) provides designed in details of treatment measures to ensure adequate treatment of discharges from the Proposed Development. No direct impacts are anticipated as all plots will have a security fence installed around their boundary prior to operation starting to prevent operational activities spreading beyond the plots. With these measures in place Chapter 16: Water and Flood Risk concludes that there is no significant effect on water quality or habitats on the Staffordshire and Worcester Canal. As a result, it is certain that there would be no significant adverse effect on the Calf Heath Bridge LWS at the County scale.

Other LWS Sites

- 10.320 A direct or indirect adverse operational impact on the following LWS significant at the county scale (or any other scale) is considered extremely unlikely due to their distance away from the Site and/or intervening land use:
- Somerford Wood;
 - Land at Four Ashes;
 - Watling Street Plantation;
 - Crateford Wood;
 - Gailey Old Reservoir;
 - Pennymore Hay Farm;
 - Boggs Marsh;
 - Water Eaton Coppice;
 - Rodbaston Wood;
 - Hatherton Bridge; and
 - Deepmore Farm.

Habitats

- 10.321 In operation, the Site would have two broad land uses as far as ecology and nature conservation is concerned: built environment and the green infrastructure/Community Park areas of soft landscaping.
- 10.322 A greater range of habitats would be present in the operational phase, notably there would be no net loss of grassland and that present would be more diverse and species rich creating lowland meadows. The bulk of this compensatory habitat would be provided within Croft Lane Community Park which previously comprised arable fields. Existing improved grassland within

⁵³ West Midland Bird Club [Online] Available at: <http://www.westmidlandbirdclub.org.uk/gailey-reservoirs/4592781544> [Accessed 13/12/2016]

Calf Heath Community Park would be enhanced (increased species diversity, removal of grazing pressure and nature conservation management) and woodland would be more evenly distributed across the Site. There would be substantially more open water, notably in the Community Parks. A mitigation commitment is made in the FEMMP that all retained and created habitat on the Site will be managed sympathetically to maximise and maintain the habitat value.

- 10.323 Lighting and noise would not affect habitats and all plots will have a security fence installed around their boundary prior to operation starting to prevent operational activities spreading beyond the plots as defined in the FEMMP provided in Technical Appendix 10.4. Therefore, there would be no direct effects on habitats in the operational phase.
- 10.324 There would be emissions to air from vehicles using the new facility in operation, and vegetation can be vulnerable to changes in air quality, however none of the habitats in the vicinity of the Site are particularly susceptible to air quality effects and it is not predicted that air pollution would affect the integrity or composition of any retained, enhanced or created habitats.
- 10.325 The workers on the Site could use the Community Parks in their breaks or before and after shifts (and local residents could also use the parks) and as a result there would be recreational pressures on habitats including grassland, hedgerows, individual trees, woodland and standing water.
- 10.326 It is envisaged that the Community Parks would have marked and maintained paths and most users would be expected to remain on these paths, such that the effects of erosion and littering would be limited, and restricted to the immediate vicinity of the paths.
- 10.327 There may be litter that builds up in the areas of green infrastructure or community parks in the operational phase, either from users of the Community Parks dropping it, or from being blown in from operational parcels of the development. Litter accumulation may locally limit the functionality of habitats though bins would be provided.
- 10.328 Areas of development (Zones A1-A7, Zone B and Zone C as per the Parameter Plans) would be designed with standard pollution prevention measures included, such that spills are retained by appropriate attenuation facilities with suitable interceptors or equivalent alternative biological treatment measures and water quality in discharged water is of permissible standard. These measures are secured via the FEMMP as provided in Technical Appendix 10.4. On this basis no significant adverse operational phase effects on surface or groundwater that could affect nearby habitats is predicted.
- 10.329 Overall, there would be no significant adverse effect on habitats of value in the local context in the operational phase, particularly when taking the provision of new and enhanced habitats into account. Nonetheless there would be effects on habitats and mitigation measures are proposed in the relevant section.

Species

Amphibians

- 10.330 The operational phase of the Proposed Development will, in the absence of mitigation, lead to permanent effects including potential amphibian death/injury from traffic using the new road infrastructure. The existing roads to the north and west (the A5 and the A449) already constitute a barrier to amphibian movement; this is not considered to change in the operational phase as a result of the Proposed Development. The distribution of traffic on local roads is predicted to alter as a result of the Proposed Development. Heavy goods vehicle (HGVs) and associated journeys from users of the Proposed Development will account for a predicted increase in vehicles on the A5 east of the proposed link road junction and a predicted reduction of vehicles using the A5 west of the proposed link road junction. Similarly, an increase in vehicles is predicted on Vicarage Road to the east of the proposed new road link but no change from the baseline scenario is predicted to the west of the new road link. The increase in road traffic and road infrastructure on-site represents a notable change in the

current baseline conditions within the Site being a largely undeveloped area at present. The potential for habitat fragmentation and risk of collision was recognised and mitigation has been embedded to allow amphibians to move through the Site, namely the provision of ecological corridors linking new and retained habitats, specification of amphibian friendly gully pots, ladders and amphibian wildlife kerbs across the Site to prevent trapping amphibians and wildlife crossings at interfaces of roads and key areas of blue / green infrastructure. These measures are designed to allow the movement and dispersal of amphibians throughout the Site and promote population growth and are secured via the FEMMP provided in Technical Appendix 10.4.

- 10.331 The operational development will feature two Community Park areas with terrestrial habitats including rough grassland/wildflower meadow areas and further creation of habitat areas suitable for amphibians. These include wooded areas, hedgerows and hibernation habitat as embedded mitigation for habitats lost as a result of the Proposed Development. Embedded mitigation includes retention of waterbodies where possible and provision of permanent and ephemeral surface water features (for attenuation but also of biodiversity value) providing 'stepping stones' across the Site. New ponds will be provided as compensation for any ponds lost as a result of the development and a minimum of 10 waterbodies will be provided as enhancement whereby the primary aim is to increase biodiversity and offer suitable breeding habitat for GCN. Ponds will include a range of depths, bank profiles, aquatic planting suitable for egg laying and shade regimes. These created landscape features will be designed to provide areas for shelter and foraging on-site and make a cohesive habitat suitable for amphibians. These will be in contrast to the often ephemeral/poor quality ponds with little or no aquatic vegetation that are currently found on Site. While these areas will be enhanced to provide replacement for lost habitat including waterbodies, they will also be attractive areas for local residents and people who work in the Site. This will increase recreational pressure on amphibians in the area where there was previously little to no public access, however, this is unlikely to affect the conservation status of the species as amphibians are generally less active and seek refuge during daylight hours when the parks would be busiest. Footpaths will be provided to help manage visitor pressure and areas of the parks will be designed to be separated from publicly accessible areas e.g. by hedgerows. No lighting is proposed within the park areas.
- 10.332 The FEMMP provided in Appendix 10.4. provides detail of additional embedded measures to mitigate the impacts of the Proposed Development on amphibian populations including; careful design of development plots to separate areas posing potential hazard to amphibians from areas of mitigation e.g. ponds and high quality terrestrial habitat and managing areas of retained (and new) habitats sympathetically for the benefit of wildlife including amphibians e.g. management of the retained portion of Calf Heath Wood and undertaking landscape maintenance in sensitive habitats at times of year to avoid direct impacts on amphibians. The FEMMP makes provision for future plot specific EMMP to highlight any particular ecological constraints from amphibians or particular considerations required to ensure legal compliance and that impacts on amphibians are avoided.
- 10.333 Overall, the operational phase of the Proposed Development will lead to a permanent change in the nature of the Site from a mainly undeveloped area into one being dominated by built environment with associated traffic and disturbance. However, the embedded mitigation measures proposed ensure the continued permeability of the Site for amphibians with a significant increase in areas of standing water and ephemeral ponds providing a connective ribbon through the Site and the specification of measures to limit so far as is possible potential conflict between amphibians and the built environment so as to not add to the vulnerability of a what was identified to be a small amphibian population in the local area. Consequently, no significant adverse effects are anticipated in the operational phase.

Birds

- 10.334 The replacement of a landscape dominated by open fields and hedges with one dominated by built environment and associated activity will affect the birds that the Site can support. The FEMMP provided in Appendix 10.4. provides detail of provision of nestboxes for a range of

building nesting species and species of woodland and scrub; in addition, the soft landscaping in the Site (particularly in the Croft Lane and Calf Heath Community Parks, the former of which would be created early in the development (completed within 5 years of the commencement of the authorised development) and is designed to be of benefit to nesting and foraging birds, with a range of habitats retained, enhanced or created.

- 10.335 A greater range of habitats would be present in the operational phase, notably there would be no net loss of grassland and that present would be more diverse, species rich grassland creating lowland meadows and woodland would be more evenly distributed across the Site. There would be substantially more open water, notably in the Community Parks which would be of benefit to a range of bird species potentially including snipe, mallard, lapwing and lesser black-backed gull. The large warehouse roofs may be attractive for nesting to gulls associated with the nearby reservoirs; it is possible that the Amber List lesser black-backed gull (or Red List herring gull *Larus argentatus*) could nest on the Site, the former nests on industrial buildings throughout the region and the latter having first been confirmed nesting in Staffordshire in 2013 (on an industrial building) and nesting more widely in Birmingham and Wolverhampton⁵⁴.
- 10.336 Some species of conservation concern such as starling (which isn't common on-site in the breeding season) and house sparrow are likely to benefit from the new nesting and foraging opportunities presented, along with species such as house martin, swift and pied wagtail. A further range of commensal species such as collared dove, feral pigeon and general species of woodland and scrub would find suitable breeding habitat on the Site.
- 10.337 The increase in surface water on the Site will complement similar habitats in the Gailey Reservoirs and Belvide Reservoir designated sites and provide stepping stone habitat between these sites east and west of the Proposed Development. As discussed in paragraph 10.313, the removal of an overhead power line would remove this existing hazard to birds from the Site in the operational phase.
- 10.338 These factors are likely to increase the resilience of the designated sites and the abundance and distribution of waterbird species such as snipe and the Amber List mallard in the local context, because it is expected that such birds would use the resource in spite of operational disturbance effects of the scheme. New open water may also be used by other species such as lapwing.
- 10.339 A key effect is that most of the County value assemblage of birds of open farmland (skylark, yellow wagtail, lapwing, yellowhammer, linnet, bullfinch and reed bunting) are unlikely to be able to breed or spend winter on the Site in the operational phase due to the removal of suitable open areas in the construction phase and creation of more mixed habitat intended to be of benefit for a range of species in the Community Parks. The Community Park areas may support breeding or wintering yellowhammer, linnet, bullfinch or reed bunting but arable land is not the focus of these areas and therefore this is not certain. House sparrow is considered in Paragraph 10.336.
- 10.340 The operational phase would involve rail freight and warehousing operations and associated disturbance but it should be noted that bird activity across a large proportion of the Site is likely to be influenced by the existing noise and visual effects from the railway line, A5, A449 and M6. Landscaping bunds form part of the designs acting to screen areas such as along the canal from noise and visual disturbance and that habitat in water features would be somewhat screened by low points in topography in which they would sit, but habitat facing operational areas in areas not screened by bunds would be subject to noise, visual disturbance and lighting effects. Noise predictions presented in Chapter 13 (Noise and Vibration) include increases of up to 12 dB LAeq,T (between Zones A4(a&b) and A5 (a&b)) although of 25 points across the Site, four would experience an increase of more than 3 dB during the day and 10 would experience the same increase at night.
- 10.341 The area around the canal and Croft Lane Community Park would experience increases of up to 6 dB during the day and up to 12 dB at night (increases around Calf Heath Reservoir LWS

are considered in Paragraphs 10.310 onwards). This is in an area where baseline noise levels are around 45 dB LAeq,T in the baseline situation.

- 10.342 Calf Heath Wood (including the portion in the Bericote Development land) would experience increased noise levels of up to 10 dB more at night, with all daytime levels in excess of 49 dB, although the presence of woodland species in similar habitat along the already noisy A449 west of the site (53dB in the baseline) demonstrates that such species can tolerate noisy habitat in this location; Calf Heath Wood in the operational phase (including the retained portion in the Bericote Development) would still be a large block of woodland in the context of the surrounding area.
- 10.343 The operational areas of the Site (Zones A1-A7, Zone B, Zone C and new roads as per the Parameter Plans) would be lit to facilitate operations and this is in contrast to the largely unlit character of the Site in the baseline conditions. A Lighting Strategy and Lighting Impact Assessment has been produced (Technical Appendix 12.8 and has been developed to embed mitigation). The mitigation section of that strategy details the principles of the lighting strategy and specific measures taken in relation to ecologically sensitive areas.
- 10.344 The retained habitat areas would be managed for the benefit of wildlife including birds according to the FEMMP and so it is difficult to predict the net result on breeding for species of woodland and scrub of increased noise, but improved habitat quality. It is likely that species of such habitats including those of conservation concern such as dunnoek, song thrush, mistle thrush, willow warbler and stock dove would continue to breed, although onsite populations would likely be reduced.
- 10.345 Overall, and in the absence of mitigation, the operational phase effects on the County scale assemblage of farmland birds would not be significant (removal of arable fields and their margins in the construction phase having removed suitability for most species). The operational effects, notably noise on the other important bird species would be offset by removal of severance effects, habitat improvements or habitat creation within the Site (focussed in the Community Parks and notably including significant open water features). Adverse effects for birds of woodland and scrub would be significant at the Site scale (i.e. not significant at the Local level), but given the habitat improvements and long-term management for biodiversity that would occur in water features on the Site there would be a significant beneficial effect on water birds at the Local level. There would be no significant adverse effect on birds nesting on buildings which would have nesting provision provided.

Invertebrates

- 10.346 The existing habitat and the invertebrate fauna of the Site would be removed in the construction phase with the exception of those retained habitats such as the southern extent of Calf Heath Wood, habitats in the Croft Lane and Calf Heath Community Parks, retained ponds individual mature / over mature or veteran trees. The retention of these areas enables an invertebrate assemblage to persist.
- 10.347 The Proposed Development includes the provision of habitats of value as a foraging resource for invertebrates such as extensive areas of rough grassland/wildflower meadow, standing deadwood in ecological corridors, ponds and deadwood (log piles) hibernacula provided for amphibians and reptiles in the Community Parks and in green infrastructure corridors.
- 10.348 The FEMMP will provide the mechanism for ensuring these areas of habitat creation are managed in the long term to prevent the natural succession of habitats away from the nectar rich wildflower of value to invertebrates. These measures will ensure the value of the habitats created for invertebrate species is maintained.
- 10.349 The future safeguard and management of habitats (created in the construction phase) for the benefit of invertebrates in the operational phase would lead to an improvement in habitat interest and value resulting in a long term, beneficial effect significant at the Local scale (given the dominant arable and improved grassland habitats in the landscape).

⁵⁴ West Midland Bird Club (2016) The Birds of Staffordshire, Warwickshire, Worcestershire and the West Midlands 2013

Bats

10.350 The impact assessment presented in this section has taken account of the embedded mitigation measures being provided as detailed in the Embedded Mitigation Section of this Chapter and as secured via the FEMMP provided in Appendix 10.4.

Roosting Impacts

10.351 Natural roosting resource will be retained in part in the operational phase and supplemented by artificial roosts (bat boxes and retained building enhancements). Blocks of woodland and individual trees suitable to support bat roosts (or with the potential to support bat roosts in future) will be retained. Where new roosting provision (bat boxes) become occupied there is potential for disturbance, however, this will be limited by the careful siting of bat boxes within areas of green infrastructure. Bats using the bat boxes would choose to do so in the prevailing conditions and as such any potential for disturbance is not considered to be significant. Retained buildings such as the proposed Estate Management Offices/Amenity and Welfare Facilities adjacent the canal at Gravelly Way (presently, The Farmhouse, The Barn and The Stables) will be modified and enhanced to provide enhanced roosting opportunities and bat boxes will be provided on retained trees (in woodland or individual trees with good connectivity) of sufficient maturity. These measures are detailed within the FEMMP and will be secured as part of the EPSML. All species recorded as roosting on Site (Common pipistrelle, soprano pipistrelle, Daubenton's, natterer's and brown long-eared bats) will use bat boxes. Indeed, all species recorded as present (but not roosting) on Site will use bat boxes to a greater or lesser extent with the exception of serotine which was recorded in low numbers. The embedded mitigation of enhancing the proposed Estate Management Offices/Amenity and Welfare Facility buildings (notably the Farmhouse) will enhance the suitability of the roost resource on-site for this species in the operational phase. These provisions will ensure adequate long-term provisional of roosting resource in the operational phase for the range of bat species present.

10.352 The seven roosts located off-site but within 100 m of the Site boundary have potential to be affected during operation:

- Calf Heath Wood Birch 1 – A summer day roost for Daubenton's approximately 80 m west of the Site;
- Calf Heath Wood Birch 2 – A summer day roost for Daubenton's approximately 20 m west of the Site;
- Woodview Cottage – A maternity or satellite roost for brown long-eared approximately 20 m south of the Site;
- Stable Lane Building Roost 13 – A summer day roost for brown long-eared approximately 25 m east of the Site;
- Tree Roost 15 – A maternity roost for noctule bats approximately 40 m south of the Site;
- Tree Roost 10 – A night roost for whiskered/brandt's approximately 45 m south of the Site; and
- Tree Roost 9 – A summer day roost for Daubenton's bat approximately 90 m south of the Site.

10.353 For the purpose of this assessment the two Daubenton's summer day roosts identified in Calf Heath Wood (Calf Heath Wood Birch 1 & 2) are considered together. The potential for roost abandonment was identified in the assessment of construction phase impacts when considering construction disturbance effects in conjunction with habitat modification in the vicinity of the roosts. Should these roosts persist into the operational phase, in the absence of mitigation there is potential for significant adverse effects from disturbance including lighting and to a lesser extent noise. As detailed in the assessment of lighting impacts below and as shown on Figure 10.003 of the ES, the location of the two Daubenton's tree roosts in Calf Heath Wood would be located within a dark corridor. No light spill is anticipated at the roosts. The average predicted increase in day time noise in this part of the wood is 4 dB LAeq,T and predicted night time increases of 7 dB LAeq,T. Given the locally abundant population of

this species and the plentiful availability of alternative roost locations in the study area a significant effect is predicted at a Local scale.

10.354 The Daubenton's summer day roost (Tree Roost 9) is near the Site boundary but the roost is located approximately 500 m from any of the proposed built environment. The core foraging area for this individual was along the canal beyond the south of the Site and over/in adjacent woodland in the canal corridor. The enhancements proposed in Calf Heath Community Park including woodland and areas of standing water would provide additional foraging habitat for this species contiguous with that shown to be used in the baseline situation. There will be no lighting impacts in this location. The nearest noise receptor is located north of Straight Mile and small predicted increases are shown here (1 dB LAeq,T day time and 2 dB LAeq,T night time), these are not considered to be significant at the roost. Given the distance of the day roost from the Proposed Development and the habitats identified as being used for foraging being off-site proximal to areas to be enhanced to form Calf Heath Community Park, a significant effect on this population of Daubenton's bats is not considered likely at a District or any other level during operation.

10.355 The brown long-eared maternity or satellite roost at Woodview Cottage is already subject to a degree of disturbance from traffic in the baseline scenario and also from building occupiers. Noise impacts in the operational phase are not considered likely to affect the roost in this location, increases of 1 dB LAeq,T are predicted (day and night). Radio tracking has shown use of habitats in areas to the south of the roost over the canal and this population is not considered to be solely dependent on habitats within the Site. Whilst habitats on-site will change from being arable dominated to buildings and hardstanding, key green infrastructure links are included in the Parameter Plans which will provide foraging resource. The roost is opposite the land identified for enhancement as part of the Bericote Development and proximal to the green corridor between development Zones A5 and A6 in the existing location of Woodside Farm. This will maintain connectivity with retained elements of Calf Heath Wood and Croft Lane Community Park / the canal and towards Calf Heath Reservoir. The roost is directly adjacent the proposed Calf Heath Community Park which will be enhanced with a greater diversity of habitats suitable for foraging (including surface water features) than present in the baseline scenario. The brown long-eared roost identified in a house on Stable Lane (Stable Lane Roost 13) would not be subject to any increase in lighting and small increases in noise (1 dB LAeq,T day time and 2 dB LAeq,T night time). The adult male tracked from this roost was recorded foraging over the woodland block in the east of the Site off Woodlands Lane and over paddocks and gardens with mature trees east of the Site near to the roost. The habitats shown to be used for foraging by the adult male will be retained and enhanced within Calf Heath Community Park. The Community Parks will not be subject to any lighting and no increase in lighting levels will be experienced in these locations. As such, a significant effect on these populations of brown long-eared bats is not considered likely at a District or any other level.

10.356 The noctule maternity roost (Tree Roost 15) is located approximately 500 m from the nearest proposed built environment. The juvenile female individual was shown to have a large range and was recorded at a further maternity roost in a tree in Somerford approximately 1400 m to the west of the Site. The key foraging areas for this individual were over arable fields and plantation woodland next to the River Penk near Somerford, over woodland and arable fields over Saredon Brook to the immediate south of Four Ashes Industrial Estate, over the canal and woodland south of the Site in close proximity to the maternity roost and within the western portion of Calf Heath Wood. There will be no lighting impacts in this location. The nearest noise receptor is located north of Straight Mile and small predicted increases are shown here (1 dB LAeq,T day time and 2 dB LAeq,T night time), these are not considered to be significant at the roost. Given the distance of the maternity roost from the operational development and the large geographical extent of habitats used for foraging (most occurring off-site or in proximity to the proposed Community Parks), a significant effect on this population is not considered likely at a District or any other level during operation of the Proposed Development.

10.357 The night roost for whiskered/brandt's (Tree Roost 10) is located approximately 240 m to the south of the nearest area of the operational Site subject to infrastructure development with

the intervening part of the Site forming Calf Heath Community Park. The breeding female individual was shown to have a large range and in addition to the night roost within 100 m of the Site boundary, two further roosts were identified via tracking; one in a house on Stable Lane, approximately 200 m east from the Site and the second in a house in Slade Heath, approximately 2.1 km south-west of the Site. The core foraging area for this bat was over Woodlands Lane and Stable Lane and over the south-east of the Site in what would be Calf Heath Community Park in the operational phase. There will be no lighting impacts in this location and habitats in this area will be enhanced as part of the Proposed Development. The second core foraging area for this bat was to the north of Vicarage Road in woodland to the east between Vicarage Road and Calf Heath Reservoir where the access track for the reservoir is located, an area of retained habitat where lighting impacts are not predicted. No lighting or disturbance impacts are expected at the roost given the distance from the operational part of the Site and the intervening habitats present. Given the distance of the night roost from the operational development and the large geographical extent of habitats used for foraging (most occurring off-site or in areas which will become community parks or be retained), a significant effect on this population of whiskered/brandt's is not considered likely at a District or any other level during operation of the Proposed Development.

10.358 In summary, no significant effects on bats roosting within 100 m of the operational development are considered likely at a District or any other level with the exception of the two Daubenton's Roosts within Calf Heath Wood which are predicted to be subject to a significant adverse effect at a Local scale (from disturbance effects).

Foraging Impacts

10.359 The operational phase presents a different landscape for bats to that present in the baseline scenario and the effect of the operational layout and features of the site are discussed in this section.

10.360 The Proposed Development incorporates two park areas, Croft Lane and Calf Heath Community Parks. These areas retain existing habitat features of value to foraging bats such as woodland blocks, hedgerows, standing water and add additional further structural planting and enhancements designed to deliver biodiversity gains in these areas including substantial areas of open water, species rich grassland, native woodland, hedges and scrub. Both Community Parks are adjacent the ecological corridor formed by the canal. The parks will deliver a greater range of habitats of value to foraging bats than currently present on-site e.g. intensively farmed arable fields with narrow margins albeit over a smaller area. Notable habitat enhancements include an increased number of standing water features which will provide an increased insect biomass in these areas. These features will be of particular value for species with strong habitat preferences for open water and riparian habitats such as Daubenton's and soprano pipistrelle. Other species known to forage over water as recorded on-site include Brandt's and natterer's. The retained and created habitat areas will be managed for the benefit of wildlife including bats in accordance with the FEMMP.

10.361 Woodland blocks are retained in the Community Park areas and other notable areas of retained woodland include the southern extent of Calf Heath Wood and existing plantation woodland adjacent Calf Heath Reservoir. Embedded mitigation measures include the provision of a 100 m ecological corridor linking these two areas of retained habitat. The corridor will comprise woodland and incorporate areas of standing deadwood from elsewhere on-site. The ecological corridor will be planted early in the development (to be completed within 5 years of the commencement of the authorised development, or prior to commencement of development at Development Zones A4a or A4b, whichever is sooner), by the time the development is fully operational would have matured over a period of approximately 10-15 years. Areas of woodland would be more evenly distributed across the Site in the operational phase and Calf Heath Wood would still be a large block of woodland in the context of the surrounding area. The canal and adjacent vegetation is retained and is situated adjacent the Community Parks where existing habitats will be strengthened with additional planting. The function and integrity of the canal for foraging and commuting bats is considered likely to be maintained.

10.362 The developed Site would include 'green corridors' incorporating retained habitat features and supplementary habitat features such as structured planting (woodland, hedgerows etc.) and standing waterbodies which will serve to link the larger contiguous areas of foraging habitat provided by the retained woodland and the Community Parks to valuable off-site habitat including Calf Heath Reservoir and the canal corridor. Key linkages include:

- Calf Heath Community Park to Calf Heath Wood and the canal and Croft Lane Community Park beyond and vice versa;
- Calf Heath Wood and Calf Heath Reservoir; and
- Maintenance of the canal corridor through Croft Lane Community Park and south of Calf Heath Community Park.

10.363 It is acknowledged that some of these corridors are intersected by roads. Specific bat hop-overs have been specified as embedded mitigation in five locations, illustrative details of these features are provided in the FEMMP. Lighting impacts at these intersections and more generally across the Site are discussed below. The connectivity of the habitats is reduced relative to the baseline scenario with the extensive network of interconnected hedgerows present. The reduction in habitat suitable for commuting and foraging bats will reduce the permeability of the Site moving from a wide network of interconnected features to specific corridors, linking key features but reduced in spatial extent. This is considered to be a direct, permanent adverse effect. Given the availability of large areas of equivalent habitat in the locality suitable for foraging and commuting and the provision of embedded mitigation this effect is not considered significant at a District scale (as the receptor is valued at) but is considered significant at a Local level.

Lighting and Noise Impacts

10.364 The operational phase of the Proposed Development has potential for disturbance effects on foraging and commuting bats as a result of lighting and noise.

10.365 A Lighting Strategy and Lighting Impact Assessment has been produced (Technical Appendix 12.8) and has been developed to embed ecological mitigation. The range of mitigation measures defined within the lighting strategy have enabled the following parameters to be used within the assessment of operational lighting impacts on foraging bats as shown in Figure 10.003 of this ES:

- No increase in lighting in Community Park Areas (Calf Heath and Croft Lane) as a result of the Proposed Development;
- The existing dark canal corridor will be maintained. No increase in lighting as a result of the Proposed Development; and
- Dark ecological corridors where lighting levels are below 1 Lux at ground level (shown by shaded areas on Figure 10.003 of this ES).

10.366 Figure 10.003 of the ES shows the locations of these parameters and should be viewed in combination with this assessment.

10.367 Lighting provided within the development plots to provide a safe working environment would have a detrimental impact on foraging and commuting for most species of bat identified as present within the study area. As such, embedded mitigation measures are proposed as detailed in Table 10.10 'Embedded Mitigation' to block unwanted light to minimise the potential for light spill from the development plots onto adjacent habitats including ecological corridors and Community Parks. This has been achieved as shown on Figure 10.003 of the ES. Species such as noctule, Leisler's, serotine and pipistrelle bats are known to swarm around white

mercury street lights (and metal halide) feeding on the insects attracted to the light⁵⁵. However, the slower flying broad winged species such as long-eared bats and *Myotis* species generally avoid street lights. This effect has potential to be compounded as insects have potential to be attracted to lit areas on-site from adjacent unlit habitats in the study area, thus potentially reducing prey availability for light avoiding species deterred from using (elements of) the Site. For some species of bats the presence of lighting will not preclude foraging and commuting though increased levels of artificial lighting within development plots has potential to increase avian predation of bats⁵⁶. Provision has been made for more light adverse species within the designated ecological corridors and Community Parks. Where ecological corridors are intersected by roads specific bat hop-overs are specified where lighting impacts are reduced as far as possible e.g. with specification of lower lighting columns. As detailed in Technical Appendix 12.8, detailed design of lighting in these locations will be devised with input from an ecologist and will be subject to approval under a DCO Requirement. Where crossings are present on adoptable roads non-standard arrangements may be used to effectively manage ecological sensitivities and arrangements will be put in place to ensure that it is maintained and continues to operate in accordance with the design intent.

- 10.368 The operational phase would involve rail freight and warehousing operations and associated disturbance. Landscaping bunds are proposed to screen areas such as along the canal from noise but the habitat on the face of any bunds facing operational areas or not screened by bunds would be subject to noise (and lighting) effects. Increases in night time noise have the potential to lead to reduced foraging and reduced foraging success for bats using the Site.
- 10.369 Noise impacts are more likely to affect gleaning bats such as brown long-eared which hunt using prey-generated sounds, which could be masked by anthropogenic noise.
- 10.370 An increase in footfall may be experienced along the tow path of the canal in the operational phase, for example people walking on their lunch breaks. This is not considered likely to affect the ecological function of the canal corridor with respect to commuting or foraging bats. Furthermore, the canal corridor would not be lit, and no increases in footfall after dark are anticipated.
- 10.371 The lighting and noise associated with the operation of the Proposed Development is, when considered with changes in habitats likely to give rise to a permanent adverse effect with respect to foraging and commuting bats. The embedded mitigation has reduced the effect predicted, noise and lighting is considered to present a significant adverse effect (reducing the spatial extent of suitable foraging and commuting habitat and altering prey availability) at a Local scale i.e. Gailey / Four Ashes scale. The scale of the effect is not higher because of the availability of large areas of equivalent habitat in the locality suitable for foraging and commuting and the embedded mitigation measures defined.

Collision Risk Impacts

- 10.372 The predicted traffic movements during the operational phase shall increase by approximately 135 vehicles on the A5 (west of the proposed link road junction), 2016 vehicles on the A5 (east of the proposed link road junction) 1103 vehicles on Vicarage Road (east of the roundabout serving the Proposed Development), 240 vehicles on Vicarage Road west of the roundabout serving the Proposed Development and 5 vehicles on Straight Mile in the operational phase. These figures relate to the 8 hour average between the hours of 23:00 and 07:00 when bats are generally active. These equate to a 3%, 59%, 204%, 49% and 5% increase respectively. Embedded mitigation measures within the Site have been included to reduce the risk of impact on bat populations from traffic associated with the Proposed Development. These include a site wide speed limit of 30 mph and hop-over vegetation at key interfaces of roads and ecological corridors. There are three proposed bat hop-overs on-site to maintain ecological corridors and two hop-overs spanning existing roads (Vicarage Road and Straight Mile) as shown on Figure 10.002 of the ES. Radio tracking of bats in the baseline

scenario showed bats crossing Straight Mile and Vicarage Road. None of the radio tracked bats were recorded crossing the A5.

- 10.373 In summary, the operational phase with embedded mitigation in place is likely to result in a permanent, adverse effect on the bat assemblage on or using the Site. This effect would be significant at the Local scale due to disturbance effects at the Daubenton's roosts in Calf Heath Wood, reduction in foraging extent, prey availability, permeability and increased risk of mortality as a result of traffic collision relative to the baseline situation. The measures provided will however ensure that the roosting resource at the Site is maintained and retains and incorporates habitats which can be used by foraging and commuting bats. The outline lighting design has demonstrated that lighting impacts can be controlled sufficient to ensure the functionality of landscape features e.g. ecological corridors. Whilst a significant effect is predicted, this is not considered to be at a District scale i.e. the South Staffordshire scale at which the receptor is valued. This is as a result of the Site remaining suitable for bats outside of the development plots, the plentiful availability of equivalent habitat within South Staffordshire and the results of radio tracking which have shown tracked species not to be solely reliant on the Site, being shown to use a variety of off-site habitats locally.

Badger

- 10.374 Appendix 10.2 – Confidential Badger Report presents the impact assessment with respect to badgers in the operational phase.
- 10.375 Permanent operational effects to badger include risk of road traffic accidents leading to badger death or injury and the predicted traffic movements during the operational phase shall increase by approximately 2016 vehicles on the A5 east of the new link road, 135 vehicles on the A5 west of the new link road, 1103 vehicles on Vicarage Road east of the link road, 240 vehicles on Vicarage Road west of the link road and 5 vehicles on Straight Mile. These figures relate to the 8-hour annual average weekday traffic between the hours of 23:00 and 07:00 when badgers are generally more active. These equates to a 59%, 3%, 204%, 49% and 5% increase respectively, though the bait marking survey found no evidence to indicate the clans range identified extend beyond the A5. There would also be increased human disturbance.
- 10.376 The Proposed Development includes the provision of mammal underpasses to allow the safe passage of mammals under roads. Four crossings are proposed within the Site. Three crossings provide links from Calf Heath Wood to the north, south and east and one is provided in the north of the Site adjacent the A5 under the new road link.
- 10.377 Disturbance by recreational users to the Community Parks during the day is not considered to affect nocturnal species and is also not considered further. The daytime use of the parks may introduce the risk of dog walkers and dogs being close to setts, however, badger are considered to be resilient to this and it is unlikely to affect their normal behaviour.
- 10.378 The adverse effect on badgers is considered to be significant at the Local scale, traffic has the potential to affect the abundance of badgers at the local scale through mortality effects. The bait marking survey found no evidence to indicate the clans range identified extend beyond the A449 or A5, however, it is considered likely that as the size of the clan territories is reduced as a result of the Proposed Development badgers are likely to seek to extend their territories which would involve crossing of these main roads. The population dynamics of the clans may differ in the operational phase, however, sett provision and habitat suitable for foraging would persist.

Otter

- 10.379 Permanent operational effects include potential traffic collisions on the new and existing roads as an increase in night-time vehicle movements are anticipated. Vehicle movements will, as far as possible be influenced via a Travel Plan as presented in the Sustainable Travel Strategy as an appendix to the Transport Assessment (Technical Appendix 15.1) e.g. encourage car

⁵⁵ Bat Conservation Trust and Institute of Lighting Engineers (2009). [Online] Available at: http://www.bats.org.uk/data/files/bats_and_lighting_in_the_uk__final_version_version_3_may_09.pdf [Accessed 22/12/2016]

⁵⁶ Stone, E.L. (2013) Bats and lighting: Overview of current evidence and mitigation guidance

sharing. The potential for traffic collisions on-site has been considered in the development of the design and embedded mitigation measures have been devised including provision of mammal underpasses in the key green corridors throughout the Site to enable the movement of otters from the canal to Calf Heath Reservoir and elsewhere where ecological corridors are intersected by roads. The new through-road requires a new bridge across the canal. The risk of otter road traffic accidents at this location are largely eliminated by the design, which allows for mammal underpasses/ledges (towpath) and redirection features. A speed limit of 30 mph is also proposed. The proposed locations of the mammal underpasses are shown on Figure 10.002 of the ES. These measures will reduce the potential likelihood and frequency of road fatalities/injuries within the Site.

- 10.380 On roads adjacent to the Site, the Staffordshire and Worcestershire Canal crosses under the A5 in the north-west and under Vicarage Road in the south-west of the Site. These locations have tow paths which run underneath the road providing existing safe crossing points for otter. Predicted increases in traffic flows on the A5 in the location of the canal are considered to be negligible (increase of 94 vehicles) in the operational phase by virtue of the provision of the new link road which diverts traffic from the crossing point on the A5. An increase of 224 vehicles is predicted in the location of the canal crossing in the south at Vicarage Road. These figures relate to the 8 hour annual average weekday traffic between the hours of 23:00 and 07:00 when otters are generally more active. Records received from SERC did not identify any otter casualties on the A5, Vicarage Road and Straight Mile.
- 10.381 Small increases in the recreational use of the canal path and enhanced habitats may occur as a result of changes in the amenity value of the Site. Amenity use is likely to be limited to the areas around the proposed Community Parks during the daytime, therefore the extent, duration and likelihood of disturbance to nocturnal species is low. No lighting is proposed within the park areas. Daytime recreational use of the canal towpath is not likely to affect the ecological function of the canal corridor with respect to otters. No increases in footfall after dark are anticipated. The effect of disturbance on otters caused by recreational visitors is negligible and not significant.
- 10.382 The presence of new bridge structures over watercourses can present the potential for creating a barrier to movement at the times of spate, as water levels have potential to rise to the deck level of a bridge with no freeboard (air gap) if not designed appropriately, forcing unsafe passage for otters. However, the watercourse is a canal, which has fairly consistent water levels and the tow path shall be retained to provide safe passage. Furthermore, bridges will be constructed at a height to allow safe passage of canal boats. The tow path is considered to remain dry during 1-in-100 year flood events and no mitigation is considered necessary as severance of the watercourse and potential otter fatalities as a result of the bridge presence is not anticipated.
- 10.383 In the operational phase there would be noise from site operations but otter activity would be largely confined to the canal, Community Parks and green infrastructure areas. These areas would be less disturbed and the new waterbodies created would present otters with additional foraging habitat. Otters (which are increasingly being recorded in busy locations such as town centres) would be expected to adapt to the new conditions such that their range and ability to feed would not be compromised.
- 10.384 The design of the Proposed Development also allows for enhancements adjacent the canal along the southern boundary of the Site in existing woodland in Calf Heath Community Park. Otter holt(s) will be provided in this location as embedded mitigation.
- 10.385 With the embedded mitigation in place e.g. mammal crossings on-site and habitat enhancements the adverse effect of the proposed development on otters is considered to be not significant at a District scale as valued.

Other Mammals

- 10.386 Permanent operational effects to polecat and hedgehogs include risk of road traffic accidents leading to death or injury (though in the context of the presence of busy roads on the scheme boundaries) and increased human disturbance. As described in the embedded mitigation

section, mammal underpasses are provided as embedded mitigation to allow the safe passage of mammals under roads in the Site.

- 10.387 Harvest mice occupy a home range of approximately 100 m² in suitable habitats and as such impacts of vehicular traffic are not thought to be significant for this species. Management prescriptions for areas of suitable habitats e.g. grassland will be developed in the FEMMP to take account of harvest mice e.g. maintaining habitats and connectivity and timing/extent of grass cuts. With these measures in place, no significant effect on harvest mice is considered likely at the local or any other scale during the operation of the Proposed Development.
- 10.388 The magnitude of the impacts are assessed to be minor, therefore the operational effects to polecat, hedgehogs and harvest mice during operation are assessed to be not significant at the Local scale.

Mitigation and Residual Effects

Construction

Habitats

Habitat Loss and Fragmentation

- 10.389 Mitigation measures with respect to impacts on habitats have been embedded within the project.
- 10.390 The retention of habitat, creation of new habitat and enhancement of existing habitat will offset the habitat lost with respect to woodlands, hedgerows, open water and semi-improved grassland. A net gain will be provided for hedgerows, woodland, semi-improved grassland and open water. Arable habitats on-site would be lost. The habitat value of the green infrastructure and Community Park areas will be maximised and managed to maintain this value for biodiversity in the long term. As a result, there would be no significant adverse effect at the local level from habitat loss or fragmentation for any receptor other than individual trees where veterans would not be replaced in the timescales of hundreds of years and where there would be a significant adverse residual effect at the Local scale.

Pollution Effects on Habitats

- 10.391 An overview of the proposed approach to the FEMMP is provided in the 'embedded mitigation' section. This provided in full in Technical Appendix 10.4.
- 10.392 Phase specific EMMPs will be prepared and adopted to reflect any risks to the environment specific to that development parcel.
- 10.393 The ODCEMP defines roles and responsibilities for pollution prevention and control, and reviews of the effectiveness of measures proposed.
- 10.394 With the measures defined in the ODCEMP in place to address pollution events there would be no significant residual effect because recovery from any small incidents would be possible.

Species

Birds

- 10.395 Mitigation measures with respect to impacts on bird assemblages during construction have been embedded within the project.
- 10.396 The construction effect on the assemblage of farmland birds with embedded mitigation applied would be a significant residual adverse effect at the Local scale due to the removal of breeding habitat (although during the construction phase there may be some local temporary gains). There would be no residual adverse construction effect on the local value assemblage of other birds of conservation concern with the embedded mitigation measures applied.

Invertebrates

10.397 During construction with the embedded mitigation in place there remains a residual significant adverse effect on the assemblage of invertebrates that would be short term (i.e. less than five years) while created habitats establish. This is significant at the Site scale. No long-term residual significant effect is considered likely.

Bats

10.398 Mitigation measures with respect to impacts on the bat assemblage have been embedded within the project.

10.399 In summary, with the embedded mitigation measures in place the Proposed Development is likely to result in a temporary residual significant adverse effect on the bat assemblage on or using the Site while vegetation matures. This effect, when considering the application of the embedded mitigation and the conservation status of the bat assemblage (i.e. considering legal implications separately) is considered to be significant at the Local scale.

Operational Development

Habitats

Operational effects on retained and created habitats

10.400 The created habitat areas will be designed with connectivity in mind and will form ecological corridors with the existing retained vegetation features across the Site. The basis for this is secured via the Parameters Plan Green Infrastructure Plan (Document 2.7).

10.401 Landscape management and maintenance will be carried out at times of year that do not compromise seeding/fruitletting/nectar production as defined in the FEMMP.

10.402 Maintenance records should include reference to the FEMMP or plot specific plans and should highlight any particular ecological constraints or particular considerations required to ensure the habitat value is maintained and where possible enhanced.

10.403 As defined in the FEMMP, access to the Community Parks will be managed in order to maximise the value of the habitat for a range of species and to maintain its intrinsic value. For instance, signage will be provided highlighting the value of these areas and promoting their responsible use. The parks will be actively managed to remove litter and to seek responsible use of these areas and deter activities that would compromise their habitat value.

10.404 All operators in the developed Site will be requested to adhere to a Waste Management Scheme that minimise potential for rubbish to accumulate in the green infrastructure areas and operational management plans will be adopted that include measures to keep the Site and the surrounding area (including green infrastructure and community parks) clean and tidy.

10.405 The drainage throughout the Proposed Development will be maintained so that it performs as designed, in particular in relation to interception of run-off from car park and yard areas. All operators will implement and practice pollution prevention and control measures in order to provide ongoing management of the risks to surface water quality. These measures are secured in the FEMMP.

10.406 The residual effect would remain not significant at the Local scale, but the mitigation applied would further reduce the effects on habitats and a range of valuable habitats including open water, woodland, hedges and trees would be created and managed in the long term (decades).

10.407 The native black poplar mitigation provides a beneficial effect for these SBAP trees. The mature example present on-site would be lost as part of the Proposed Development, however, irrespective of this it is in significant decline and it would likely be lost naturally in the short term (i.e. decades). The mitigation ensures the propagation of replacement trees and secures their future management to ensure the long-term provision of this species on-site. This is

considered to represent a residual beneficial effect on black poplar significant at the County scale.

Species

Birds

10.408 Mitigation measures with respect to impacts on the bird assemblages during operation have been embedded within the project and within the FEMMP.

10.409 Operational plans for the rail freight and associated operations will include procedures such as minimising movements and idling of vehicles, freight doors in buildings to be kept closed whenever not in use and reversing to be kept to a minimum. It is likely that operational noise would still have an effect on bird breeding activity, although over years the local bird community would become conditioned to the noise levels.

10.410 Landscape maintenance and facilities maintenance will be carried out with reference to the FEMMP so that impacts on nesting birds are avoided, and so that replacement bird nesting opportunities can be provided. Measures will include landscape and facilities (buildings) maintenance at times of year to avoid direct impacts on bird nests. This includes building maintenance which should be carried out in light of the potential for birds to nest on roofs or elsewhere in structures (including the bird boxes provided). Any specific plans to cater for presence of birds such as nesting gulls will be implemented to avoid compromising nesting success. Where it is not necessary for aesthetic reasons or to preserve structural integrity the growth of any plants on roof areas should be allowed (for instance growth of small ephemeral plants would benefit foraging birds such as pied wagtail, linnets and other species).

10.411 The EMMP(s) will highlight any particular ecological constraints from nesting birds or particular considerations required to ensure legal compliance and that impacts on nesting success are avoided.

10.412 The residual operational effects, notably noise on the assemblage of bird species important at the local level would be offset by habitat improvements or habitat creation within the site which would be focussed in the community parks but would apply throughout the development. Habitat intended for additional species of conservation concern would be provided but there would be a residual adverse effect on birds of woodland and scrub significant at the Site scale (i.e. not significant at the Local level), due to uncertainty as to how effective the habitat improvements and long-term management for biodiversity that would be implemented would be. Water features provided in the operational phase would provide complementary habitat to the designated reservoir sites in the vicinity of the scheme and there would be a residual beneficial effect on waterbirds significant at the local scale.

Invertebrates

10.413 Mitigation measures with respect to impacts on the invertebrate assemblage have been embedded within the project.

10.414 The future safeguard and management of habitats (created in the construction phase) for the benefit of invertebrates in the operational phase would lead to an improvement in habitat interest and value resulting in a long term, **residual beneficial effect** significant at the Local scale (given the dominant arable and improved grassland habitats in the landscape).

Bats

10.415 Mitigation measures with respect to impacts on the bat assemblage have been embedded within the project.

10.416 In the operational phase with embedded mitigation in place the Proposed Development is likely to result in a residual permanent, adverse effect on the bat assemblage on or using the Site, significant at the Local scale. The measures provided will ensure that the roosting resource at the Site is maintained and retains and incorporates habitats which can be used by foraging and commuting bats. The outline lighting design has demonstrated that lighting impacts can be controlled sufficient to ensure the functionality of landscape features e.g.

ecological corridors. Whilst a significant effect is predicted, this is not considered to be at a District i.e. South Staffordshire scale as the receptor is valued. This is as a result of the Site remaining suitable for bats outside of the development plots, the plentiful availability of equivalent habitat within South Staffordshire and the results of radio tracking which have shown tracked species not to be solely reliant on the Site, being shown to use a variety of off-site habitats locally.

Summary of Mitigation Measures

10.417 Embedded mitigation has been fully integrated into the Proposed Development to limit any otherwise potentially adverse effects on sensitive receptors. These measures are presented earlier in this Chapter. These measures have been informed by significant survey effort and in consultation with relevant stakeholders.

10.418 The measures below are those deemed to be required in addition to the embedded mitigation.

Table 10.12 : Summary of Proposed Mitigation and Enhancement Measures	
Potential Effects Identified	Proposed Mitigation/Control & Enhancement Measures
Completed Development	
Effects on habitats	Landscape management and maintenance should be carried out at times of year that do not compromise seeding/fruitletting/nectar production. Management of green infrastructure and community parks to remove litter and encourage responsible use. Development parcels to be managed to prevent rubbish accumulating in adjacent habitats. Drainage to be maintained to ensure effective protection of surface and groundwater.
Effects on birds	Sensitive lighting and noise mitigation measures maintained in the long term to ensure continued effectiveness, operational controls to minimise noise effects, maintenance of developed plots with birds taken into account (i.e. in buildings and facilities management to avoid impacts on nesting birds), management of green infrastructure and community parks to maintain their ecological value in the long term and controls on activity such as fences to restrict access to certain areas and management of the community parks. A Site wide breeding bird survey will be carried out periodically in the operational phase (for instance every five years).

Summary of Residual Effects

10.419 Table 10.13 provides a tabulated summary of the outcomes of the Ecology and Nature Conservation of the Proposed Development.

Table 10.13: Summary of Residual Effects							
Receptor	Description of Residual Effect	Nature of Residual Effect *					
		Significance**	+	D	P	R	St
			-	I	T	IR	Lt
Construction							
Habitats	Significant effect from loss of veteran trees and time required to replace.	Local scale	-	D	T	R	Lt
Farmland birds	Significant effect due to the removal of breeding habitat (although during the construction phase there may be some local gains, and there would be gains for other species in the operational phase).	Local scale	-	D	P	IR	Lt
Invertebrates	Significant effect on the assemblage of invertebrates while vegetation and enhancements establish with mitigation measures applied.	Site scale	-	D	T	R	St
Bats	Significant effect due to the time taken for vegetation in green corridors and providing screening to mature and sufficiently establish to provide a fully functional habitat resource for bats.	Local scale	-	D	T	R	St
Badger	Traffic hazards and associated mortality.	Local scale	-	D	P	IR	Lt
Completed Development							
Habitats	Securing long term provision of native black poplar on-site.	County scale	+	D	P	IR	Lt
Birds woodland and scrub	Change of habitat available compared with baseline, noise effects on the assemblage of bird species important at the	Site scale	-	D	P	IR	Lt

Table 10.13: Summary of Residual Effects							
	local level offset by habitat improvement/creation. Habitat intended for additional species of conservation concern would be provided but there would be a significant effect due to uncertainties relating to effectiveness of habitat improvements and management.						
Water birds	Provision of significant areas of open water in the operational phase, managed for the benefit of birds.	Local scale	+	D	P	IR	Lt
Invertebrates	Significant effect providing enhanced habitats for invertebrates relative to those in the local area managed for biodiversity in the long term.	Local scale	+	D	P	IR	Lt
Bats	Significant effect owing to the impact on foraging and commuting bats as a result of noise and lighting which, whilst largely mitigated for may result in a change in the use of the Site by and composition of the bat assemblage.	Local scale	-	D	P	IR	Lt
Badger	See Confidential Technical Appendix 10.2	-	-	-	-	-	-

Notes:

* - = Adverse/ + = Beneficial; D = Direct/ I = Indirect; P = Permanent/ T = Temporary; R=Reversible/ IR= Irreversible; St- Short term/ Mt –Medium term/ Lt –Long term

**Negligible/Minor/Moderate/Major

Likely Significant Environmental Effects

10.420 This chapter has been prepared following CIEEM guidelines for Ecological Impact Assessment²⁴. The guidance calls for the emphasis in EclA to be on significant effects rather than all effects and this assessment has only considered effects on ‘Important Ecological Features’ (if present). Effects on ‘Other Ecological Receptors’ are excluded from the assessment and therefore only effects that could be material to the DCO decision i.e. significant are described. Therefore, the stated residual effects in the text and Table 10.11 above represent the likely significant effects of the Proposed Development in respect of ecological receptors.

10.421 There are significant residual effects in the operational phase, generally at the Site or Local scale (notably on farmland birds) or while habitats develop. This is balanced through the provision of significant new and enhanced habitat, maintained in the long term which would

provide benefits to a range of wildlife and which would be in positive habitat management for the duration of the operational phase. The habitats created would address local and national biodiversity action plan targets.

Decommissioning

10.422 The Proposed Development is expected to be operational indefinitely, as long as it is viable and fit for purpose.

10.423 In the long term, it may likely to be re-developed or adapted on a piecemeal basis as operator requirements change and new occupiers move to the Site. Any such piecemeal redevelopments would be expected to be undertaken in accordance with current and future legislation and guidance in relation to ecology and nature conservation and would be subject to separate planning applications and planning requirements and conditions. It is anticipated that the relevant EMMP(s) or documents that supersede this plan would consider ecological receptors such that appropriate avoidance, licences or other measures to avoid direct effects such as killing or injury to animals or damage/destruction of nests or places of shelter would be adopted for the decommissioning works.

10.424 On this basis the potential effects on ecology and nature conservation for decommissioning are considered to be negligible.

Cumulative Effects

10.425 This cumulative effects assessment considers the combined effects of the Proposed Development along with the ‘other development(s)’ on ecological receptors.

10.426 The relevant cumulative schemes considered in this assessment are described in the table below:

Table 10.14: Relevant Cumulative Schemes	
Scheme	Reason for Consideration of Cumulative Effect
Land off Gravelly Way, Four Ashes (Bericote Development)	Adjacent to the scheme
Lyne Hill Industrial Estate, Boscomoor Lane, Penkridge South, Staffordshire	Proximity to Site, close to the Staffordshire and Worcestershire Canal
i54 Sites - i54 Site, Wobaston Road, Pendeford, South Staffordshire; - Land At i54 Innovation Drive, Pendeford, South Staffordshire, WV9 5GA; and - i54 South Staffordshire Strategic Employment Site	Close to the Staffordshire and Worcestershire Canal
Land West of Cannock Road and South of Hazelstrine Lane Stafford Staffordshire	Close to the Staffordshire and Worcestershire Canal
ROF Featherstone Strategic Employment Site and Access Road	Proximity to Site, similar habitats as on Site

Table 10.14: Relevant Cumulative Schemes	
Saredon South Quarry	Quarry scheme so relevant when considering Calf Heath Quarry
Calf Heath Quarry	Assumed quarry would be restored under existing consent
M54 M6/M6 Toll Link Road	Proximity to Site, similar habitats as on Site

10.427 The schemes considered in combination other than those listed in the table above have been assessed as not being likely to lead to combined effects for reasons of distance from the Site and/or because of intervening land uses such as urban conurbations or motorways resulting in severance.

Construction

10.428 The Land off Gravelly Way (Bericote Development) is adjacent to the Site. Construction of the Bericote Development will be completed prior to commencement of WMI construction. Construction effects would not act in combination. The Lyne Hill Industrial Estate, Land West of Cannock Road and South of Hazelstrine Lane (north of the Site), and three i54 schemes (south of the Site) are within close proximity to the Staffordshire and Worcestershire Canal that also passes through the Site. As a result, there may be combined construction phase effects on animals using the canal including bats and otter. All of these schemes would be expected (in common with the Proposed Development) to include CEMP measures to protect surface waters and minimise effects on habitats and species.

10.429 The ROF Featherstone Strategic Employment and Access Road Site includes woodland, farmland and grassland and so habitat lost through development there would compound that from the Site, notably for farmland birds, but also for bats and other mammal species. The scheme mitigation would be expected to address these effects in a similar manner proposed for the Site, resulting in similar outcomes.

10.430 Calf Heath Quarry is currently operational, however should DCO consent be granted, no further minerals will be excavated within the Site including the new minerals allocation. The existing minerals infrastructure will be removed. As the quarry is regulated under an Environmental Permit removal of the existing minerals infrastructure at Calf Heath Quarry would be expected to employ stringent mitigation measures similar to those that would be implemented during construction of the Proposed Development. It is anticipated that the current quarry workings would be left open, thereby minimising the need to rework materials during the earthworks stage of the Proposed Development, and this has been taken into account in the cut/fill models for the Proposed Development. As such, it is not anticipated that there will be any cumulative effects.

10.431 The M54 M6/M6 Toll Link Road scheme construction timescales are not known and so it cannot be determined whether there would be any cumulative effects of works. The scheme would sever countryside to the south-east of the Site, although because it is a linear scheme habitat loss would be limited.

10.432 The Bericote Development and Calf Heath Quarry are most relevant and are discussed where relevant in the main impact assessment text. Overall the remaining schemes would have limited residual effects as a result of controls through their consents. Consequently, the significance of effects in the main Construction section of this chapter would not be affected.

Completed Development

10.433 The Bericote Development includes retention of a part of Calf Heath Wood which would complement the part retained in the Site and the mitigation design takes the Bericote

Development ecology mitigation into account. Both complementary green infrastructure areas would be in positive ecological management for the duration of the respective operational phases to the benefit of wildlife.

10.434 In operation the wildlife using the canal adjacent to the Lyne Hill Industrial Estate, Land West of Cannock Road and South of Hazelstrine Lane (north of the Site) and three i54 schemes (south of the Site) would be expected to become accustomed to the new schemes and their associated landscaping and ecology enhancements, such that the canal would remain a usable corridor of aquatic and bankside habitat for bats, otters, water voles and other species.

10.435 Any development at the Featherstone Strategic Employment and Access Road Site would be expected to provide mitigation for loss of farmland habitat this would complement the measures proposed for the Site to address habitat loss and associated effects on species. As a result, in the operational phase it is predicted that there would be habitat creation or enhancement as in the Proposed Development which would combine to provide niches for wildlife in both sites.

10.436 The conclusion of quarrying at Saredon South Quarry would be followed by restoration to add to the habitats in the local area of value to wildlife, or would continue under a further consent, which would be expected to include requirements for proportionate ecological mitigation.

10.437 Modern highway schemes are designed to be permeable to wildlife and so it is not anticipated that the M54 Link Road scheme would compound any severance effects from the Proposed Development.

10.438 Overall the schemes considered in combination would have limited residual effects as a result of controls through their consents. Consequently, the significance of effects in the main Operational Development section of this chapter would not be affected.