CONTENTS

Introduction	. 1	1-1
Proposed Development	. 1	1-1
Purpose of an EcIA	. 1	1-1
Legislative and Planning Policy Context (National)	. 1	1-2
Guidance and Industry Best Practice	. 1	1-9
Consultation	. 1	1-9
Approach to Assessment	. 1	1-9
Collation of Baseline Data - Background Ecological Records	11.	-10
Collation of Baseline Data - Habitat Survey	11.	-10
Approach to Evaluation	11.	-12
Impact Assessment	11.	-12
Baseline	11.	-15
Contextual Information	11.	-15
Undesignated Habitats	11.	-17
Protected. Rare and Notable Species of Flora and Fauna	11.	-20
Flora – Phase 1 and Botanical Survey 2015	11.	-21
Protected and Notable Fauna – Existing Records	11.	-21
Fauna	11.	-21
Ecological Processes and Trends	11.	-25
Evaluation	11.	-25
Designated Ecological Sites	11.	-25
Undesignated Features of Biodiversity Importance – Valuation	11.	-26
Social, Community or Economic Value	11.	-27
Potential Impacts	11.	-27
Valued Ecological Receptors (VER's)	11.	-27
Potential Impacts	11.	-28
Summary of Effects	11.	-33
Daneshill LWS and LNR	11.	-34
Habitats	11.	-34
Species	11.	-34
Mitigation	11.	-34
General Mitigation Incorporation into Scheme	11.	-34
Statutory and Non-Statutory Wildlife Sites	11.	-35
Un-designated Habitats	11.	-35
Protected Species	11.	-35
Enhancement	11.	-35
Assessment of Residual Impacts	11.	-36
Ecological Sites	11.	-36
Habitats	11.	-36
cumulative effects	11·	-36
Conclusions	11.	-36

Appendices

Appendix 11/1 Appendix 11/2 Appendix 11/3

Data Search Report
Botanical Survey Report
Reptile Survey Report

Drawings

Drawing TL11/1	Phase 1 Habitat Plan
Drawing TL11/2	Ecological Sites Plan

INTRODUCTION

- 11.1 This Chapter has been prepared in accordance with CIEEM guidelines for Ecological Impact Assessment (EcIA) in respect of the proposed development of an exploratory well site near Blyth, Nottinghamshire, hereafter termed the Application Site.
- 11.2 The Application Site is described in Chapter 2.

Proposed Development

- 11.3 A detailed description of the proposed development is given in Chapter 3 of the Environmental Statement.
- 11.4 In summary, the following development activities are proposed:-
 - Drilling three sets (with each set containing up to 3 boreholes) of monitoring boreholes would be installed to sample and monitor groundwater and ground gas;
 - Drilling of a single vertical hydrocarbon exploration well to recover samples from, and to measure the properties of, the Bowland Shale and Millstone Grit group geological formations that underlie the site;
 - The well would be drilled through all of the coal and shale formations, logged electronically and then used as a temporary baseline seismicity monitoring well;
 - Drilling operations will need to take place continuously, 24 hours a day and seven days a week; and
 - Hydraulic fracturing would not be performed in the well on either the coal or shale targets.
- 11.5 Planning permission is sought for a period of up to 3 years.

Purpose of an EcIA

- 11.6 The purpose of an EcIA is to provide decision-makers with information about the likely significant ecological effects associated with a proposal.
- 11.7 Good Practice Guidance relating to the collection of baseline data¹ and EcIA² is published by the Chartered Institute of Ecology and Environmental Management (CIEEM). These guidelines are widely recognised as the industry standard.
- 11.8 CIEEM recommends that all baseline data collection is relevant to the aims of the study, for instance, the likely ecological effects of a proposed project. Baseline data collection should aim to identify the relevant biotopes,

¹ CIEEM - Sources of Survey Methods (http://www.cieem.net/sources-of-survey-methods-sosm).

² Guidelines for Ecological Impact Assessment in the United Kingdom. Institute of Ecology and Environmental Management (2006). A review of these Guidelines is currently in progress, with updated guidance scheduled for publication in 2016.

ecological resources and features; e.g. the terrestrial, aquatic and coastal environments and species which could be affected by a project.

- 11.9 EcIA is an objective, transparent, staged and iterative process, which provides a useful framework for establishing a baseline and predicting and monitoring ecological change.
- 11.10 The main stages of an EcIA are set out below:-
 - 1. Scoping to establish the likely zone of influence and scope of data collection;
 - Collection of Baseline data this stage involves desk study, consultation and field survey to identify the ecological resources and features likely to be affected;
 - 3. Evaluation of ecological resources and the services they provide;
 - 4. Assessment of predicted impacts, including potential for cumulative impacts;
 - 5. Identification of avoidance and mitigation measures and proposals for any compensation measures required to reduce residual impacts;
 - Assessment of the significance of residual impacts, based upon the refined project, incorporating avoidance, mitigation and/or compensation measures;
 - 7. Identification of monitoring measures required, if appropriate based on the site specifics, to evaluate success of mitigation or justify assumptions from initial impact assessment; and
 - 8. A summary of the consequences for decision making for example, compliance with legislation and proposals for monitoring the effectiveness of mitigation measures.
- 11.11 In assessing the effects of any such proposal, it is necessary to define the spatial and temporal area of study and to focus the assessment upon those features or resources that are of ecological value in the context of that proposal. The scope of this assessment has been determined through the consideration of the possible direct and indirect impacts associated with the proposal by a preliminary assessment of ecological receptors that may be affected.

Legislative and Planning Policy Context (National)

11.12 This section summarises the key wildlife legislation under the conservation of habitats and species, and national planning policies relevant to ecology and nature conservation

Legislative Context

Wildlife and Countryside Act 1981 (as amended)

11.13 The Wildlife and Countryside Act 1981 is the primary legislation in Great Britain for the protection of flora, fauna and the countryside. This legislation is the means by which the 'Bern Convention' and the European Council Directives 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive) and 2009/147/EC on the Conservation of Wild Birds (The Birds Directive) are implemented in Great Britain. The Act also empowers Natural England to protect habitats of national importance through the statutory designation of Sites of Special Scientific Interest (SSSIs) for features of interest.

The Conservation of Habitats and Species Amendment Regulations 2012

11.14 The Conservation of Habitats and Species Amendment Regulations 2012 (The Habitats Regulations) transposes Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive) into national law and provides for the designation and protection of 'European sites' including Special Areas of Conservation (SAC) and Special Protection Area (SPA), the protection of 'European protected species', and the adaptation of planning and other controls for the protection of European Sites. The regulations introduce a review procedure for plans and projects likely to significantly affect a European site, and licensing requirements for developments that may affect a European protected species for example, bats, otter and great crested newt. The Habitats Regulations also contain provisions designed to implement aspects of the Marine and Coastal Access Act 2009 (The Marine Act).

The Countryside and Rights of Way (CRoW) Act 2000

- 11.15 Part III of the CRoW Act deals specifically with wildlife protection and nature conservation. The Act requires that Government departments have regard for the conservation of biodiversity, in accordance with the Convention on Biological Diversity, and demands that the Secretary of State publishes a list of living organisms and habitat types that are considered to be of principal importance in conserving biodiversity.
- 11.16 The CRoW Act amends the Wildlife and Countryside Act 1981, by strengthening the protection of designated SSSIs. In addition, it increases the legal protection of threatened species, by also making it an offence to 'recklessly' destroy, damage or obstruct access to a sheltering place used by an animal listed in Schedule 5 of the Act or 'recklessly' disturb an animal occupying such a structure or place.

The Natural Environments and Rural Communities (NERC) Act 2006

11.17 The NERC Act amends the CRoW Act, by further extending the requirement to have regard for biodiversity to all 'public authorities', which includes local planning authorities, and requires that the Secretary of State consults Natural England in the publication of the list of living organisms and habitat types deemed to be of principal importance in conserving biodiversity (see below).

The Protection of Badgers Act 1992

11.18 The Act makes it an offence to wilfully take, injure or kill a badger; cruelly mistreat a badger; interfere with badger setts, sell or possess a live badger; mark or ring a badger. Natural England is the licensing authority in respect of licences required for development purposes.

Wild Mammals (Protection) Act 1996

11.19 The Act affords protection for all wild animals in respect of acts of cruelty.

Hedgerow Regulations 1997

11.20 The Regulations seek to protect important hedgerows from removal by identifying criteria centred on ecology and the historic environment. Removal of important hedgerows is only permitted once approval is granted by the relevant Local Authority.

Planning Policies – National

- 11.21 Nationally, the Government's commitment to sustainable development and conserving the diversity of wildlife is set out in the National Planning Policy Framework (NPPF). This document, along with Government Circular 06/05: Biodiversity and Geological Conservation the OPDM Circular, which accompanied the now superseded Planning Policy Statement 9 (PPS9) sets out the Government's broad policy objectives in relation to the protection of biodiversity and geological conservation in England through the planning system. These policies reflect statutory obligations for nature conservation.
- 11.22 Government Circular 06/05 (Para 99) states that "developers should not be required to undertake surveys for protected species unless there is a reasonable likelihood of the species being present and affected by the development".
- 11.23 The NPPF's section on "Conserving and Enhancing the Natural Environment" sets out in paragraph 109 that:-

"The planning system should contribute to and enhance the natural and local environment by:-

- 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 by establishing, coherent ecological networks that are more resilient to current and future pressures;
- Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability;

- Remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate."
- 11.24 Further to this in Paragraph 118 it states that:

"When determining planning applications, local planning authorities should aim to conserve and enhance biodiversity by applying the following principles:

- If significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
- Proposed development on land within or outside a Site of Special Scientific Interest likely to have an adverse effect on a Site of Special Scientific Interest (either individually or in combination with other developments) should not normally be permitted. Where an adverse effect on the site's notified special interest features is likely, an exception should only be made where the benefits of the development, at this site, clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of Sites of Special Scientific interest;
- Development proposals where the primary objective is to conserve or enhance biodiversity should be permitted;
- Opportunities to incorporate biodiversity in and around developments should be encouraged;
- Planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss; and
- The following wildlife sites should be given the same protection as European sites:
 - 1. Potential Special Protection Areas and possible Special Areas of Conservation; and
 - 2. 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."

UK Biodiversity Action Plans

11.25 The UK post-2012 Biodiversity Framework replaces the previous UK Biodiversity Action Plan (UKBAP) published in 1994. The purpose of this Framework is to set a broad enabling structure for biodiversity action across the entire UK up to 2020, but which will be delivered through the own strategies of each of the individual countries of the UK and Northern Ireland

for the protection, enhancement and expansion of priority habitats and species.

Local Biodiversity Action Plans

11.26 To implement actions to enhance biodiversity at a local level, a number of Local Biodiversity Action Plans (LBAPs) have been produced. This plan implements individual habitat and species action plans that contribute to national biodiversity targets.

Section 41 Habitats and Species of Principal Importance.

- 11.27 The Natural Environment and Rural Communities (NERC) Act came into force on 1st October 2006. Section 41 (S41) of the Act requires the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. The list has been drawn up in consultation with Natural England, as required by the Act.
- 11.28 The S41 list is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under section 40 of the Natural Environment and Rural Communities Act 2006, to have regard to the conservation of biodiversity in England when carrying out their normal functions.
- 11.29 Following devolution the S41 list is now the most commonly referenced list of species and habitats of importance.

Planning Policies – Local

11.30 A two-tier system of local government operates in Nottinghamshire with the County Council as the first tier and seven Borough and District Councils at the second tier.

Emerging Minerals Local Plan

- 11.31 The County Council policy set out in the submission draft Minerals Local Plan in Spring 2016 is below:
- 11.32 Policy MP12: Hydrocarbon Minerals

"Exploration

1. Proposals for hydrocarbon exploration will be supported provided they do not give rise to any unacceptable impacts on the environment or residential amenity...."

Minerals Local Plan (Adopted 2005)

11.33 Until the new Minerals Local Plan is adopted all but 7 policies from the 2005 plan still stand. Those relating to Environmental Protection include:

11.34 Policy M3.1 Information in Support of Planning Applications

"Planning permission for minerals development will not be granted unless sufficient information is provided to enable a balanced assessment of all relevant factors. Such information should include as appropriate details of... ...(p) an assessment of the landscape and ecological value of the area and the potential impact of the development;"

11.35 Policy M3.17 Biodiversity

"Planning permission will not be granted for minerals development which will adversely affect the integrity or continuity of habitats or features identified as priorities in the UK and/ or Nottinghamshire Local Biodiversity Action Plan, unless an overriding need for development is demonstrated which outweighs the nature conservation importance of the feature. If the loss of the habitat or feature cannot be avoided, provision will be made, where practicable, for the creation of an equivalent habitat or feature, either on the development site or under the terms of a voluntary agreement on a suitable alternative location within the county."

11.36 Policy M3.18 Special Areas of Conservation

"Planning permission will not be granted for minerals development which would destroy or significantly adversely affect a Special Area of Conservation or a candidate Special Area of Conservation unless:

(a) there is no alternative solution; and

(b) there are imperative reasons of overriding public interest; and, if the site hosts a priority habitat or species:

(c) there are overriding reasons of human health and public safety; and

(d) there are beneficial consequences of primary importance for the environment.

The assessment of any adverse impact will take account of the scope for mitigation and/ or compensatory measures to replace the loss."

11.37 Policy M3.19 Sites of Special Scientific Interest

"Planning permission will not be granted for minerals development which would have an adverse effect, directly or indirectly, on the special interest of an SSSI or a candidate SSSI unless the reasons for the development outweigh the nature conservation considerations. The assessment of any adverse impact will take account of the scope for mitigation and/or compensatory measures to replace the loss."

11.38 Policy M3.20 Regional and Local Designated Sites

"Planning permission for minerals development in areas which are regional or local designated sites will only be granted where it can be demonstrated that the importance of the development outweighs the regional or local value of the site, taking into account measures to mitigate/compensate against any adverse impact."

11.39 Policy M3.21 - Protected Species has not been retained since the plan expired.

Bassetlaw District

- 11.40 The site falls within Bassetlaw District where the current local policy relevant to the site is the Bassetlaw District Local Development Framework (Adopted 2011).
- 11.41 Policy DM9: Green Infrastructure; Biodiversity & Geodiversity; Landscape; Open Space and Sports Facilities:

"A. Green Infrastructure

Development proposals will be expected to support the Council's strategic approach to the delivery, protection and enhancement of multi-functional Green Infrastructure, to be achieved through the establishment of a network of green corridors and assets (please refer to the Council's Green Infrastructure work for a full list of Green Corridors and Nodes within, and running beyond, the District) at local, sub-regional and regional levels. Particular support will be given to proposals that will further the development of:

- The Idle Valley Project;
- The Trent Vale Partnership;
- Sherwood Forest Regional Park.

Development proposals will be expected to demonstrate, in line with the Council's Green Infrastructure work, that:

i. they protect and enhance green infrastructure assets affected by the development and take opportunities to improve linkages between green corridors;

ii. where they overlap with or will affect existing green infrastructure nodes or corridors, such assets are protected and enhanced to improve public access and use;

iii. where opportunities exist, development proposals provide improvements to the green infrastructure network that benefit biodiversity through the incorporation of retained habitats and by the creation of new areas of habitat; and

iv. they provide robust delivery mechanisms for, and means of ensuring the long-term management of, green infrastructure.

Development that will result in the loss of existing green infrastructure may be supported where replacement provision is made that is considered to be of equal or greater value than that which will be lost. Where new development may have an adverse impact on green infrastructure, alternative scheme designs that minimise impact must be presented to the Council for consideration before the use of mitigation measures (e.g. off-site or through financial contributions for improvements elsewhere) is considered. B. Biodiversity and Geodiversity

Development proposals will be expected to take opportunities to restore or enhance habitats and species' populations and to demonstrate that they will not adversely affect or result in the loss of features of recognised importance, including:

i. Protected trees and hedgerows;

ii. Ancient woodlands;

iii. Sites of Special Scientific Interest (SSSI);

iv. Regionally Important Geodiversity Sites;

v. Local Wildlife Sites (Sites of Importance for Nature Conservation (SINC)); vi. Local and UK Biodiversity Action Plan Habitats (including Open Mosaic Habitats on Previously Developed Land); and vii. Protected Species.

Development that will result in the loss of such features may be supported where replacement provision is made that is considered to be of equal or greater value than that which will be lost and which is likely to result in a net gain in biodiversity. Where new development may have an adverse impact on such features, alternative scheme designs that minimise impact must be presented to the Council for consideration before the use of mitigation measures is considered. Where sufficient mitigation measures cannot be delivered, compensation measures must be provided as a last resort..."

Guidance and Industry Best Practice

11.42 The scope of this EcIA, collection of baseline data, evaluation of ecological resources, description and assessment of the significance of impacts follows guidelines set out by the Institute of Ecology and Environmental Management (IEEM 2006) now a Chartered Institute and references therein.

Consultation

- 11.43 A request for a Scoping Opinion under Regulation 13 was submitted to Nottinghamshire County Council (NCC) in October 2015.
- 11.44 Comments relating to ecological issues and scoping were received from the following organisations and are enclosed as Appendix 11/1.
 - Nottingham County Council;
 - Natural England;
 - Nottinghamshire Wildlife Trust; and
 - Parish Council brief ecological comments were received from Ranskill, Torworth and Blyth Parish Councils.
- 11.45 Consultation comments received referred to the need to consider direct and indirect effects on statutory and non-statutory ecological sites, undesignated habitats (e.g. ancient woodland and S41 Priority habitats) and protected and notable species.
- 11.46 Telephone consultation has taken place between SLR ecologists and Nick Crouch, planning ecologist with NCC on the 12th February 2016 confirming that breeding bird surveys were not required.

Approach to Assessment

- 11.47 The area of study focuses on the planning application area termed the "Application Site".
- 11.48 The surrounding area was also included for context and/or due to the need to consider species of fauna such as great crested newt, bats and badger to be

present outside of the application boundary but potentially using the Application Site as part of their habitat range.

- 11.49 The presence of statutory and non-statutory ecologically designated sites also formed part of the study due to the need to undertake wider assessments of potential air quality, noise and hydrological effects on these receptors.
- 11.50 As a general principle a 2km radius was used around the Application Site to identify such sites during the desk study as this was considered sufficient, taking into account the nature of the development, to encompass the potential reach of any direct or indirect impacts.
- 11.51 The Desk Study found that the Application Site lies within the outermost Impact Risk Zone for Mattersey Hill Marsh SSSI. The SSSI is situated 2.7km to the north-east of the Application Site. It was considered appropriate to include this site in the EcIA for this reason and due to the presence of hydrologically-dependent habitats.
- 11.52 A review of the conclusions reached in respect of Air Quality (Chapter 7), Noise (Chapter 8) and potential ecological interactions with the water environment (Chapter 9) has been undertaken.
- 11.53 The proposed scheme for lighting has been subject to a detailed design and a lux contour map produced which has been used to consider the extent to which light spill could occur.

Collation of Baseline Data - Background Ecological Records

- 11.54 A desk-based study was undertaken and involved collating data from the following organisations or on-line resources:-
 - Nottinghamshire Biological and Geological Records Centre (NBGRC);
 - Nottinghamshire Mammal Group via the Nottinghamshire Wildlife Trust (NWT);
 - National Biodiversity Network (NBN) Gateway; and
 - MAGIC website.
- 11.55 Data included: details of statutory and non-statutory designated nature conservation sites; and protected, rare and notable species of flora and fauna within a 2km radius of the site centre.

Collation of Baseline Data - Habitat Survey

11.56 The scope and detail of the surveys undertaken for this assessment follow those recommendations made by the former Institute of Environmental Assessment (IEA 1995). The methods used for ecological survey are in accordance with those established and generally accepted methodologies for field survey, as published by the CIEEM.

- 11.57 To inform this EcIA Extended Phase 1 Habitat Surveys were undertaken of the Application Site on 21st August 2015 and wider area on the 22nd February 2016 by an experienced ecologist from SLR who is a Full Member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and Chartered Environmentalist.
- 11.58 The surveys were conducted following a standard methodology³ and involved the production of a map of the habitats present using colour codes and target notes (TN) to describe any feature of particular ecological interest (Drawing 11/1).
- 11.59 The survey method was extended to include the recording of additional information on habitats and species, including any evidence of, or potential presence of, statutorily protected species, other species of conservation significance, or any other features of note and that may require mitigation or an ecologically sensitive design in respect of the proposed development at this site.
- 11.60 Following the initial Phase 1 habitat survey a more detailed botanical survey of the roadside verges and field margins was undertaken in September 2015 which is reported in Appendix 11/2.

Protected Fauna Surveys

- 11.61 The findings of the Phase 1 habitat survey were reviewed to assess the potential for protected or notable fauna to be affected by the proposed development. A summary is provided below with more detailed explanation provided in the Evaluation and Impact sections of this EcIA.
- 11.62 The proposed development would be situated within a corner of a large intensively managed arable field, an ecological receptor of low value. The trimmed boundary hedgerows and margins are to be retained and protected by an 8 metre buffer strip, bunds and two rings of fencing.
- 11.63 Vegetation loss would therefore be localised and limited in scale to the vicinity of the existing field entrance which would need to be improved to allow access entrance and the field itself, which is regularly cropped.
- 11.64 The roadside verge is wide in places and was found during the Phase 1 survey to support some plant species of interest and, whilst isolated, to be of sufficient size to potentially support small populations of the commoner reptiles. Further botanical survey work and a reptile survey were therefore recommended due to the need for localised vegetation removal to improve the existing access and ensure adequate visibility.
- 11.65 A survey for reptiles was undertaken in September and early October 2015 by experienced and licensed ecologists from SLR all of whom are members at the appropriate grade of the Chartered Institute of Ecology and

³ Nature Conservancy Council (1990). Handbook for Phase 1 Habitat Survey – a Technique for Environmental Audit, 2003 reprint. JNCC, Peterborough.

Environmental Management (CIEEM). The survey report is enclosed as Appendix 11/3.

- 11.66 A daytime appraisal of the potential for the tree resource within the adjacent young plantation (Target Note 4) to provide opportunities for roosting by bats was undertaken in August 2015 and February 2016 by a Natural England licenced bat worker from SLR (NE Level 2: Licence Ref 2015-10724-CLS-CLS). No suitable habitat was identified.
- 11.67 Taking the above into consideration it is considered that the potential for other notable flora and fauna to be affected by the proposed development was negligible. No other surveys for protected or notable flora or fauna were therefore considered to be necessary to inform completion of this assessment.

Approach to Evaluation

- 11.68 The baseline information obtained has been used in undertaking an assessment of the value of ecological features within the study area. Ecological features are defined as:
 - Statutorily protected (Natura 2000 sites, NNR, SSSI and LNR) or locally designated (e.g. County Wildlife Sites) sites and features;
 - Sites and features of biodiversity value not designated in this way, e.g. areas listed on published inventory of priority biodiversity habitats (e.g. ancient woodland inventory, lowland grassland inventory) or areas of habitats subject to UK or Local BAP; and
 - Species of biodiversity value or significance, including those protected and controlled by law.
- 11.69 An evaluation of each type of ecological feature has been based upon the IEEM guidelines (IEEM 2006).

Impact Assessment

- 11.70 The assessment of ecological impacts follows the process described by the IEEM, which can be summarised as:
 - Determine the value of ecological features and resources affected through survey and/or research and assess impacts affecting important features and resources (quantifying the proportion affected and reversibility/recoverability of those resources);
 - Identify significant impacts in the absence of any mitigation;
 - Identify measures to avoid or reduce adverse impacts (and in particular likely significant impacts);
 - Identify opportunities for enhancement; and
 - Produce a clear summary of the significant residual impacts of the proposal incorporating all mitigation and enhancement measures.

- 11.71 As highlighted in the first section of this document, the significance of residual impacts is assessed on three separate levels. These can be summarised as:
 - Impacts upon biodiversity resources;
 - Consequences in terms of national and local nature conservation planning policy; and
 - Legal requirements relating to species and habitats.
- 11.72 All species and populations of species, including those with statutory protection, are evaluated on the same basis. It should be noted that even when a species is protected under European and UK statute, the presence of a small population on a site within a region where this species is widespread is unlikely to be assessed at a value of greater than district-level importance. Equally, a particular feature on a site may attract large numbers of an unprotected species that has limited distribution and this may represent a feature of county or even regional importance.
- 11.73 The criteria used to determine the biodiversity value of a species or features that may support a species include the following general considerations:-
 - rarity at a geographical level (international, national or local);
 - endemism and locally distinct varieties or sub-species;
 - species on the edge of geographic range;
 - size of populations in the local geographical context;
 - species-rich assemblages of a larger taxonomic grouping, e.g. herpetofauna or wintering birds;
 - populations of species considered as significant under locally published guidelines or Red Data Books (RDB); and
 - plant communities, ecosystems or habitat mosaics/associations that provide habitat for any of the above species or assemblages.
- 11.74 IEEM guidelines (2006) suggest that to ensure a consistency of approach, ecological features are valued in accordance with their geographical frame of reference as follows:
 - International;
 - UK;
 - National (England);
 - Regional (East Midlands);
 - County (Nottinghamshire)
 - District (North Nottinghamshire);
 - Local or Parish (Torworth CP); and/or
 - Less than Local (the Application Site).
- 11.75 Sites and features that are valued as being important within the immediate zone of influence (i.e. site level) may still have ecological value, for either flora or fauna, but this value is considered to be no greater than what is typical for those habitats or species in that locality and they do not have any special nature conservation interest. These categories have been applied to the features identified in the baseline survey described previously.

- 11.76 Separate valuations are provided for designated sites, non-designated sites, features and species where appropriate.
- 11.77 These categories are then applied to the features identified in baseline surveys and desk-top studies. Some features can already be recognised as having ecological value and as such they may be designated as a statutory or non-statutory wildlife site, other features may require an evaluation based upon their previously un-assessed biodiversity value.
- 11.78 Table 11/1, below, identifies the key considerations when characterising impacts on ecological receptors once the above values have been established.

Descriptor	Definition
Direction of Impact	Positive or negative
Probability of Occurring	Certain, probable or unlikely
Complexity	Direct, indirect or cumulative
Extent and Context	Area/number affected and if appropriate % of
	total
Magnitude	Describe the severity in words
Duration	Permanent or temporary in ecological terms
Reversibility	Whether or not the effect can be reversed in
	ecological timescales
Area	Expressed as area or percentage of study area

 Table 11/1

 Key Considerations when Characterising Impacts

11.79 Table 11/2, below, provides criteria for the assessment of magnitude.

Table 11/2Criteria for Assessing the Magnitude of Impacts

Magnitude	Criteria
Major Negative	A change likely to cause a permanent
	adverse effect upon the integrity of the
	ecological receptor
Negative	A change adversely affects the valued
	ecological receptor but no with permanent
	effect on integrity
Neutral	No effect
Positive	A change is likely to benefit the receptor in
	terms of its conservation status, but not so far
	as to achieve favourable conservation status
Major Positive	A change is likely to restore an ecological
	receptor to favourable conservation status, or
	to create a feature of recognisable value

11.80 Residual impacts and their significance will depend upon the magnitude and the value of the receptor. For example, a negative impact on a site of national importance would be of minor through to major significance whereas a major negative impact upon a site of parish importance would be of minor to moderate. The levels of significance that may occur can only be refined by the careful consideration of those factors at the site such as existing baseline, predicted trends, background level of impacts and the likely effectiveness of the proposed mitigation measures. Areas or features assessed as being of negligible value are excluded from this assessment.

BASELINE

Contextual Information

11.81 This section provides a general overview of the existing ecological baseline conditions within the Application Site and within the wider local environment.

Nature Conservation Sites (see Drawing 11/2)

- 11.82 The presence of statutory and non-statutory ecologically designated sites formed part of the study due to the need to undertake wider assessments in respect of the potential for air quality, noise and hydrological effects to occur on these receptors.
- 11.83 As a general principle a 2km radius (extended to 3km for international sites) was used around the Application Site to identify such sites during the desk study as this was considered sufficient, taking into account the exploratory nature of the development, to encompass any direct or indirect impacts.
- 11.84 The Desk Study found that the Application Site lies within the outermost SSSI Impact Risk Zone for Mattersey Hill Marsh SSSI which is situated 2.7km to the north-east. It was considered appropriate to include this site in the EcIA for this reason and due to the presence of hydrologically-dependent habitats (bog and marsh).
- 11.85 Table 11/3 provides a summary of the ecological sites based on the above approach.

Delow).			
Geographical Level	Site Name	Interest	Proximity to Application Site.
International	n/a	n/a	n/a
National	Mattersey Hill Marsh SSSI	Lowland Bogs (mixed marsh) Woodland	2.7km north east
Up to County	Tinker Lane LWS 2/414	Grassland	c.250m north and north west
Up to County	Daneshill Local Wildlife Site 2/565 Local Nature Reserve	A very rich mosaic of woodland, marsh and aquatic habitats on old sand and gravel workings	1.6km east

Table 11/3

Ecological Sites within 3km (International and National) and 2km (County and Below).

ECOLOGY 11

Geographical Level	Site Name	Interest	Proximity to Application Site.
		its plant and animal communities	-

Statutory Designated Nature Conservation Sites

- 11.86 The Application Site is not designated as a statutory nature conservation site.
- 11.87 There are no European Sites such as Special Area of Conservation (SAC) or Special Protection Area (SPA) within a 3km (or indeed within 10km) radius of the Application Site.

Mattersey Hill Marsh SSSI

- 11.88 There is one Site of Special Scientific Interest (SSSI), Mattersey Hill Marsh, which occurs within a 3 km radius at approximately 2.7km north-east of the Application site.
- 11.89 Mattersey Hill Marsh SSSI extends for 4.89 hectares (ha) and is considered to represent one of the best examples of mixed marsh in Nottinghamshire. The vegetation present is representative of marsh communities in Central and Eastern England (see Appendix 11/1 for citation).
- 11.90 The Application Site lies within the outermost radii of the SSSI Impact Risk Zone which requires Natural England to be consulted in respect of planning applications which could affect the qualifying features of the SSSI.

Local Nature Reserves

11.91 Daneshill Local Nature Reserve (LNR) is situated 1.6 km to the north-east of the Application site. The dominant habitat is the lakes and associated wetland which are important for over-wintering waterfowl. Other habitats include damp willow woodland, scrub and grassland habitats.

Non-Statutory Designated Nature Conservation Sites

- 11.92 The Application Site is not subject to any non-statutory nature conservation designation such as a Local Wildlife Site (LWS).
- 11.93 There are two non-statutory Local Wildlife Sites (LWS) within a 2km radius, as shown on Drawing TL11/2. Tinker Lane, Barnby Moor LWS is approximately 250m to the north and north-west. Daneshill LWS is situated 1.6km east and is designated for similar reasons to that of the LNR.
- 11.94 See Appendix 11/1 for further details of these sites.

Undesignated Habitats

Ancient Semi-Natural Woodland

11.95 There are no Ancient Woodland Sites within a 2km radius.

UK and Local BAP Priority Habitats

- 11.96 The Application Site contains Arable Field Margins which have been established as part of an Entry Level Stewardship Scheme. As they have been created for wildlife benefit it is considered that they fall within the definition of the UK BAP Priority Habitat Type. These features are to be retained and protected from adverse effects.
- 11.97 An area of Floodplain Grazing Marsh is identified on MAGIC to the north of the Application Site at a location in excess of 2km. The approximate extent of this habitat is shown on Drawing TL11/2. A low level of confidence is attached to the assignation of this habitat type to this area in MAGIC. Due to the distance at which it occurs, the potential for an adverse impact is negligible and it is not considered further in this EcIA.

Important Hedgerows (Hedgerow Regulations 1997)

- 11.98 Native hedgerows form the southern and eastern boundary of the Application Site. The hedgerows are trimmed to c.2m in height and are not bordered by public footpaths.
- 11.99 The species composition of the hedges in respect of woody species and their hedge base was assessed during the Phase 1 survey. The hedges were found to be species-poor and dominated by hawthorn (*Crataegus monogyna*) with some blackthorn (*Prunus spinosa*) and elder (*Sambucus nigra*). Hazel (*Corylus avellana*) occurs very rarely.
- 11.100 The hedgerows do not meet the ecological criteria relating to qualification as an important hedgerow; however these features are to be retained and protected from adverse effects by the retention of field margins and the erection of fencing.

Undesignated Habitats Present Within and Near to the Application Site

- 11.101 Drawing TL11/1 shows the locations and extent of habitats recorded within and immediately adjacent to the Application Site and any associated Target Notes (TN). A description of each TN is provided below in Table 11/4 where this is merited.
- 11.102 The majority of the Application Site is currently used for growing arable crops. It forms part of a large field (TN 2) which is bordered by trimmed hedgerows dominated by hawthorn (TN 3) which lack standard trees. The hedgerows have rough grassland margins on the inside which are

maintained as part of an Entry Level Scheme Agri-Environment Scheme (ELS).

11.103 Outside of the Application Site, approximately 25 metres, to the south-west is a narrow (c.20m wide) shelterbelt comprising of a mix of young to semimature broad-leaved and coniferous species (TN 4) including a number of non-native species. Bordering the application site to the north-east is a wide roadside verge (TN 1) with a scattering of young broad-leaved trees (planted). The outermost strip is closely mowed to maintain visibility with the remainder of the verge apparently un-managed.

Table 11/4Target Notes (see Drawing TL11/1)

Target Note	Photograph	Description
1		<u>Roadside Verge</u> with layby, field access and scattered trees which have been planted (Small- leaved lime, Ash, Beech, and Norway Maple).
		Up to 20m wide the inner verge is mown short. The outer verge appears to be un-managed as the presence of trees makes mowing difficult. This has encouraged the initial colonisation by bramble (<i>Rubus fruticosus</i>) from the hedgerow.
		The grassland sward is tall and dominated by coarse grasses such as false oat-grass (<i>Arrhenatherum elatius</i>), cock's foot (<i>Dactylus glomerata</i>) and Yorkshire fog (<i>Holcus lanatus</i>).
		Prominent forbs comprise of competitive species which are indicative of un-managed or disturbed conditions such as creeping cinquefoil (<i>Potentilla</i> <i>reptans</i>), nettle (<i>Urtica dioica</i>), horse-radish (<i>Armoracia rusticana</i>), creeping thistle (<i>Cirsium</i> <i>arvense</i>), ribwort plantain (<i>Plantago lanceolata</i>) and yarrow (<i>Achillea millefolium</i>).
		Less frequently occurring in localised patches are common knapweed (<i>Centaurea nigra</i>) and much more rarely greater knapweed (<i>C.</i> <i>scabiosa</i>), field scabious (<i>Knautia arvensis</i>), yellow-oat grass (<i>Trisetum flavescens</i>) and common restharrow (<i>Ononis repens</i>).
2		Large Arable Field
		At the time of survey sown with a carrot crop.

ECOLOGY 11



ECOLOGY 11

Target Note	Photograph	Description
4a		Cherry tree
		A surface split but with no depth.
4b		False Acacia tree
		Loose bark. No significant void or roosting opportunities inspected with endoscope by NE licensed ecologists (Level 2 class licence).
4c		Mammal excavation (rabbits)
		A series of holes within the plantation and under tree roots. Localised excavated soil. Field evidence of rabbits. Two of the holes were large enough for badger but no field evidence was found to indicate use by this species.
5		Native Hedgerow
	248.046	Trimmed and species-poor with two semi-mature oak and one ash.
5		Tinker Lane
<u>(cont)</u>		Trimmed hedgerows and retained young and semi-mature standard trees.

Protected, Rare and Notable Species of Flora and Fauna

11.104 Details of protected, rare and notable species records within a 2 km radius of the Application Site were obtained during the desk-based study and at the Application Site and its immediately surrounding area during the Phase 1 Survey where general observations and searches were made for the presence, or potential presence, of protected or notable species for flora and fauna. 11.105 See Appendix 11/1 for details of protected and notable species records.

Flora – Phase 1 and Botanical Survey 2015

Invasive Plants

- 11.106 The Phase 1 survey in August 2015, or follow-on botanical survey, did not record the presence of any invasive plant species which are listed in Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). The Act makes it an offence to plant or cause the spread of listed species in the wild.
- 11.107 It is considered that if present such species would have been evident during this stage of the growing season.

Notable Flora

- 11.108 The Application Site was subject to an initial Phase 1 Habitat Survey in August 2015. In September 2015 an experienced (Associate Member of CIEEM) ecologist from SLR visited the site to assess the botanical composition of the roadside verge (TN 1) and field margins (TN 3). Records for invertebrates encountered during the visit were also made. A survey report was produced which is provided as Appendix 11/2.
- 11.109 The conclusion which has been reached is that the grassland sward within and adjacent to the site to the north east is of poor quality with a small number of plant species of local interest occurring at low cover.

Protected and Notable Fauna – Existing Records

11.110 Records for protected and notable fauna returned by NBGRC, NWT or obtained through a review of other relevant data are summarised in Appendix 11/1.

Fauna

Mammals - Bats

- 11.111 The NBGRC and Nottinghamshire Mammal Group returned no records for bats. The NBN contains records on a 10km resolution basis for the area containing the Application Site for Daubenton's bat, long-eared bats and common pipistrelle.
- 11.112 An assessment of the potential for indirect impacts to occur in respect of bats has been undertaken in the relevant section of this EcIA.

Roosts in Buildings

11.113 The Application Site does not contain any buildings and none are present nearby (<500m in any direction).

Roosts in Trees

- 11.114 The Application Site does not contain any mature trees which could provide roosting opportunities for bats.
- 11.115 The Application Site is situated at distance from any farm buildings and no trees with the potential to support bat roosts were noted in the area forming the immediate vicinity of the site (see below) where foraging could be critical.
- 11.116 Outside of the Application Site to the south-west is a narrow shelterbelt comprising of a mix of young to semi-mature native and non-native species (TN 4). The trees closest to the application site were assessed in August 2015 and this was extended in scope to encompass the entire plantation in February 2016. No trees were found which were considered to have the potential to provide significant roosting opportunities for bats due to their young age and no further surveys in respect of tree roosts are required.

Bats - Foraging and Commuting

- 11.117 Bat records are scarce for the area, although this may reflect recording effort.
- 11.118 The Application Site is situated within an area which is intensively used for arable farming. Field sizes are large, farmsteads are scattered, watercourses / waterbodies are infrequent, woodland and tree cover is low and hedgerows tend to be species-poor and are either absent, gappy or subject to mechanical trimming.
- 11.119 The arable field itself is in intensive arable cultivation involving frequent interventions to sow crops, apply herbicides and pesticides, harvest and plough-in and is therefore unlikely to provide any significant foraging opportunities for bats.
- 11.120 For the above reasons the Application Site and surrounding area has been assessed as being unlikely to be of importance as a foraging resource for bats, with only localised opportunities present and any roosts likely to be distant.

Badger (Meles meles)

- 11.121 The NBGRC, NWT and NBN searches all contained records for badger.
- 11.122 Due to the near absence of woodland cover and permanent pasture the Application Site and wider area provides sub-optimum habitats for this species.

- 11.123 During the extended Phase 1 the Application Site and its immediate surrounding area up to 100m were inspected for field signs indicative of the presence of badgers including sett entrances, paw prints, hairs, faeces, tracks and signs of foraging.
- 11.124 No field evidence of badgers was recorded.
- 11.125 As noted in Table 11/4 two of the holes present in the feature described by TN 4c were of a size which could be used by badger but no field evidence was found of this species and use by rabbits was prevalent.

Water Vole (Arvicola amphibius)

- 11.126 The NBGRC, NWT and NBN searches all contained records for water vole.
- 11.127 There are no waterbodies or watercourses within the site or nearby with the potential to support this species.

Reptiles

- 11.128 The NBGRC and NBN searches returned records for all of the commoner species of reptile and also an old record for adder, which may now be extinct in Nottinghamshire.
- 11.129 The extended Phase 1 survey concluded that the roadside verge grassland (TN 1) could provide a habitat for the commoner species of reptile such as slow worm (*Anguis fragilis*).
- 11.130 The Phase 1 survey recommended that a reptile survey was undertaken using a combination of direct observation and the use of artificial refuges (squares of roofing felt). A survey using these recognised techniques was undertaken during September and Early October 2015. The survey did not record the presence of any reptiles.
- 11.131 See Appendix 11/3 for the full Reptile Survey Report.

Amphibians (including Great Crested Newt)

- 11.132 The NBGRC and NBN searches returned no records of Great Crested Newt (*Triturus cristatus*) (GCN) from within 2km.
- 11.133 A search of aerial photography and OS maps has not located the presence of any ponds within 500m of the Application Site and terrestrial habitats are poor.
- 11.134 No further surveys in respect of amphibians were considered to be required to inform the preparation of this EcIA.
- 11.135 The 2015 SLR reptile survey recorded the presence of a single toad (*Bufo bufo*).

Breeding Birds

- 11.136 NBGRC returned records for Corn Bunting, Lesser Redpoll and Willow Tit for the 2km search area. None of these records relate to the Application Site.
- 11.137 The NBN returned a relatively large list of birds, however, with the resolution being at a 10km level the search would also have encompassed former gravel pit sites such as Daneshill LWS and LNR which have an ornithological interest due to the presence of open water.
- 11.138 The Application Site comprises of part of a field used to grow crops and trimmed hedgerows which are both typical of the wider area. No features, which could be of value to breeding birds, such as ponds, marshy grassland or scrub are present.
- 11.139 Due to the frequency and intensity of agricultural operations within the fields themselves any nesting and feeding activity by birds is most likely to take place within field margins and hedgerows.
- 11.140 The young shelterbelt (TN 4), which is off-site, is likely to be used by a typical range of common birds associated with farmland such as carrion crow and wood pigeon for breeding between March and August inclusive.
- 11.141 The Application Site was considered to be typical of arable fields in the area and the rest of the UK and unlikely to be of critical value to the maintenance of any population of breeding birds of conservation concern taking into account the habitats present, their ubiquitous nature and intensive management for arable cropping.

Invertebrate Species

- 11.142 NBGRC returned one record for dingy skipper butterfly within the outer edge of the 2km search area see Appendix 11/1.
- 11.143 Whilst no site is without invertebrate interest, it is considered highly unlikely that the Application Site would support any protected, rare or notable invertebrate species due to the intensive nature of agricultural management which takes place.
- 11.144 The casual invertebrate records provided in Appendix 11/2 (Appendix B) and obtained through hand searches and sweeping of the roadside verge in September 2015 recorded a local interest associated with patches of common knapweed and restharrow, but no rare or scarce species. The majority of the roadside verge is unaffected by the development proposals.

Other Protected, Rare and Notable Species

11.145 During the survey no other rare or notable species were recorded. Though the site may support low numbers of common and widespread species it is considered highly unlikely that any other specially protected, rare or notable species would be present.

ECOLOGICAL PROCESSES AND TRENDS

11.146 In the absence of development there is no reason to believe that the current baseline, as described above, would change significantly over the short to long-term and intensive agricultural management would continue.

EVALUATION

Designated Ecological Sites

Statutory Nature Conservation Sites

- 11.147 Natural England (NE) notifies sites that are of national importance for nature conservation as Sites of Special Scientific Interest (SSSIs), although some sites that are of national importance for certain species have not been so designated.
- 11.148 Internationally important sites may also be designated or declared as Special Areas of Conservation (SAC), Special Protection Areas (SPA) or Ramsar sites. In some instances a site that is considered to be of national importance can also be purchased or leased by NE or other accredited bodies and declared as a National Nature Reserve.
- 11.149 Local Nature Reserves (LNR) are designated by Local Authorities under the provisions of the National Parks and Access to the Countryside Act 1949 and usually also have an amenity value.
- 11.150 No international nature conservation sites are present within a 3km radius of the centre of the Application Site.
- 11.151 Within a 3km radius, one nationally designated site, Mattersey Hill Marsh SSSI occurs 2.7km to the north-east of the Application Site.

Non-Statutory Nature Conservation Sites

- 11.152 Local Wildlife Sites (LWS) are core areas for nature conservation, which underpin local ecological networks and make a significant contribution towards both national and local biodiversity targets and objectives. They are considered to be of up to county level value.
- 11.153 The Application Site is not subject to any non-statutory nature conservation designation.
- 11.154 There are two non-statutory Local Wildlife Sites (LWS) within a 2 km radius of the Application Site, namely Tinker Lane, Barnby Moor LWS (<250m) and Daneshill LNR and LWS (>1km).

Undesignated Features of Biodiversity Importance – Valuation

11.155 For features that have not been formally recognised by a designation SLR has undertaken an evaluation based upon those guidelines suggested by CIEEM. The features being evaluated are considered in the context of the site and locality. In this way it is possible to provide a more accurate assessment of the impacts in the locality.

Habitats

- 11.156 The Application Site is not designated as a statutory or non-statutory ecological site.
- 11.157 The Application Site supports arable field margins which have been established for conservation benefit and therefore fall within the remit of a S41 Priority Habitat type.
- 11.158 Based on the findings of the initial Phase 1 Survey the Application Site is considered to be of ecological value at the lowest geographical level (i.e. Application Site level).

Biodiversity Valuation for Species

Bats - Roost Status

11.159 No buildings or trees have been identified within or near to the site with the potential to support bat roosts.

Bats – Evaluation of Foraging and Commuting Habitat Resource

11.160 The landscape within which the Application Site is situated offers few roosting opportunities and the resource in respect of foraging and commuting is considered to be generally poor.

Breeding Birds

- 11.161 The Application Site comprises of a typical arable field bordered by trimmed species-poor hedgerows with field margins.
- 11.162 The field which forms the Application Site is in intensive cultivation and was growing crops at the time of survey. Frequent mechanical interventions will take place during the growing season and its value as a habitat for ground-nesting birds is considered to be negligible, particularly as features which can be of value to this group, such as pockets of wet grassland, ponds and scrub are absent.
- 11.163 Overall, the breeding bird assemblage associated with the Application Site has been assessed as being of likely value at a site level of ecological importance only.

Social, Community or Economic Value

- 11.164 Some areas of habitat / species may not be particularly rare or of high ecological value in their own right but they may be of social or community value for a neighbourhood / community that has the use of such an area for recreational or educational use (nature trails for example). In addition to this some wild populations of animals may also be of economic value such as red grouse on heather moors that can be shot or trout in rivers that are fished, or even significant populations of birds that may attract bird watchers to a region.
- 11.165 Such an assessment is, however, centred upon those populations and areas that are considered to be natural or semi-natural.
- 11.166 The site is not considered to be of particular social or community value.

POTENTIAL IMPACTS

- 11.167 To assess the effects of a proposed development it is essential that the impacts that could arise are identified and characterised. The range of impacts that require consideration in the EcIA are based upon knowledge of the proposed development and knowledge of the receptors (features of ecological significance). This can only be undertaken with a thorough understanding of ecological processes and how flora and fauna react to the range of impacts that could occur.
- 11.168 Potential impacts are characterised in terms of their direction, permanence, certainty and reversibility. An assessment is also made of the likely significance of the impact prior to mitigation, and the significance of the residual impact, i.e. after all agreed mitigation is implemented. The degree of confidence in the likely success of mitigation, based upon published studies and the experience of the assessor, is also made and any uncertainties are clearly expressed.

Valued Ecological Receptors (VER's)

- 11.169 The following features of ecological significance have been identified through baseline studies and consultation as having the potential to be affected by the development proposals, <u>or</u> requiring further evaluation and/or comment:
 - Statutory and Non-Statutory Ecological Sites;
 - Un-designated Habitats;
 - Bats (foraging); and
 - Breeding birds.
- 11.170 The following assessment of potential impacts will consider only effects upon those features that have been identified as being of ecological significance. This may be because they are subject to legal protection rather than being of nature conservation value *per se*.

Potential Impacts

- 11.171 The potential for the following impacts has been identified and are discussed in the following section:
 - Direct and in-direct habitat loss, fragmentation and isolation through land-take;
 - Effects upon fauna;
 - Emissions to Air (including dust);
 - Effects on the water environment (surface and ground-water);
 - Noise and Vibration;
 - Visual Disturbance;
 - Artificial Lighting; and
 - Pollution

Direct Habitat Loss, Fragmentation and Isolation through Land-Take

- 11.172 Habitat loss involves the direct destruction or physical take-up of vegetation, or other structures of conservation interest, such as dead wood or bare ground. Habitat loss may also occur as a result of a change in land or water management, for instance the drying-up of ponds or successional events leading to a change in habitat type.
- 11.173 Habitat loss can result in the direct loss of individuals or populations of plant or animal species. It may also cause other populations to become demographically unstable or unsustainable, due to loss of prey species or habitat niches.
- 11.174 Fragmented and isolated habitats are likely to be more vulnerable to external factors that may have a negative effect upon them; e.g. disturbance, and may be less resilient to change, including climate and management change; than connected habitats because colonising species may be unable to reach the habitat. Due to the complexities of ecological systems, it is not possible to quantify the potential effects that may occur to isolated habitats. The potential effects upon fauna associated with fragmented habitats are considered in the next section.

Designated Ecological Sites – Statutory and Non-Statutory

11.175 The proposed development would not result in direct habitat loss, fragmentation or isolation in respect of any internationally, nationally or locally designated sites.

Undesignated Habitats

11.176 The proposed development would result in the temporary loss of part of an arable field (2.2ha). Land intensively cultivated for crop growing is of negligible ecological value.

11.177 The proposed development would result in the minor loss of a small area of species-poor hedgerow and a small number (4) of young trees in order to create a site access and provide an adequate field of vision for road safety. Such localised impacts are considered to be of minor significance.

In-Direct Habitat Loss, Fragmentation and Isolation through Land-Take

Designated Ecological Sites

11.178 The proposed development would not result in in-direct habitat loss in respect of any internationally, nationally or locally designated sites.

Other Ecological Receptors (Habitats)

11.179 The Application Site is not bordered by habitats/sites of ecological value. As such, development activities would not lead to indirect effects on adjacent sensitive habitats.

Effects upon Fauna

Bats - Potential Impacts to Foraging and Commuting Habitats

- 11.180 The field itself is considered to represent a habitat of negligible value to bats as a foraging resource and the temporary loss of 2.2ha is therefore not considered to be of ecological significance.
- 11.181 Boundary hedgerows are species-poor and are trimmed to a low height. They are largely being retained, with only a short length for the proposed site access being removed. The retained hedgerows will be protected by an 8 metre buffer and the construction of perimeter fencing (2m herras and 2.5m inner hoarding) and bunds (3m high). This will maintain connectivity with the young shelterbelt to the south west and retain a wide and dark corridor.
- 11.182 The proposed development would require artificial lighting for operational and security purposes as drilling operations would be undertaken 24 hours a day for a 4 month period. Lighting will be kept to a minimum to ensure the safety of site personnel and operation of key equipment and would be designed to be highly targeted within the operational area which is enclosed by high fencing and bunds.
- 11.183 An assessment of the proposed lighting plan and Lux contour plan shows that artificial lighting would be contained within the site and that light spill and indirect illumination of boundary hedgerows will be largely avoided.
- 11.184 Due to the absence of predicted effects and the poor quality foraging resource which occurs it is not considered that further surveys in respect of bats are necessary to inform this assessment.

Breeding Birds

- 11.185 The temporary loss of the corner of a large arable field in intensive use for cropping is not considered likely to affect the ability of any species of breeding bird of conservation significance to maintain their population.
- 11.186 Boundary hedgerows and rough-grass margins which may provide opportunities for nesting and feeding by birds as part of a wider resource will be retained and buffered.
- 11.187 The majority of the hedgerow and tree resource is to be retained and would be available for birds to use for nesting. The localised removal of a very short section of hedgerow and small number of young trees is proposed to improve the existing site access. If the removal of vegetation is required during the nesting season then a prior check would be made by an experienced ecologist. If nests are recorded then works would need to cease until such time as nesting activity has ceased and any young have fledged.
- 11.188 Due to the absence of predicted effects it is not considered that further surveys in respect of breeding birds are necessary to inform this assessment.

Emissions to Air

- 11.189 Chapter 7 (including the technical appendix 7.1) considers Air Quality (including dust).
- 11.190 The Air Pollution Information System (APIS) is a support tool for assessment of potential effects of air pollutants on habitats and species developed in partnership by the UK conservation agencies and regulatory agencies and the Centre for Ecology and Hydrology. APIS has been used to provide information on:
 - identification of whether the habitats present are sensitive;
 - critical levels (Table 2-3, Appendix 7.1) and current baseline concentrations (Table 4-6, Appendix 7.1); and
 - critical loads and current deposition rates (Tables 4-7 and 4-8, Appendix 7.1).
- 11.191 According to EPR H1 Guidance, Special Protection Areas (SPA), RAMSARs or Special Areas of Conservation (SAC) within 10km of the location of a facility should be considered; Sites of Special Scientific Interest (SSSI), Ancient Woodlands (AWL), Local Nature Reserves (LNR), National Nature Reserves (NNR) and Sites of Importance for Nature Conservation (SINC) within 2km should also be considered. The identified designated sites and broad habitat types are presented in Table 4-2 of the Technical Appendix 7.1 and their location shown in Drawing 11/2 (Ecological Sites Plan).

- 11.192 The Assessment has considered the potential for impacts to occur due to emissions to air in respect of Mattersey Hill Marsh SSSI (Ecological Receptor 1 – ER1), Tinker Lane, Barnby Moor LWS (ER2) and Daneshill LWS and LNR (ER3).
- 11.193 Impacts at all of the above sensitive ecological sites are well below the relevant critical levels and loads which if exceeded could result in a change in the composition of habitats. Actual impacts will be lower due to the duration of site operations (only 4 months for drilling generators).
- 11.194 Consideration of the potential combined impacts of combustion emission from both the onsite power generation plant and road vehicles has been undertaken for receptors affected by both sources. This has determined that there are no significant combined impacts.

Dust Deposition

- 11.195 The potential for dust to be generated during the main stages (earthworks, construction, track-out and decommissioning) have been considered together with the presence of receptors (for ecological receptors up to 500m) which are potentially sensitive to dust deposition.
- 11.196 Tinker Lane, Barnby Moor LWS is present within 250m of the Application Site although the lanes where the roadside verges occur are very narrow (see Table 11/4 TN 5) and would not be used for vehicle movements associated with the proposed development and they are protected by hedgerows. An assessment of the potential for an impact to occur due to dust deposition has been undertaken as the LWS is present within 50m of an access route (up to 500m from the site entrance).
- 11.197 Given the large standoff distances to the LWS the risk of impact occurring during construction, drilling, evaluation and de-commissioning is considered to be low.
- 11.198 As best practice for a low risk site, mitigation measures would be implemented and these are presented in Section 5.6 of the Air Quality Technical Appendix. The implementation of effective suppression techniques (see Table 5.3 of the Air Quality Technical Appendix) together with monitoring and other control methods should ensure that any impacts arising from dust deposition are avoided or minimised.

Noise and Vibration

11.199 Chapter 8 provides a detailed assessment of noise and vibration. The assessment has considered the potential effect on residential properties and human receptors and concluded that there would be no increase in ambient noise during the daytime due to drilling. Drilling would result in, at most, a temporary 1 dB increase in ambient noise in the evening and up to 3 dB at night-time. This temporary and short term increase in night-time and evening ambient noise is not considered significant.

- 11.200 The information provided by Chapter 8 on noise has been used by an ecologist to assess the likelihood and significance of an impact occurring in respect of ecological interests.
- 11.201 There are no ecological receptors present within the Application Site or nearby which are considered to be particularly sensitive to noise.
- 11.202 The noise contour maps provided in respect of the various potential rig designs show noise to be at low levels and largely contained within the site (i.e. narrow inner rings), see Appendix 8.3.
- 11.203 Any noise generated would be of a continuous nature as a rotary bore is proposed, as opposed to loud and unpredictable noise (such as that created by percussive piling operations, for example). In other comparable situations, it has been shown that local wildlife quickly becomes acclimatised to low levels of noise which is of a continuous nature.
- 11.204 Taking into account the absence of important ecological receptors and low levels of predictable noise, adverse effects on ecology are not predicted to occur.
- 11.205 In respect of vibration, there are no anticipated ecological impacts that would arise due to the absence of receptors.

Visual Disturbance

- 11.206 There are no ecological receptors present within the Application Site or nearby which are considered to be particularly sensitive to visual disturbance, such as wetlands supporting large concentrations of breeding or wintering birds.
- 11.207 The presence of perimeter fencing will provide a visual barrier in respect of the movement of vehicles and personnel within the Application Site.
- 11.208 To conclude, no adverse ecological effects are predicted to occur due to visual disturbance.

Effects on Groundwater Dependent Eco-systems

- 11.209 Chapter 9 provides a detailed assessment of the potential for indirect effects on groundwater.
- 11.210 The potential exists for hydraulic continuity with groundwater that the proposed exploratory well will be drilled through. The sensitivity of Mattersey Hill Marsh Hill SSSI is considered to be high and the sensitivity of Daneshill Nature Reserve and LWS is considered to be at a medium level.
- 11.211 The potential indirect impact as a consequence of groundwater from beneath the site passing to the Mattersey Hill Marsh SSSI and Daneshill Nature Reserve and LWS has been assessed in Chapter 9 as being negligible given

their distance from site and the very low likelihood of a pollution event occurring.

11.212 The resultant significance of effect is assessed as being negligible at both Mattersey Hill Marsh Hill SSSI and at Daneshill Local Nature Reserve (LWS and LNR).

Indirect Effects on Surface Water Dependent Eco-systems.

- 11.213 Chapter 9 provides a detailed assessment of the potential for indirect effects on surface water receptors, such as rivers and streams.
- 11.214 There are no surface water courses near to the application site. In the unlikely event of a spillage occurring on site the mitigation measures included in the site design would contain any spill and safeguard the local water environment. For example, the application site would be bunded and underlain by an impermeable liner, spill kits would be maintained on site and materials that could pose a risk to the water environment would be stored in impermeable containers sized in accordance with best practice guidance. The potential impact on surface waters and surface water dependent ecosystems is therefore considered to be of negligible significance during the establishment, drilling and restoration phases of the proposed development.

Pollution

- 11.215 A comprehensive range of control measures would be incorporated into the development to prevent or mitigate pollution to the ground, air and water. The relevant sections of the ES provide further details.
- 11.216 The likelihood of a significant pollution event is low and strict measures would be in put place in respect of emergency events in consultation with the emergency services.

SUMMARY OF EFFECTS

Statutory Sites

11.217 No likely significant effects on statutory sites arising from emissions to air or interactions with the water environment are predicted to occur.

Non-Statutory Sites

Tinker Lane, Barnby Moor LWS

11.218 No likely significant effects on the Tinker Lane, Barnby Moor LWS arising from emissions to air, dust deposition or interactions with the water environment are predicted to occur.

Daneshill LWS and LNR

11.219 No likely significant effects on the Daneshill LWS and LNR arising from emissions to air or interactions with the water environment are predicted to occur.

Habitats

- 11.220 The habitats within the site fall into the category of being "undesignated" and have been evaluated by SLR, using recognized frameworks, as being at the lowest geographical level of ecological importance, at a site-level only.
- 11.221 The development would result in the temporary loss of arable habitats extending to c. 2.2ha, a short length of species-poor hedgerow and small number (4) of young trees. Such effects are not considered to be of ecological significance above that of a local level and would not involve habitats considered to be a high priority for conservation.
- 11.222 Arable field margins are to be retained and managed in accordance with an ELS agreement.

Species

11.223 The following section considers the significance of effects likely to arise from the proposed development on the listed VER's.

Bats

11.224 There is no predicted impact on bats.

Breeding Birds

11.225 There is no predicted impact on breeding birds. It is considered that the retention and protection of the majority of the existing boundary vegetation and measures to prevent light-spill, contain noise and vibration and visual disturbance will ensure that any nesting activity associated with the boundaries of the Application Site can continue unaffected.

MITIGATION

11.226 This section outlines the mitigation measures that would be incorporated into the proposed scheme. Recommendations for mitigation are based upon what is practicable and 'reasonable' (i.e. proportionate) and would not affect the integrity of the proposed development.

General Mitigation Incorporation into Scheme

11.227 Working practices would include procedures and safeguards to monitor and mitigate the risk of pollution and dust generation.

11.228 Specific measures would be implemented to reduce noise, vibration, dust deposition and prevent light spill.

Statutory and Non-Statutory Wildlife Sites

11.229 Specific measures are proposed to ensure the protection of the water environment due to the potential for hydrological continuity within the wider area which contains, at distant locations, ecological receptors. No mitigation specific to statutory or non-statutory wildlife sites is considered necessary.

Un-designated Habitats

- 11.230 Farmland will be reinstated following the completion of the proposed development.
- 11.231 Arable Field Margins are to be retained and managed in accordance with an ELS agreement.

Protected Species

Breeding Birds

- 11.232 The nests of wild birds, regardless of how common the species are, are protected under the Wildlife and Countryside Act 1981 (as amended) whilst they are occupied or being built.
- 11.233 If the removal of vegetation is required during the nesting season (March to August inclusive) then a prior check should be made by an experienced ecologist. If nests are recorded then works would need to cease until such time as nesting activity has ceased and any young have fledged.

Other Species

11.234 It is considered that no other mitigation measures for protected species are required, or that any other protected species would be impacted upon.

ENHANCEMENT

- 11.235 No enhancement measures solely for ecology are deemed necessary or are proposed due to the absence of ecological impacts.
- 11.236 Chapter 10 (Landscape and Visual Assessment) proposes for reasons of screening that existing hedgerows around the perimeter of the site would be allowed to grow out / in height, by cutting sides only (whilst avoiding sight lines for road access) and that there would be strengthening/infill planting of hedgerows around the site using locally native tree species to increase landscape structure, enclosure / screening and habitat connectivity. Such measures would be of local benefit for ecology, for example, by increasing nesting opportunities for birds.

ASSESSMENT OF RESIDUAL IMPACTS

Ecological Sites

11.237 No residual impacts following the implementation of avoidance and/or mitigation measures are predicted.

Habitats

11.238 No residual impacts following the implementation of avoidance and/or mitigation measures are predicted.

Protected and Notable Species

11.239 No residual impacts following the implementation of avoidance and/or mitigation measures are predicted.

CUMULATIVE EFFECTS

11.240 An assessment of the potential for indirect effects on statutory and nonstatutory sites and species in combination with other developments in the area has been undertaken and having regard to the conclusions of the noise, air quality and water assessments, no significant adverse cumulative impacts are predicted to occur on ecological sites or species.

CONCLUSIONS

- 11.241 SLR Consulting has undertaken a detailed Ecological Impact Assessment of potential impacts associated with the proposed Exploratory Well at Tinker Lane, between Blyth and Barnby Moor (the Application Site).
- 11.242 The scope of the work has included a desk study, Phase 1 Survey and follow-on botanical and reptile surveys. The site based work has mapped and described the main habitat types and considered the potential for protected and notable species to occur.
- 11.243 There has also been technical input into air quality, lighting, noise and hydrological studies as the potential exists for an ecological interaction to occur.
- 11.244 The desk study revealed that the Application Site is not the subject of any statutory or non-statutory ecological site designations (i.e. as SSSI, Local Wildlife Site or Local Nature Reserve).
- 11.245 The study identified the presence, within a 3km radius, of Mattersey Hill Marsh SSSI and within 2km of Tinker Lane, Barnby Moor LWS and Daneshill LNR and LWS. Of these the Tinker Lane, LWS is the closest, being present within 250m of the Application Site.

- 11.246 Detailed assessments of the potential for direct and indirect effects on statutory and non-statutory sites has been undertaken which has concluded that subject to the implementation of appropriate avoidance, control and mitigation measures no significance adverse impacts are predicted to occur.
- 11.247 The Application Site comprises of part of an intensively managed arable field bordered by low trimmed, species-poor, hedgerows. As such, it does not support undesignated habitats of high conservation value and none are present nearby.
- 11.248 An appraisal of the site undertaken by qualified ecologists has concluded that the arable habitats which occur are ubiquitous and anthropogenic (manmade) in character and of ecological value at "site" level only.
- 11.249 The potential for protected species to occur within or near to the Application Site has been assessed as being very low. A specific survey undertaken in autumn 2015 did not record the presence of any reptiles.
- 11.250 The application proposes measures to protect and buffer boundary hedgerows and margins from direct damage and to ensure that in-direct effects including light spill, noise and visual disturbance are avoided. Provided these measures are adopted in full it is considered that any use of these features by breeding birds and bats will continue and be unaffected.
- 11.251 The localised removal of young trees and hedgerow to improve the existing site access would be undertaken outside of the bird nesting season or be preceded by a check by an appropriately qualified ecologist.
- 11.252 This EcIA concludes that no significant residual effects on Valued Ecological Receptors (VER's) are predicted and that there are no overriding ecological reasons why the proposed development should not proceed.