

The Keadby 3 Low Carbon Gas Power Station Project

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The Keadby 3 (Carbon Capture Equipped Gas Fired Generating Station) Order

Land at and in the vicinity of the Keadby Power Station site, Trentside, Keadby, North Lincolnshire

Landscaping and Biodiversity Management and Enhancement Plan

The Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 – Regulation 5(2)(q)

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GLOSSARY

Abbreviation	Description
AGI	Above Ground Installation - installations used to support the safe and efficient operation of a pipeline; above ground installations are needed at the start and end of a cross-country pipeline and at intervals along the route.
AIL	Abnormal Indivisible Load - a load that cannot be broken down into smaller loads for transport without undue expense or risk of damage. It may also be a load that exceeds certain parameters for weight, length and width.
CCGT	Combined Cycle Gas Turbine - a highly efficient form of energy generation technology. An assembly of heat engines work in tandem using the same source of heat to convert it into mechanical energy which drives electrical generators and consequently generates electricity.
CCUS	Carbon Capture, Usage and Storage - group of technologies designed to reduce the amount of carbon dioxide (CO ₂) released into the atmosphere from coal and gas power stations as well as heavy industry including cement and steel production. Once captured, the CO ₂ can be either re-used in various products, such as cement or plastics (utilisation), or stored in geological formations deep underground (storage).
CEMP	Construction Environmental Management Plan - a plan to outline how a construction project will avoid, minimise or mitigate effects on the environment and surrounding area.
CoW	Clerk of Works - a person who oversees building work in progress.
DCO	Development Consent Order - made by the relevant Secretary of State pursuant to The Planning Act 2008 to authorise a Nationally Significant Infrastructure Project. A DCO can incorporate or remove the need for a range of consents which would otherwise be required for a development. A DCO can also include rights of compulsory acquisition.
Defra	Department for Environment, Food and Rural Affairs

Abbreviation	Description
EIA Regulations	Environmental Impact Assessment Regulations 2017
ES	Environmental Statement - a report in which the process and results of an Environment Impact Assessment are documented.
HP	High Pressure
INNS	Invasive Non-native Species - species that have occurred outside of their natural range. Invasive species have the potential to hinder or prevent survival of others within the ecosystem.
ISMP	Invasive Species Management Plan - preventing and managing the spread of invasive species and their potential impacts.
LBAP	Local Biodiversity Action Partnership – partnerships that operate at a local authority level and help conserve and enhance biodiversity. The partnerships deliver a wide range of biodiversity conservation, communication and education work in their local areas.
LBMEP	Landscape and Biodiversity Management and Enhancement Plan
MW	Megawatt – unit of power.
NEP	The Northern Endurance Partnership - a partnership between bp, Eni, Equinor, National Grid, Shell and Total to develop infrastructure to transport and store CO2 emissions.
NLC	North Lincolnshire Council
NPPF	<p>The National Planning Policy Framework – Policy Framework which first came into effect in March 2012 (with some transitional arrangements) replacing the majority of national planning policy other than NPSs. A revision of the NPPF was published in July 2018 by the Ministry of Housing, Communities and Local Government and updated again in February 2019.</p> <p>The NPPF is part of the Government's reform of the planning system intended to make it less complex, to protect the environment and to promote sustainable growth. It does not contain any specific policies on Nationally Significant Infrastructure Projects, but its policies may be considered in decisions on DCOs if the Secretary of State considers them to be 'relevant'.</p>
NPS	National Policy Statements – statements produced by Government under the Planning Act 2008 providing the policy framework for Nationally Significant Infrastructure Projects. They include the Government's view of the need for and objectives for the development of Nationally Significant Infrastructure Projects in a particular sector such as energy and are used to determine applications for such development.

Abbreviation	Description
NSIP	<p>Nationally Significant Infrastructure Projects – defined by the Planning Act 2008 and covers projects relating to energy (including generating stations, electric lines and pipelines); transport (including trunk roads and motorways, airports, harbour facilities, railways and rail freight interchanges); water (dams and reservoirs, and the transfer of water resources); waste water treatment plants and hazardous waste facilities.</p> <p>These projects are only defined as nationally significant if they satisfy a statutory threshold in terms of their scale or effect.</p>
OMH	Open Mosaic Habitats - found mainly in urban and formerly industrial areas and have high biodiversity value.
The Order	The Keadby 3 (Carbon Capture Equipped Gas Fired Generating Station) Order
PCC	Power and Carbon Capture
PINS	Planning Inspectorate - executive agency of the Department for Communities and Local Government of the United Kingdom Government. It is responsible for determining final outcomes of town planning.
SoS	Secretary of State - title typically held by Cabinet Ministers in charge of Government Departments.
WCA	Wildlife Countryside Act 1981 (as amended) – legislation for the protection of animals, plants and certain habitats in the UK.
ZCH	Zero Carbon Humber - a consortium of energy and industrial companies and academic institutions with a shared vision to transform the Humber region into the UK's first net-zero carbon cluster by 2040.

CONTENTS

Executive Summary	vi
1.0 Introduction.....	1
1.1 Overview	1
1.2 The Applicant	1
1.3 What is Carbon Capture, Usage and Storage?	2
1.4 The Proposed Development.....	3
1.5 The Proposed Development Site.....	6
1.6 The Development Consent Process	8
1.7 The Purpose of this Document.....	8
2.0 Legislation and Planning Policy.....	10
2.1 Overview	10
2.2 Legislation	10
2.3 Planning Policy.....	10
2.4 Other Guidance	11
3.0 Existing Landscape and Biodiversity Features and Development Impacts.....	12
3.1 Existing Landscape and Biodiversity Features	12
3.2 Impacts on Landscape and Biodiversity Features	13
4.0 Impact Avoidance Requirements.....	16
4.1 Overview	16
4.2 Protected and Invasive Species Update Surveys.....	16
4.3 Protected Species Licences	17
4.4 Clerk of Works.....	18
4.5 Tree Works.....	19
4.6 Built Structures	19
4.7 Precautionary Working Methods	20
4.8 Animal Welfare Requirements.....	23
4.9 Lighting.....	24
4.10 Habitat Reinstatement.....	24
5.0 Landscape and Biodiversity Enhancement.....	28
5.1 Approach	28
5.2 Habitat Enhancements	29
5.3 Comparison of Permanent Habitat Losses and Gains.....	36
6.0 Monitoring.....	40
7.0 Roles and Responsibilities	41
7.1 The Applicant and/ or the Appointed Main Contractor.....	41
7.2 The Appointed Ecologist.....	41
7.3 The Appointed Landscape Architect/ Arboriculturalist	42
8.0 References	43
Figures	45

APPENDIX

APPENDIX A Seed Mixtures.....	46
APPENDIX B Barn Owl Tower Design Parameters	48

APPENDIX C	Maintenance Regimes.....	49
APPENDIX D	Output from Habitat Loss/ Gain Calculator.....	51

EXECUTIVE SUMMARY

- 1 This Landscaping and Biodiversity Management and Enhancement Plan (LBMEP) has been prepared on behalf of Keadby Generation Limited (the Applicant) and forms part of the application for development consent for the construction, operation (including maintenance) and decommissioning of a new low carbon gas fired electricity generating station (the Proposed Development). The Proposed Development is predominantly located within the wider Keadby Power Station site, to the west of Keadby 2 Power Station, in North Lincolnshire.
- 2 The purpose of this document is to set out the measures proposed to mitigate the potential impacts and effects of the Proposed Development on landscape and biodiversity features, and to enhance the biodiversity, landscape and green infrastructure value of the Proposed Development Site. The final LBMEP will be agreed as a Requirement of the draft DCO (**Application Document Ref. 2.1**).
- 3 The Proposed Development has been designed, as far as is practicable, to avoid or reduce effects on landscape and biodiversity features through careful siting, development design and impact avoidance. These include measures to avoid impacts on protected species to comply with legislation (see **Chapter 11: Biodiversity and Nature Conservation** (ES Volume I - **Application Document Ref. 6.2**)).
- 4 The ecological impact assessment (**Chapter 11: Biodiversity and Nature Conservation** (ES Volume I - **Application Document Ref. 6.2**)) identifies that the careful siting of the Proposed Development to avoid sensitive habitats has minimised potential for sensitive habitats and species to be adversely affected. Consequently, no likely significant ecological effects are predicted. However, the assessment still identifies a need for proportionate embedded ecological mitigation for purposes of good practice and legislative compliance. Habitat re-instatement and enhancement is also required in order to demonstrate no net loss and a net gain of biodiversity in accordance with the requirements of national and local planning policy.
- 5 The landscape and visual impact assessment (**Chapter 14: Landscape and Visual Amenity** (ES Volume I - **Application Document Ref. 6.2**)) concludes that the Proposed Development will result in significant adverse effects on visual amenity during construction and operation from three of the assessed viewpoints as a result of the close distance to the Proposed Development Site and lack of intervening vegetation:
 - Viewpoint 1 (Chapel Lane West, Keadby);
 - Viewpoint 2 (Gate Keepers Residence (Vazon Bridge), Keadby); and
 - Viewpoint 4 (PRoW (KEAD9, KEAD10) north of Keadby).

- 6 However, the opportunity for mitigation of the visual effects of the Proposed Development is limited due to the size and scale of the Proposed Development. As shown in the assessment, the effects on visual amenity largely relate to the height of the tallest structures and as such it is considered that the addition of landscape features such as trees and woodland would not be effective in reducing the effects on visual amenity. However, there remains a need for enhancements to the landscape character and improvements to the green infrastructure network, to meet requirements of local and national planning policy.
- 7 This document outlines the landscape and biodiversity impact avoidance measures that will be implemented prior to, and during, construction of the Proposed Development, as well as the habitat reinstatement, enhancement, management and monitoring measures to be implemented once the Proposed Development is operational. This would be controlled and implemented through the final CEMP that will be developed by the contractor. A Framework CEMP is provided as **Application Doc Ref. 7.1**.
- 8 The proposed landscape and biodiversity enhancement measures are summarised below. The proposals have been designed to be delivered within the existing land ownership of the Applicant and focus on enhancing the value of existing habitats within the vicinity of the Proposed Development to include:
- creation of flower-rich native grassland;
 - new species-rich native hedgerow plantings;
 - enhancement of field drains for water voles and other aquatic biodiversity; and
 - installation of nest boxes for barn owl and other birds, habitat creation for willow tit, and installation of roosting boxes for bats.
- 9 The Natural England Biodiversity Metric 2.0 has been used to quantify the biodiversity value of the habitats to be lost, restored and enhanced to demonstrate that there will be no net loss and that overall, there will be a net gain of biodiversity as a result of the Proposed Development. In the limited instances (as explained in the main text) where it is not been possible to compensate like for like for habitat loss (e.g. loss of scrub) then functionally comparable habitat will be provided (e.g. new hedgerow plantings).
- 10 The proposed locations for flower-rich native grassland includes areas directly connected to, and therefore enhancing, two habitat corridors associated with Local Wildlife Sites (LWS), namely Stainforth and Keadby Canal Corridor LWS and Hatfield Waste Drain LWS.

1.0 INTRODUCTION

1.1 Overview

- 1.1.1 This Landscaping and Biodiversity Management and Enhancement Plan (LBMEP) (**Application Document Ref. 5.10**) has been prepared by AECOM on behalf of Keadby Generation Limited ('the Applicant') which is a wholly owned subsidiary of SSE plc. It forms part of the application (the 'Application') for a Development Consent Order (a 'DCO'), that has been submitted to the Secretary of State (the 'SoS') for Business, Energy and Industrial Strategy, under Section 37 of 'The Planning Act 2008' (the '2008 Act').
- 1.1.2 The Applicant is seeking development consent for the construction, operation and maintenance of a new low carbon Combined Cycle Gas Turbine (CCGT) Generating Station ('the Proposed Development') on land at, and in the vicinity of, the existing Keadby Power Station, Trentside, Keadby, Scunthorpe DN17 3EF (the 'Proposed Development Site').
- 1.1.3 The Proposed Development is a new electricity generating station of up to 910 megawatts (MW) gross electrical output, equipped with carbon capture and compression plant and fuelled by natural gas, on land to the west of Keadby 1 Power Station and the (under construction) Keadby 2 Power Station, including connections for cooling water, electrical, gas and utilities, construction laydown areas and other associated development. It is described in **Chapter 4: The Proposed Development of the Environmental Statement (ES)** (ES Volume I - **Application Document Ref. No. 6.2**).
- 1.1.4 The Proposed Development falls within the definition of a 'Nationally Significant Infrastructure Project' (NSIP) under Section 14(1)(a) and Sections 15(1) and (2) of the 2008 Act, as it is an onshore generating station in England that would have a generating capacity greater than 50MW electrical output (50MWe). As such, a DCO application is required to authorise the Proposed Development in accordance with Section 31 of the 2008 Act.
- 1.1.5 The DCO, if made by the SoS, would be known as 'The Keadby 3 Low Carbon Gas Fired Generating Power Station Order' (the Order).

1.2 The Applicant

- 1.2.1 The Applicant, Keadby Generation Limited, is the freehold owner of a large part of the Proposed Development Site and is a wholly owned subsidiary of the FTSE 100-listed SSE plc, one of the UK's largest and broadest-based energy companies, and the country's leading developer of renewable energy generation. Over the last 20 years, SSE plc has invested over £20bn to deliver industry-leading offshore wind, onshore wind, CCGT, energy from waste, biomass, energy networks and gas storage projects. The Applicant owns and operates the adjacent Keadby 1 Power Station and is in the process of constructing Keadby 2 Power Station. SSE operates the Keadby Windfarm which lies to the north and south of the Proposed Development Site and

generates renewable energy from 34 turbines, with a total installed generation capacity of 68MW.

- 1.2.2 SSE has produced a 'Greenprint' document (SSE plc, 2020a) that sets out a clear commitment to investment in low carbon power infrastructure, working with government and other stakeholders to create a net zero power system by 2040. This includes investment in flexible sources of electricity generation and storage for times of low renewable output which will complement other renewable generating sources, using low carbon fuels and/ or capturing and storing carbon emissions. SSE is working with leading organisations across the UK to accelerate the development of carbon capture, usage and storage ('CCUS') clusters, including Equinor and National Grid Carbon.
- 1.2.3 The design of the Proposed Development demonstrates this commitment. The Proposed Development will be built with a clear route to decarbonisation, being equipped with post-combustion carbon capture technology, consistent with SSE's commitment to reduce the carbon intensity of electricity generated by 60% by 2030, compared to 2018 levels (SSE plc, 2020b). It is intended that the Proposed Development will connect to infrastructure that will be delivered by the Zero Carbon Humber (ZCH) Partnership¹ and Northern Endurance Partnership (NEP)² for the transport and offshore geological storage of carbon dioxide.

1.3 What is Carbon Capture, Usage and Storage?

- 1.3.1 CCUS is a process that removes carbon dioxide emissions at source, for example emissions from a power station or industrial installation, and then compresses the carbon dioxide so that it can be safely transported to secure underground geological storage sites. It is then injected into layers of solid rock filled with interconnected pores where the carbon dioxide becomes trapped and locked in place, preventing it from being released into the atmosphere. Plate 1 shows what is involved in the process.

¹ <https://www.zerocarbonhumber.co.uk/the-vision/>

² <https://www.zerocarbonhumber.co.uk/news/northern-endurance-partnership/>

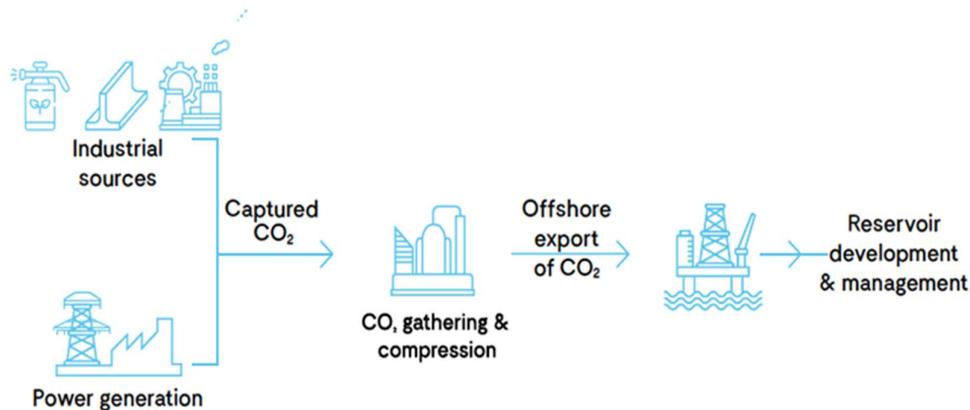


Plate 1: Illustration of the Carbon Capture, Usage and Storage

- 1.3.2 The technologies used in CCUS are proven and have been used safely across the world for many years. Geological storage sites are located far underground and are subject to stringent tests to ensure that they are geologically suitable. It is expected that the storage sites will be located offshore, in areas such as the North Sea. The NEP has been formed to develop the offshore infrastructure to transport and store carbon dioxide emissions in the North Sea.
- 1.3.3 CCUS is crucial to reducing carbon dioxide emissions and combatting global warming. The UK Government has committed to achieving Net Zero in terms of greenhouse gas emissions by 2050. This is a legally binding target. UK Government policy further states that the *'deployment of power CCUS projects will play a key role in the decarbonisation of the electricity system at low cost'* (HM Government, 2020a, page 47).
- 1.3.4 The Proposed Development will provide up to 910MWe (gross) of dispatchable capacity and capture some 2 million tonnes of carbon dioxide per annum, dependent upon the turbine equipment chosen and the running hours of the plant. The Proposed Development could be up and running by the mid-2020s and will facilitate the timely development of a major CCUS cluster in the Humber region, making an important contribution towards the achievement of Net Zero by 2050.

1.4 The Proposed Development

- 1.4.1 The Proposed Development will work by capturing carbon dioxide emissions from the gas-fired power station and connecting into the ZCH Partnership export pipeline and gathering network for onward transport to the Endurance saline aquifer under the North Sea.
- 1.4.2 The Proposed Development would comprise a low carbon gas fired power station with a gross electrical output capacity of up to 910MWe and associated

buildings, structures and plant and other associated development defined in the Schedule 1 of the draft DCO (**Application Document Ref. No. 2.1**) as Work No. 1 – 11 and shown on the Works Plans (**Application Document Ref. No. 4.3**).

1.4.3 At this stage, the final technology selection cannot yet be made as it will be determined by various technical and economic considerations and will be influenced by future UK Government policy and regulation. The design of the Proposed Development therefore incorporates a necessary degree of flexibility to allow for the future selection of the preferred technology in the light of prevailing policy, regulatory and market conditions once a DCO is made.

1.4.4 The Proposed Development will include:

- a carbon capture equipped electricity generating station including a CCGT plant (**Work No. 1A**) with integrated cooling infrastructure (**Work No. 1B**), and carbon dioxide capture plant (CCP) including conditioning and compression equipment, carbon dioxide absorption unit(s) and stack(s) (**Work No. 1C**), natural gas receiving facility (**Work No. 1D**), supporting uses including control room, workshops, stores, raw and demineralised water tanks and permanent laydown area (**Work No. 1E**), and associated utilities, various pipework, water treatment plant, wastewater treatment, firefighting equipment, emergency diesel generator, gatehouse, chemical storage facilities, other minor infrastructure and auxiliaries/ services (all located in the area referred to as the 'Proposed Power and Carbon Capture (PCC) Site' and which together form **Work No. 1**);
- natural gas pipeline from the existing National Grid Gas high pressure (HP) gas pipeline within the Proposed Development Site to supply the Proposed PCC Site including an above ground installation (AGI) for National Grid Gas's apparatus (**Work No. 2A**) and the Applicant's apparatus (**Work No. 2B**) (the 'Gas Connection Corridor');
- electrical connection works to and from the existing National Grid 400kV Substation for the export of electricity (**Work No. 3A**) (the 'Electrical Connection Area to National Grid 400kV Substation');
- electrical connection works to and from the existing Northern Powergrid 132kV Substation for the supply of electricity at up to 132kV to the Proposed PCC Site, and associated plant and equipment (**Work No. 3B**) (the 'Potential Electrical Connection to Northern Powergrid 132kV Substation');
- Water Connection Corridors to provide cooling and make-up water including:
 - underground and/ or overground water supply pipeline(s) and intake structures within the Stainforth and Keadby Canal, including temporary cofferdam (**Work No. 4A**) (the 'Canal Water Abstraction Option');
 - in the event that the canal abstraction option is not available, works to the existing Keadby 1 power station cooling water supply pipelines and

- intake structures within the River Trent, including temporary cofferdam (**Work No. 4B**) (the 'River Water Abstraction Option');
- works to and use of an existing outfall and associated pipework for the discharge of return cooling water and treated wastewater to the River Trent (**Work No. 5**) (the 'Water Discharge Corridor');
 - towns water connection pipeline from existing water supply within the Keadby Power Station to provide potable water (**Work No. 6**);
 - above ground carbon dioxide compression and export infrastructure comprising an above ground installation (AGI) for the undertaker's apparatus including deoxygenation, dehydration, staged compression facilities, outlet metering, and electrical connection (**Work No. 7A**) and an above ground installation (AGI) for National Grid Carbon's apparatus (**Work No. 7B**);
 - new permanent access from A18, comprising the maintenance and improvement of an existing private access road from the junction with the A18 including the western private bridge crossing of the Hatfield Waste Drain (**Work No. 8A**) and installation of a layby and gatehouse (**Work No. 8B**), and an emergency vehicle and pedestrian access road comprising the maintenance and improvement of an existing private track running between the Proposed PCC Site and Chapel Lane, Keadby and including new private bridge (**Work No. 8C**);
 - temporary construction and laydown areas including contractor facilities and parking (**Work No. 9A**), and access to these using the existing private roads from the A18 and the existing private bridge crossings, including the replacement of the western existing private bridge crossing known as 'Mabey Bridge' over Hatfield Waste Drain (**Work No. 9B**) and a temporary construction laydown area associated with that bridge replacement (**Work No. 9C**);
 - temporary retention, improvement and subsequent removal of an existing Additional Abnormal Indivisible Load Haulage Route (**Work No. 10A**) and temporary use, maintenance, and placement of mobile crane(s) at the existing Railway Wharf jetty for a Waterborne Transport Offloading Area (**Work No. 10B**);
 - landscaping and biodiversity enhancement measures (**Work No. 11A**) and security fencing and boundary treatments (**Work No. 11B**); and
 - associated development including: surface water drainage systems; pipeline and cable connections between parts of the Proposed Development Site; hard standings and hard landscaping; soft landscaping, including bunds and embankments; external lighting, including lighting columns; gatehouses and weighbridges; closed circuit television cameras and columns and other security measures; site preparation works including clearance, demolition, earthworks, works to protect buildings and land, and utility connections; accesses, roads, roadways and vehicle and cycle

parking; pedestrian and cycle routes; and temporary works associated with the maintenance of the authorised development.

- 1.4.5 The Applicant will be responsible for the construction, operation (including maintenance) and eventual decommissioning of the Proposed Development, with the exception of the National Grid Gas compound works (**Work No. 2A**), the works within the National Grid Electricity Transmission 400kV substation (part of **Work No. 3A**), the works within the Northern Powergrid 132kV substation (part of **Work No. 3B**), and the National Grid Carbon compound works (**Work No. 7B**), which will be the responsibility of those named beneficiaries.
- 1.4.6 The Proposed Development includes the equipment required for the capture and compression of carbon dioxide emissions from the generating station so that it is capable of being transported off-site. ZCH Partnership will be responsible for the construction, operation and decommissioning of the carbon dioxide gathering network linking onshore power and industrial facilities including the Proposed Development in the Humber Region. The carbon dioxide export pipeline does not, therefore, form part of the Proposed Development and is not included in the Application but will be the subject of separate consent applications by third parties, such as the Humber Low Carbon Pipeline DCO Project by National Grid Carbon .
- 1.4.7 The Proposed Development will operate 24 hours per day, 7 days per week with programmed offline periods for maintenance. It is anticipated that in the event of CCP maintenance outages, for example, it will be necessary to operate the Proposed Development without carbon capture, with exhaust gases from the CCGT being routed via the Heat Recovery Steam Generator (HRSG) stack.
- 1.4.8 Various types of associated and ancillary development further required in connection with and subsidiary to the above works are detailed in Schedule 1 'Authorised Development' of the draft DCO (**Application Document Ref. 2.1**). This along with **Chapter 4: The Proposed Development in the ES Volume I (Application Document Ref. 6.2)** provides further description of the Proposed Development. The areas within which each numbered Work (component) of the Proposed Development are to be built are defined by the coloured and hatched areas on the Works Plans (**Application Document Ref. 4.3**).

1.5 The Proposed Development Site

- 1.5.1 The Proposed Development Site (the 'Order Limits') is located within and near to the existing Keadby Power Station site near Scunthorpe, Lincolnshire and lies within the administrative boundary of North Lincolnshire Council (NLC). The majority of land is within the ownership or control of the Applicant (or SSE associated companies) and is centred on national grid reference 482351, 411796.

- 1.5.2 The existing Keadby Power Station site currently encompasses the operational Keadby 1 and (under construction) Keadby 2 Power Station sites, including the Keadby 2 Power Station Carbon Capture and Readiness reserve space.
- 1.5.3 The Proposed Development Site encompasses an area of approximately 69.4 hectares (ha). This includes an area of approximately 18.7ha to the west of Keadby 2 Power Station in which the generating station (CCGT plant, cooling infrastructure and CCP) and gas connection will be developed (the Proposed PCC Site).
- 1.5.4 The Proposed Development Site includes other areas including:
- Previously developed land, along with gas, towns water and other connections, and access routes, within the Keadby Power Station site;
 - the National Grid 400kV Substation located directly adjacent to the Proposed PCC Site, through which electricity generated by the Proposed Development will be exported;
 - Emergency Vehicle Access Road and Potential Electrical Connection to Northern Powergrid Substation, the routes of which utilise an existing farm access track towards Chapel Lane and land within the existing Northern Powergrid substation on Chapel Lane;
 - Water Connection Corridors:
 - Canal Water Abstraction Option which includes land within the existing Keadby Power Station site with an intake adjacent to the Keadby 2 Power Station intake and pumping station and interconnecting pipework;
 - River Water Abstraction Option which includes a corridor that spans Trent Road and encompasses the existing Keadby Power Station pumping station, below ground cooling water pipework, and infrastructure within the River Trent; and
 - a Water Discharge Corridor which includes an existing discharge pipeline and outfall to the River Trent and follows a route of an existing easement for Keadby 1 Power Station;
 - an existing river wharf at Railway Wharf (the Waterborne Transport Offloading Area) and existing temporary haul road into the into the existing Keadby 1 Power Station Site (the 'Additional Abnormal Indivisible Load (AIL) Route');
 - a number of temporary Construction Laydown Areas on previously developed land and adjoining agricultural land; and
 - land at the A18 Junction and an existing site access road, including two existing private bridge crossing of the Hatfield Waste Drain lying west of Pilfrey Farm (the western of which is known as Mabey Bridge, to be replaced, and the eastern of which is termed Skew Bridge) and an existing temporary gatehouse, to be replaced in permanent form.

- 1.5.5 In the vicinity of the Proposed Development Site the River Trent is tidal, therefore parts of the Proposed Development Site are within the UK marine area. No harbour works are proposed.
- 1.5.6 Further description of the Proposed Development Site and its surroundings is provided in **Chapter 3: The Site and Surrounding Area** in ES Volume I (**Application Document Ref. 6.2**).

1.6 The Development Consent Process

- 1.6.1 As a NSIP project, the Applicant is required to obtain a DCO to construct, operate and maintain the generating station, under Section 31 of the 2008 Act. Sections 42 to 48 of the 2008 Act govern the consultation that the promoter must carry out before submitting an application for a DCO and Section 37 of the 2008 Act governs the form, content and accompanying documents that are required as part of a DCO application. These requirements are implemented through the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended) ('APFP Regulations') which state that an application must be accompanied by an ES, where a development is considered to be 'EIA development' under the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the EIA Regulations).
- 1.6.2 An application for development consent for the Proposed Development has been submitted to the Planning Inspectorate (PINS) acting on behalf of the Secretary of State. Subject to the Application being accepted (which will be decided within a period of 28 days following receipt of the Application), PINS will then examine it and make a recommendation to the Secretary of State, who will then decide whether to make (grant) the DCO.

1.7 The Purpose of this Document

- 1.7.1 The purpose of this document is to set out the measures proposed to mitigate the effects of the Proposed Development on landscape and biodiversity features, and to enhance the biodiversity, landscape and green infrastructure value of the Site, to secure compliance with relevant national and local planning policies.
- 1.7.2 In order to avoid potential conflicts in approach to impact avoidance and enhancement, this document identifies the measures required for both landscape and biodiversity together, to demonstrate a cohesive strategy.
- 1.7.3 The document is structured as follows:
- Section 2 summarises relevant legislation and planning policy;
 - Section 3 describes the existing landscape and biodiversity features and the potential impacts and effects of the Proposed Development;

- Section 4 outlines the requirements for impact avoidance, both during advance works and during the construction phase;
- Section 5 describes the proposals for landscape and biodiversity enhancement and the measures required for their effective management and maintenance. The areas of the Proposed Development Site to which the different proposals will be applied are illustrated in **Figure 1**;
- Section 6 describes the high-level approach to monitoring of the success of the proposed landscape and biodiversity habitat interventions; and
- Section 7 describes the roles and responsibilities of all parties involved in the delivery of the management and enhancement proposals.

2.0 LEGISLATION AND PLANNING POLICY

2.1 Overview

2.1.1 The legislation and planning policy relevant to construction of the Proposed Development and the specification of landscape and biodiversity mitigation and enhancement is listed in this section. This legislation and planning policy have been considered when formulating this Plan. **Appendix 11A: Biodiversity and Nature Conservation Legislation and Planning Policy (ES Volume II – Application Document Ref. 6.3)** provides more details on this relevant legislation and planning policy for biodiversity.

2.2 Legislation

2.2.1 The following legislation has been considered in the preparation of this Plan:

- The Conservation of Habitats and Species Regulations 2017 (as amended);
- Wildlife and Countryside Act (WCA) 1981 (as amended);
- Countryside and Rights of Way Act 2000;
- Natural Environment and Rural Communities (NERC) Act 2006;
- Protection of Badgers Act 1992;
- Wild Mammals (Protection) Act 1996;
- Environmental Protection Act 1990; and
- Invasive Alien Species (Enforcement and Permitting) Order 2019.

2.3 Planning Policy

2.3.1 Relevant national planning policy that has been considered in relation to landscape and biodiversity impact avoidance, mitigation and enhancement is as follows:

- Overarching National Policy Statement (NPS) for Energy (EN-1) (Department for Energy and Climate Change (DECC), 2011a);
- NPS for Fossil Fuel Electricity Generating Infrastructure (EN-2) (DECC, 2011b);
- National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government (MHCLG), 2019); and
- European Landscape Convention (Council of Europe, 2000).

2.3.2 The local planning policies that are relevant to the Proposed Development Site are set out in the following documents:

- North Lincolnshire Local Plan Saved Policy LC5: Species Protection (NLC, 2003a);
- North Lincolnshire Local Plan Saved Policy LC6: Habitat Creation (NLC, 2003a);
- North Lincolnshire Local Plan Saved Policy LC12: Protection of Trees, Woodland and Hedgerows (NLC, 2003a);
- Emerging North Lincolnshire New Local Plan Policy DQE3p: Biodiversity and Geodiversity (NLC, 2020); and
- Emerging North Lincolnshire New Local Plan Policy DQE8p: Climate Change and Low Carbon Living (NLC, 2020).

2.4 Other Guidance

2.4.1 Other guidance that is relevant context includes:

- North Lincolnshire Supplementary Planning Guidance 3: Design in the Countryside (NLC, 2003b);
- Natural England, Forestry Commission and Department for Environment, Food and Rural Affairs (Defra) Standing Advice on protected sites and species (gov.uk);
- The National Pollinator Strategy (Defra, 2014);
- Local Biodiversity Action Plan (LBAP) for Lincolnshire (Lincolnshire Biodiversity Partnership, 2011);
- Humberhead Levels National Character Area (NCA Profile 39) (Natural England, 2014); and
- North Lincolnshire Landscape Character Assessment and Guidelines (Trent Levels Landscape Character Area and Flat Drained Farmland Landscape Character Type) (NLC, 1999).

3.0 EXISTING LANDSCAPE AND BIODIVERSITY FEATURES AND DEVELOPMENT IMPACTS

3.1 Existing Landscape and Biodiversity Features

Habitats

3.1.1 The habitats of relevance to this Plan are described in **Appendix 11C: Preliminary Ecological Appraisal Report (ES Volume II – Application Document Ref. 6.3)**.

3.1.2 The habitats that would be affected by permanent or temporary land-take comprise:

- 'modified grasslands' encompassing species-poor improved and semi-improved neutral grasslands (located at the Proposed PCC Site and the Highway Improvements on the A18);
- dense scrub comprising stands of mixed scrub and hawthorn dominated scrub (located respectively on the boundary of the Proposed PCC Site with the former Keadby Ash Tip, and in the wayleave of the overhead electricity transmission lines associated with the existing National Grid 400kV Substation);
- ephemeral/ short perennial vegetation contributing to open mosaic habitats (OMH) (located on the south-west corner of the Proposed PCC Site where there is a minor overlap with the margin of the former Keadby Ash Tip);
- intensively managed arable farmland (located within areas proposed for temporary construction laydown);
- unvegetated disturbed bare ground (located within the temporary soil storage compound for Keadby 2 Power Station, part of the Proposed PCC Site);
- minor field drains (encompassing the unnamed drain located within Proposed PCC Site that will be lost (Drain 4), and other drains on the alignment of Emergency Vehicle Access Road and potential 132kV electrical connection to Northern Powergrid Substation);
- watercourses comprising the Hatfield Waste Drain (which is crossed by the existing Mabey Bridge which is to be replaced), the Stainforth and Keadby Canal (within which the potential Canal Water Abstraction Option would be constructed) or the River Trent (within which the potential River Water Abstraction Option would be constructed).

3.1.3 Additional areas of land to be utilised solely for purposes of landscape and biodiversity enhancement are shown on **Figure 1** of this LBMEP. The existing habitats within these landscape and biodiversity enhancement areas (as mapped and described in **Appendix 11C**, ES Volume II - **Application Document Ref. 6.3**) are:

- 'modified grasslands' of species-poor improved types (located on road verges or in small fields adjacent to the permanent access road off the A18, also includes retained vegetation within the Proposed PCC Site on the alignment of the overhead electricity transmission lines associated with the existing National Grid 400kV Substation);
- existing tarmac car park (sealed surface) to be broken out and replaced (located adjacent to the permanent access road off the A18); and
- minor field drains (located on the boundaries of the Proposed PCC Site).

Protected/ Notable Species

3.1.4 The protected species of relevance to this Plan, because of their presence in the potential zone of influence of construction activities, are:

- badger;
- water vole;
- otter (not recorded during baseline surveys but with potential to establish before construction);
- bats (but not bat roosts);
- nesting birds (including ground nesting species); and
- fish.

3.1.5 In addition, drains associated with the Proposed Development Site support the following invasive non-native flora and fauna:

- zebra mussel;
- demon shrimp;
- Nuttall's waterweed; and
- New Zealand pigmyweed.

3.2 Impacts on Landscape and Biodiversity Features

3.2.1 Table 1 summarises the permanent losses of habitats during construction of the Proposed Development. These are the habitat losses relevant to quantification of the balance of habitat loss to gain (see Section 5.3 and **Appendix D**).

Table 1: Permanent Losses of Semi-natural Habitats

Affected habitat	Construction activity	Habitat loss (ha)
Modified grassland (encompassing all species-poor grasslands)	Site clearance for construction of Proposed PCC Site	10.12ha
	A18 Junction Improvement	0.24ha
	Mabey Bridge replacement	0.30ha
Unvegetated disturbed ground (unsealed land currently within Keadby 2 construction site)	Site clearance for construction of Proposed PCC Site	4.58ha
Mixed scrub	Site clearance for construction of Proposed PCC Site	0.08ha
Hawthorn scrub	Site clearance for construction of Proposed PCC Site	0.01ha
OMH	Site clearance for construction of Proposed PCC Site	0.25ha
Species-poor drain	Infilling of minor drain (Drain 4) bisecting Keadby Common during site clearance for Proposed PCC Site. Construction of bridge for Emergency Vehicle Access Road over Glew Drain.	0.04ha
Total		15.62ha

- 3.2.2 There would also be minor/ very small-scale temporary disturbance impacts on semi-natural habitats and arable farmland, including deferral of pre-existing commitments of the Applicant for reinstatement of habitats affected during construction of Keadby 2 Power Station. Not all of these impacts may occur, as some options will not be required at the time of final design when there has been a final decision on the routes for the 132kV Electrical Connection to the

Northern Powergrid Substation and the location of the proposed cooling water intake.

3.2.3 The temporary impacts are:

- deferral of reinstatement of the agricultural land and associated boundary hedgerows and drains on the alignment of the existing temporary construction haul road currently in use for construction of Keadby 2 Power Station;
- deferral of habitat reinstatement for the Keadby 2 Power Station (if required based on measures agreed for Keadby 2 Power Station) at the location of the potential Canal Water Abstraction Option on the Stainforth and Keadby Canal due to the potential requirement for additional construction works for the Proposed Development;
- use of intensively managed arable farmland for temporary construction laydown; and
- possible small-scale disturbance of species-poor road verges and flood bank grasslands, e.g. for vehicle access, Mabey Bridge Replacement and short duration laydown of materials, during A18 Junction Improvement and installation of an eel screen on the potential River Water Abstraction Option (if required).

3.2.4 Given the limited impacts on habitats, construction and operation of the Proposed Development also has limited potential, in the absence of mitigation, to adversely affect protected and notable species through direct impacts (killing/ injury), disturbance and habitat loss. The species requiring mitigation are those identified above in Section 3.1

4.0 IMPACT AVOIDANCE REQUIREMENTS

4.1 Overview

- 4.1.1 The care that has been taken when configuring the layout of the Proposed Development maintains the functionality of existing green infrastructure networks, wildlife networks and habitat linkages. The Proposed Development therefore complies fully with the related requirements of planning policy, and even more so once the additional proposed habitat reinstatement and enhancement measures are also considered (see Section 5).
- 4.1.2 The impact avoidance measures outlined below (Section 4.2 onwards) will be implemented, as relevant and appropriate, prior to and during the construction phase, the purpose being to minimise the impact of works on landscape and biodiversity features.
- 4.1.3 These measures will be applied in order to meet legislative and planning policy requirements for protected species, or as part of standard construction environmental best practice.
- 4.1.4 The commitment to provide these measures has been considered when assessing the likely impacts and effects of the Proposed Development on landscape and biodiversity features in **Chapter 11: Biodiversity and Nature Conservation** and **Chapter 14: Landscape and Visual Amenity** (ES Volume I - **Application Document Ref. 6.2**).
- 4.1.5 Avoidance and mitigation of potential impacts on the environment through, for example, noise, vibration or emissions to air or water associated with the operational Proposed Development are not covered within this Plan. While such impacts could affect biodiversity, these effects have been appropriately controlled and mitigated through the design and impact avoidance measures presented in **Chapter 8: Air Quality** and **Chapter 9: Noise and Vibration** of Environmental Statement (ES) Volume I (**Application Document Ref. 6.2**). In addition, there are other permitting, good practice, legislative, policy and regulatory mechanisms that necessitate the control and prevention of such impacts. The relevant measures are therefore prescribed in other chapters of the ES and do not need to be included within this Plan.

4.2 Protected and Invasive Species Update Surveys

- 4.2.1 Appropriately experienced ecologists will complete site walkovers in advance of mobilisation or other potential advance works to re-confirm the ecological baseline conditions and identify any new ecological risks. Updated species surveys will also be undertaken to determine the status of protected and invasive non-native species (INNS) identified as present or potentially present at the Proposed Development Site to inform mitigation requirements and support protected species licence applications. These updated surveys will be completed sufficiently far in advance of construction works to account for

seasonality constraints and to allow time for the implementation of any necessary mitigation prior to construction.

4.2.2 Existing or potential landscape and biodiversity constraints that will be re-assessed during update surveys are as follows:

- bats – update roost surveys of trees adjacent to the Proposed Development Site;
- breeding birds – nest checks of vegetation to be cleared, where necessary;
- otter – updated survey for signs of presence;
- water vole – updated survey to determine current distribution and population size;
- badger – updated survey to determine current distribution and activity of badger setts; and
- INNS – updated survey to re-confirm the locations of species that may be disturbed during construction.

4.2.3 Should any new protected or invasive species constraints be identified as a result of the updated surveys, the LBMEP would be updated to address these constraints. Any requirement for additional impact avoidance or mitigation will be discussed and agreed with NLC and/ or the relevant statutory consultees, except where this will otherwise be addressed through the process for obtaining any necessary protected species licences.

4.2.4 Any additional surveys will be instructed during the advance works, site clearance and construction phases as identified as necessary by the ecologist, or otherwise as identified and requested by the Applicant or their contractor(s) when implementing the final approved Construction Environmental Management Plan (CEMP) and other relevant approved plans and permits. These may be required, for example, based on the construction programme, working requirements or following identification of specific issues and constraints not covered by previous advice.

4.3 Protected Species Licences

4.3.1 All necessary protected species licences will be applied for and obtained prior to undertaking any works likely to affect the conservation status of these species, as required by the relevant legislation. Based on the findings of **Chapter 11: Biodiversity and Nature Conservation (ES Volume I - Application Document Ref. 6.2)** and pending the findings of the proposed updated protected species surveys, the following protected species licences may be required:

- badger licence - if direct and indirect disturbance impacts on badger setts are likely and unavoidable (although currently this is not anticipated as likely); and

- water vole licence – if water voles are still present at the time of construction and need to be displaced or relocated from construction working areas.
- 4.3.2 Habitat compensation/ restoration and enhancement will also be required if a protected species licence is needed. Outline proposals for habitat restoration and enhancement in relation to water vole are included within Section 5 of this LBMEP. It is premature and unnecessary to define similar measures for badger at this time, given this is a highly mobile species. Instead, it is noted that the Applicant has sufficient land within their control to meet any such requirements, including land within the former Keadby Ash Tip.
- 4.3.3 Should licences be required, it is recognised that this could (a) impose restrictions on the timing of construction activities and (b) dictate lead-in times for agreement and completion of pre-construction mitigation. This will therefore be addressed in the final construction programme based on the findings of the updated surveys.

4.4 Clerk of Works

- 4.4.1 The Applicant will agree when a Clerk of Works (CoW) should be present during construction in consultation with the ecologist and landscape architect based on relevant environmental commitments, the findings of the updated surveys, the requirements of protected species, and with reference to the relevant project programmes.
- 4.4.2 Immediately prior to site clearance and the start of construction in each relevant part of the Proposed Development Site, further site walkover surveys will be undertaken by an appropriately experienced CoW to confirm that the risks associated with the Proposed Development Site remain as previously assessed and/ or to confirm the correct implementation of impact avoidance measures (e.g. tree protection fencing, protected species stand-offs and other protection measures).
- 4.4.3 The scope of the required walkover surveys will be defined on a case by case basis, in consultation with the project team, and NLC or other statutory consultees as necessary, based on the specific risks associated with each relevant part of the Proposed Development and the findings of any preceding updated surveys as detailed above in Section 4.2. This will be controlled and implemented through the final CEMP that will be developed by the contractor. A Framework CEMP is provided as **Application Doc Ref. 7.1**.
- 4.4.4 Relevant site staff will receive toolbox talks from the CoW as necessary on the relevant ecological risks present, legal requirements, working requirements necessary to comply with this legislation, and the final approved landscaping and biodiversity management and enhancement measures. Toolbox talks will be repeated as necessary over the duration of the construction works.

4.5 Tree Works

- 4.5.1 An arboricultural survey in line with BS5837:2012 will be undertaken concurrently with the detailed design, to identify where any trees are likely to be affected by the construction works and to inform the development of the detailed design and specification of tree root protection zones.
- 4.5.2 Where works in close proximity to retained trees cannot be practicably avoided, these works will be undertaken in accordance with current best practice. At the time of issue of this LBMEP, current best practice is defined in:
- British Standard (BS) 5837: 2012 Trees in relation to design, demolition and construction – Recommendations (British Standards Institute, 2012); and
 - National Joint Utilities Group (NJUG) Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees (NJUG, 2007).
- 4.5.3 Necessary protective fencing will be installed as required and prior to the commencement of site clearance or construction works in proximity to trees, as will be set out in the Arboricultural Report to be produced following the detailed pre-construction tree surveys and to be detailed as part of the Arboricultural Method Statement.

4.6 Built Structures

- 4.6.1 The following impact avoidance measures in relation to built structures are highlighted as part of the landscape and visual amenity assessment (**Chapter 10: Landscape and Visual Amenity (ES Volume I - Application Document Ref. 6.2)**) and will be taken into consideration as part of the detailed design of the Proposed Development. Implementation of these measures is secured by a Requirement of the draft DCO (**Application Document Ref. 2.1**):
- suitable materials will be used, where reasonably practicable, in the construction of structures to reduce reflections and to assist with breaking up the massing of the buildings and structures;
 - the selection of finishes for the buildings and other infrastructure will be informed by the finishes of the adjacent developments including Keadby 2 Power Station, in order to reduce the visual impact of the Proposed Development including using lighter coloured materials on the taller structures to enable them to recede against the sky. Finishes and materials will be agreed with relevant consultees and approved by NLC at the detailed design stage, secured through a Requirement of the draft DCO, in order to minimise the visual impact of the Proposed Development;
 - lighting required during the construction and operation stages of the Proposed Development will be designed to reduce unnecessary light spill

outside of the Proposed Development Site boundary, in accordance with the Indicative Lighting Strategy (**Application Document Ref. 5.11**); and

- where existing vegetation is present along the Proposed Development Site boundary, this will be retained, as far as reasonably practicable, and managed to support its continued presence to aid the screening of low level views into the Proposed Development Site.

4.7 Precautionary Working Methods

4.7.1 The following precautionary working methods will be employed to minimise potential adverse effects on protected/ notable species prior to and during construction. Precautionary working method statements will be produced as necessary to specify working requirements and other necessary impact avoidance measures. These measures would be controlled and implemented through the final CEMP) that will be developed by the contractor. The CEMP is secured by a Requirement of the draft DCO (**Application Document Ref. 2.1**). A Framework CEMP is provided as **Application Doc Ref. 7.1**.

4.7.2 The measures set out below for individual species will be implemented in a manner that avoids conflicts with requirements for other relevant species that may occupy the same habitats. As an example, nesting bird mitigation will be implemented in a manner that is consistent with the mitigation required for water vole.

4.7.3 An appropriately qualified CoW will review and advise on the requirements for precautionary working methods to be implemented within each part of the Proposed Development Site and will supervise implementation of the required measures.

Water Vole

4.7.4 An appropriate Water Vole Impact Avoidance Strategy will be prepared with reference to updated survey data and agreed with relevant stakeholders. It will set out all of the measures and supervision required to deliver legislative compliance during construction of the Proposed PCC Site and watercourse crossings. Prior submission and approval of the Water Vole Impact Avoidance Strategy is a commitment of the Framework CEMP provided as **Application Doc Ref. 7.1**.

4.7.5 The Water Vole Impact Avoidance Strategy will address (as relevant):

- loss of the sub-optimal habitat associated with the drain crossing Keadby Common, where one water vole territory was identified based on surveys in May and August 2020;
- minor works on Glew Drain at the location of the proposed bridge crossing for the Emergency Vehicle Access Road, where localised evidence of water vole was found in May and August 2020;

- replacement of Mabey Bridge at the site access off the A18 (no evidence of water vole found during baseline surveys); and
- minor works for installation of the potential 132kV electrical connection to Northern Powergrid Substation) required over Glew Drain and Keadby Common Drain, where water vole has been recorded.

4.7.6 The Water Vole Impact Avoidance Strategy will include:

- the latest updated survey data for relevant field drains;
- requirements for ongoing further surveys, ongoing monitoring and attendance by an appropriately experienced CoW;
- appropriate construction stand-offs from watercourses that will be maintained at all times (retained watercourses) or, in the case of watercourse crossings, until such time that the CoW advises that the relevant construction works can proceed;
- options for micro-siting to avoid water vole and its burrows;
- appropriate timings to minimise potential for disturbance impacts on water vole;
- requirements for habitat mitigation and enhancement to accommodate any water voles displaced as a result of land take for the Proposed Development;
- requirements (if relevant) for displacement, trapping, exclusion and relocation of water voles from relevant construction areas (although based on current data confirming only a very small and localised water vole presence on relevant drains, the adjacent retained and enhanced areas of drain habitat are anticipated to be sufficient to accommodate any water voles displaced);
- site inductions and toolbox talks as appropriate; and
- any protected species licence needed to permit the relevant construction works to proceed. If a licence is required, then enhancement proposals for water vole are likely to be needed to secure this licence. Proposals for water vole enhancement are already allowed for and outlined within this LBMEP, which will also benefit other freshwater biodiversity.

Nesting Birds

4.7.7 The following approach would be taken to deliver legislative compliance in relation to nesting birds:

- relevant grassland areas will be mown short (<5cm) prior to commencement of the breeding season (typically March-August inclusive for most species), and then mown weekly to maintain this short sward height until vegetation clearance. By so doing, ground nesting birds are unlikely to attempt to nest within construction areas;

- all clearance of other suitable vegetation will be undertaken outside the breeding season (typically March-August inclusive for most species), where possible;
- where there will be a gap in activity between site clearance/ soil stripping and the start of construction, then all cleared ground will be maintained in a disturbed state (e.g. through regular harrowing to minimise the risk of ground nesting birds establishing in the lead into construction.
- site inductions and toolbox talks will be provided as appropriate;
- in situations where the above breeding bird mitigation is not possible, an appropriately experienced CoW will check the working area for nests before works commence. If active nests are discovered through this process, then the CoW will advise on appropriate mitigation to ensure that these are not impacted by construction activities. All relevant works will be completed in accordance with this advice and under the supervision of the CoW; and
- consistent with the above, should WCA Schedule 1 bird species be present at the time of construction (to be determined through the committed pre-commencement update surveys) the CoW will advise on species-specific requirements to achieve legislative compliance.

Fish

- 4.7.8 A Fish Management Plan will specify the measures and supervision required to deliver legislative compliance during installation and drawdown of any cofferdam for (depending on the final option selected) the upgrade of the River Water Abstraction Option or the Canal Water Abstraction Option.
- 4.7.9 As all construction works within watercourses are subject to regulation and permitting regimes, the Fish Management Plan will be prepared and agreed with the relevant regulator (Environment Agency and/or Marine Management Organisation).
- 4.7.10 The Fish Management Plan will include details of:
- appropriate timings to minimise potential for capture of sensitive fish species e.g. migratory fish;
 - provision for screening of pump intakes to prevent fish being drawn into the pipe/ pump;
 - supervision of dewatering of any cofferdam(s) by an appropriately experienced CoW to oversee fish welfare and to support the relocation of any stranded fish or associated wildlife back to the main channel of the relevant watercourse outside the working area; and
 - if appropriate, e.g. to meet additional requirements of the relevant regulators, other specialist techniques to support the capture and

relocation of fish to the main channel of the relevant watercourse outside the working area prior to drawdown.

Invasive Non-native Species

- 4.7.11 An updated terrestrial plant INNS survey will be completed prior to site clearance to determine the current location and extent of these INNS within the Proposed Development Site (noting that none were present at the time of the baseline survey).
- 4.7.12 It will be assumed that aquatic plant and invertebrate INNS are present in all watercourses affected by construction, regardless of the scale of the proposed construction works.
- 4.7.13 An Invasive Species Management Plan (ISMP) will be prepared to address all relevant INNS to accompany the final CEMP and will be agreed with relevant stakeholders. The ISMP will specify the control/ eradication (as reasonable and practicable), biosecurity measures and supervision necessary during construction to prevent the spread of plant and animal INNS to new locations. Prior submission and approval of the ISMP is a commitment of the Framework CEMP provided as **Application Doc Ref. 7.1**.
- 4.7.14 Biosecurity requirements will address all potential pathways for interaction with and dispersal of INNS, including movements of vehicles, machinery and staff:
- into the Proposed Development Site from third party locations, e.g. during construction mobilisation;
 - between different parts of the Proposed Development Site, most especially between different watercourses; and
 - from the Proposed Development Site for redeployment elsewhere.

4.8 Animal Welfare Requirements

- 4.8.1 Mammal/ badger gates will be installed in boundary fences as appropriate to maintain access for nocturnal wildlife into and through the habitat corridor associated with the existing overhead electricity transmission lines connected to the existing National Grid 400kV Substation. Further details will be provided once the locations and alignment of boundary fences has been specified further and confirmed, and these details will be submitted in the final LBMEP to be agreed as a Requirement of the draft DCO (**Application Document Ref. 2.1**).
- 4.8.2 Vegetation clearance and construction excavations have potential to result in offences under animal welfare legislation. A CoW will be employed to supervise all relevant works to provide guidance on the measures required day-to-day to deliver legislative compliance.

- 4.8.3 All excavations will be covered overnight, or where this is not practicable, a means of escape will be fitted e.g. battered soil slope or scaffold plank, to provide an escape route should any animals (e.g. grass snake, badger, brown hare, hedgehog) stray into the construction area and fall into an excavation.

4.9 Lighting

- 4.9.1 Construction temporary lighting will be arranged so that glare is minimised outside the Proposed Development Site as far as reasonably practicable. Measures to minimise the impact of lighting are detailed in the Lighting Strategy (**Application Document Ref. 5.11**) and Framework CEMP (**Application Document Ref. 7.1**).

4.10 Habitat Reinstatement

- 4.10.1 Habitats that may experience low levels of access and disturbance during construction, mainly comprising small areas of species-poor road verge and flood bank grassland and arable farmland, will be reinstated (i.e. returned to a condition consistent with the existing baseline) following the completion of construction. This includes land affected by replacement of Mabey Bridge, installation of an eel screen and the Potential 132kV Electrical Connection to Northern Powergrid 132kV Substation option, and use of arable fields for temporary construction laydown. As this land is not in the permanent control of the Applicant, no ecological enhancement measures are proposed within these areas.
- 4.10.2 Some habitats lost during construction of permanent infrastructure will also be restored. These areas will remain within the permanent control of the Applicant so will be managed with the aim of increasing (relative to the existing baseline) their biodiversity value. This includes land within and immediately adjacent to the Proposed PCC Site on Keadby Common where the existing species-poor improved grassland and unvegetated disturbed ground will be sown with a locally appropriate native wildflower meadow mixture and appropriately managed thereafter. Such measures are included within the habitat enhancement proposals detailed in Section 5.
- 4.10.3 The following areas will be reinstated to the original baseline conditions.
- Land Affected by the Temporary Construction Haul Road*
- 4.10.4 The vegetation in this area was originally cleared for construction of Keadby 2 Power Station, so there is no new habitat loss for the Proposed Development and instead there is only a deferral of the date for habitat reinstatement. The responsibility and timescales for delivering this habitat reinstatement are currently controlled by conditions on planning permission PA/2019/1595 as varied by planning permission PA/2021/188. Under the draft DCO, it is proposed that these permissions will effectively be extended, and the matters controlled by condition will be secured by equivalently worded requirements in Schedule 2 of the draft DCO (**Application Document Ref. 2.1**).

4.10.5 The original baseline conditions (prior to establishment of the existing temporary haul road) present in this area were agricultural land, two species-poor native hedgerows on the eastern and western boundaries of the field, and below each of these hedgerows (where temporary bridges are currently located) were small field drains supporting emergent plant species.

4.10.6 During reinstatement:

- the two drain crossings will be removed, and the banks profiled consistent with adjacent unaffected sections of drain (if required);
- the short sections of drain bank exposed by the above works will be sown with a low maintenance grass seed mixture to provide bank stabilisation and minimise potential for erosion while other vegetation present in adjacent areas re-colonises;
- re-establishment of aquatic vegetation within the drains will be left to natural processes, as suitable plant species are present nearby in unaffected sections of drain;
- the field will be returned to agricultural land using a basic agricultural grass seed mixture in accordance with the preferences of the landowner; and
- the access points through the two boundary hedgerows will be planted with a species-rich (i.e. a minimum of five species) mixture of native shrubs planted as a double staggered row.

4.10.7 The planting mixture for the species-rich hedgerows will comprise native flower and fruit-bearing species suitable to the location as listed below:

- hawthorn (*Crataegus monogyna*);
- blackthorn (*Prunus spinosa*);
- field maple (*Acer campestre*);
- dogwood (*Cornus sanguinea* subsp. *sanguinea*);
- guelder rose (*Viburnum opulus*);
- dog rose (*Rosa canina*); and
- osier (*Salix viminalis*).

4.10.8 At least 50% of the planting stock will comprise hawthorn, with all other species contributing no more than 50% in aggregate.

4.10.9 The hedgerow planting method will be as follows:

- plants will be two-year-old transplants at least 450 millimetres (mm) to 600mm high;
- species will be planted so that no one species makes up more than 70% of the total;

- planted in a staggered double row 350mm apart with a minimum of seven plants per metre;
- plantings will be kept clear of weeds until they are established; and
- plantings will be fitted with an appropriate timber stake and a plastic-free biodegradable shrub shelter (all fitted as per manufacturer's recommendations).

4.10.10 The hedgerow will be subject to the draft aftercare maintenance regimes described in **Appendix C**, in which any plants found to be dead or dying within the initial five-year aftercare period will be replaced within the first available planting season.

4.10.11 The newly planted hedgerow will be trimmed in at least the first two aftercare years to encourage bushy growth, allowing the hedge to become taller and wider at each cut.

4.10.12 After the aftercare period, the landowner or agricultural tenant will become responsible for the long-term management and aftercare of all habitats in this area. Where the landowner remains the Applicant, then the hedgerow enhancement management regimes specified in **Section 5** will be extended to cover this area. This will be reviewed and clarified in the final LEMP.

Drains Crossed by Electrical Connections

4.10.13 If the Potential Electrical Connection to the 132kV Northern Powergrid Substation is required, then the associated crossings of minor field drains will be undertaken using small-scale cut and cover methods.

4.10.14 Following reinstatement of bank substrates and profiles, the affected areas will be sown with a low maintenance grass seed mixture to provide stabilisation and minimise potential for erosion while other vegetation present in adjacent areas re-colonises.

4.10.15 Re-establishment of aquatic vegetation within the drains will be left to natural processes, as suitable plant species are present nearby in unaffected sections of drain.

River Trent Flood Bank

4.10.16 It is anticipated that the activities at the River Water Abstraction Option (if required) will largely be confined to within the existing compound and works to be completed from a boat. However, it is possible that limited access may be required to the flood bank to either side of the compound.

4.10.17 The flood bank is currently managed as closely mown species-poor improved grassland. Any areas within the Proposed Development Site boundary that are disturbed during construction will be sown with a low maintenance grass seed mixture.

Stainforth and Keadby Canal

- 4.10.18 It is anticipated that the activities at the Canal Water Abstraction Option (if required) will largely be confined to within the existing compound previously used for construction of the Keadby 2 Power Station cooling water intake. No re-instatement of habitats was required for the preceding Keadby 2 Power Station. Given this, no new impacts on semi-natural habitats are anticipated for construction of the Proposed Development and habitat reinstatement is not considered necessary.
- 4.10.19 Vegetation establishment will be left to natural processes, consistent with the historic baseline (before works for Keadby 2 Power Station and as visible in Google Earth) of hardstanding and ruderal vegetation.

Highway Improvements at the Access off the A18

- 4.10.20 There is potential for localised disturbance of existing species-poor grassland verges and banks for temporary short-duration laydown, vehicle access, as well as ground disturbance works to install foundations for the replacement of Mabey Bridge. Works for the latter would be largely confined to the footprint of the existing Mabey Bridge.
- 4.10.21 Any vegetation disturbed by the above activities will be reinstated as set out above for the drains crossed by the Potential Electrical Connection to the 132kV Northern Powergrid Substation. In addition, land on the north side of Mabey Bridge is included within a larger area allocated for biodiversity enhancement, as described in Section 5 of this LBMEP.

5.0 LANDSCAPE AND BIODIVERSITY ENHANCEMENT

5.1 Approach

- 5.1.1 The landscape and visual amenity assessment presented in **Chapter 14: Landscape and Visual Amenity (ES Volume I - Application Document Ref. 6.2)** concludes that the Proposed Development will result in significant adverse effects on visual amenity from Viewpoint 1 (Chapel Lane West, Keadby), Viewpoint 2 (Gate Keepers Residence, Vazon Bridge, Keadby) and Viewpoint 4 (PRoW (KEAD9, KEAD10) north of Keadby) and in the event of a future baseline without the Keadby 1 Power Station built structure, for the operation assessment scenario for Viewpoint 6 (Trunk Road, Keadby). However, the opportunity for mitigation of the visual effects of the Proposed Development is limited due to the size and scale of the Proposed Development. As shown in the assessment, the effects on visual amenity largely relate to the height of the tallest structures; as such it is considered that the addition of landscape features such as trees and woodland would not be effective in reducing the effects of these on visual amenity. However, there remains a need for appropriate restoration of the landscape following construction, and enhancements to the landscape character and improvements to the green infrastructure network to meet requirements of local and national planning policy. Existing vegetation provides screening and softening of views of lower structures from non-industrial viewpoints.
- 5.1.2 The ecological impact assessment presented in **Chapter 11: Biodiversity and Nature Conservation (ES Volume I - Application Document Ref. 6.2)** identified no potentially significant adverse effects as a result of the temporary and permanent loss of habitat during construction. Habitat restoration and enhancement is proposed to maintain and improve habitats for biodiversity. This includes benefits for two Local Wildlife Sites (LWS).
- 5.1.3 Proposals for landscape and biodiversity enhancement have been designed to achieve the following outcomes:
- no net loss of biodiversity and a quantifiable gain for biodiversity as a result of the Proposed Development;
 - enhance field drain habitats for the benefit of water vole to compensate for temporary and permanent losses of habitat to the Proposed Development;
 - enhance grassland habitats for the benefits of pollinators and other invertebrates, birds, badger, brown hare and other species;
 - provide nesting and roosting features for birds and bats to address a general lack of natural features in the local area to meet this need; and
 - enhance the habitat and green infrastructure network adjacent to and through the Proposed Development Site, including provisions of habitats connected to two LWS.

5.2 Habitat Enhancements

5.2.1 Measures to enhance the biodiversity and green infrastructure value of the Proposed Development Site through establishment of new habitats and improvement of existing habitats are proposed. The areas to be enhanced are shown on **Figure 1** and described below. Once created the new habitats will be appropriately maintained (as described below) for a minimum period of 25 years (the proposed lifetime of the Proposed Development).

Habitat Creation Principles Supporting Delivery of Biodiversity Enhancement

5.2.2 Where new native habitats are to be created, or new native planting undertaken, the following principles will apply:

- all seed mixes and planting stock will be ordered as early as reasonably practicable following a decision to commence the project to allow supply to be met without risk of substitution;
- all seed mixes and planting stock will be sourced from a specialist producer of British grown native plants and/ or seed who can source-identify all stock (i.e. not a non-specialist nursery that buys in stock or an agricultural/general merchant that buys stock from diverse sources, including non-British sources); and
- terms of supply will include a condition that no part of the order shall be substituted with stock of alternative species or origin and that any change must be mutually agreed.

5.2.3 The above requirements will be incorporated into contractor specifications and contracts, as appropriate, to deliver genuinely native plantings in accordance with the biodiversity objectives of this LBMEP.

Enhancement Proposals

Proposed PCC Site – Grassland Habitat Creation

5.2.4 Keadby Common currently contains 10.22ha of species-poor improved grassland habitat ('modified grassland'), all of which will be removed prior to construction. Post-construction, there will be areas of land around the perimeter of the Proposed PCC Site, both inside and outside the security fence, that are suitable for use to provide biodiversity enhancement and visual amenity. As a minimum, 3ha of species-rich neutral grassland will be established within and adjacent to the Proposed PCC Site. There is potential to increase this further at detailed design stage, see Section 5.3.

5.2.5 These areas will be sown with a site-appropriate native neutral wildflower grassland. An indicative seed mixture suitable for this purpose is the Emorsgate EM4 Meadow Mixture for Clay Soils. The composition of this grassland is detailed in **Appendix A**.

- 5.2.6 The regular mowing and removal of arisings from the existing grassland appears to have depleted nutrient levels in the former arable soils sufficiently for the successful establishment of wildflower grassland. In addition, the removal and storage of soils during construction allows control over what substrates are returned post-construction. Given this, topsoil will not be reinstated in areas where grassland will be seeded and consequently soil testing is not considered necessary.
- 5.2.7 Ground will be suitably prepared in advance of seeding. Management, in the first year (potentially extending into Year 2, depending on the time of sowing and rate of establishment), will be in accordance with the aftercare regime recommended by the seed producer. This will involve:
- periodic mowing in the first year after sowing to maintain a sward height of 40-60mm, removing all arisings for disposal in a location pre-agreed with the ecologist or landscape architect where this would not conflict with biodiversity objectives and habitat management;
 - spot treatment of perennial weeds such as broad-leaved dock (*Rumex obtusifolius*), creeping thistle (*Cirsium arvense*) and spear thistle (*Cirsium vulgare*) with an approved herbicide;
 - a review of requirements for Year 2 at the end of aftercare Year 1, moving into the long-term nature conservation management regime (see below) if appropriate.
- 5.2.8 After the initial aftercare period of management, the grassland will be maintained through a nature conservation regime. The regime will be specified in the final LBMEP with reference to the final layout for the Proposed PCC Site but will allow for:
- mowing of plots on rotation so that in any one year there always remains areas of longer tussocky grassland suitable to provide foraging habitat for barn owl and other birds, and places of refuge for other wildlife, e.g. overwintering invertebrates, when the remainder of the grassland is cut;
 - mowing grassland to 50mm height between late July and early September, with all arisings removed;
 - a second cut, if required (not likely to be necessary given existing substrates but this will be determined later through monitoring) in April to reduce the vigour of grass species and maximise flower production by herb species;
 - periodic control of scrub cover if it establishes greater than 10% total cover, and pernicious weeds such as creeping thistle, spear thistle and broad-leaved dock where these start to dominate to the exclusion of other flora; and

- all arisings will be deposited in a suitable area in the wider landholding (as agreed with the ecologist or landscape architect) to create habitat piles suitable for use by grass snake for egg laying.
- 5.2.9 The above low intensity management regime will also be extended to an area of retained species-poor grassland within the wayleave for the existing overhead electricity transmission lines associated with the existing National Grid 400kV Substation. This area of grassland is not included within the area of habitat used to calculate the biodiversity net gain as without re-seeding it is not certain how quickly the grassland will respond to the beneficial change in management. With the enhancements proposed, it is possible to demonstrate a biodiversity net gain without a need to account for this area; inclusion of this small additional plot therefore represents an additional beneficial measure over and above the stated gain.
- 5.2.10 Allowance will also be made for a native scrub component within all of the above grassland areas. This will result in grassland habitat of more diverse structure and consequently of higher biodiversity value than uniformly open grassland.
- 5.2.11 The planting mixture will comprise native flower and fruit-bearing species suitable to the location, as indicated by the existing baseline within the Proposed PCC Site and on adjacent land. Native species suitable to this location include:
- hawthorn (*Crataegus monogyna*);
 - dog-rose (*Rosa canina* agg.);
 - sweet-briar (*Rosa rubiginosa*);
 - dogwood (*Cornus sanguinea* subsp. *sanguinea*);
 - wild privet (*Ligustrum vulgare*);
 - spindle (*Euonymus europaeus*); and
 - buckthorn (*Rhamnus cathartica*).
- 5.2.12 The extent of scrub will not contribute more than 5% of the total grassland cover and will be located so as not to impede implementation of the specified grassland management regimes.
- 5.2.13 All scrub planting will be notch planted at 1.5m and 2.5m spacings and a plastic-free biodegradable spiral and stake. All new scrub planting will be subject to the maintenance regimes described in **Appendix C**.
- 5.2.14 The establishment of species-rich grassland and its associated integral scrub will be monitored by an ecologist and a landscape architect as set out in Section 6.

Proposed PCC Site – Attenuation Pond

- 5.2.15 In addition to the above grassland enhancements, the indicative site layout includes a surface water attenuation pond. The design of the attenuation pond will be secured as a requirement of the draft DCO (**Application Document Ref. 2.1**) but the current preference is for a concrete attenuation pond, possibly with a thin overlaying layer of soil, to minimise maintenance requirements going forward. Given this, the attenuation pond is only likely to accrue a minor incidental biodiversity value and minimal emphasis is therefore placed upon it for the purpose of this LBMEP.

Land Immediately West of the North Pilfrey Bridge – Grassland Habitat Enhancement

- 5.2.16 Between the existing site access road and the South Soak Drain is a broad verge/ small fields that are currently species-poor improved grassland ('modified grassland') maintained through regular mowing. This area (laydown Area 2c on **Figure 5.1** in ES Volume III – **Application Document Ref. 6.4**) can be improved following construction to create a minimum of 1.7ha of species-rich neutral grassland. This location connects to the Stainforth and Keadby Canal Corridor LWS, so the proposed new grassland will enhance the LWS.
- 5.2.17 The regular mowing and removal of arisings from the existing grassland is likely to have depleted nutrient levels in the former arable soils sufficiently for the successful establishment of wildflower grassland, but soil testing will be undertaken to confirm this and as a basis for agreement of the final specification.
- 5.2.18 Within laydown Area 2c, there is also an existing 0.5ha car park currently in use for the construction of Keadby 2 Power Station. The current planning permission (reference PA/2018/1950) requires the restoration of the 'Site' on or before 21 November 2022 after which it is intended that it be broken out and reinstated to a suitable condition consistent with the adjacent land-use (the improved grassland). However, under the draft DCO, it is proposed that this permission will effectively be extended to allow this area to be beneficially used as laydown for the Proposed Development. The matters controlled by condition, including a later date of reinstatement, will be secured by equivalently worded requirements in Schedule 2 of the draft DCO (**Application Document Ref. 2.1**). It is also proposed that this area be used for species-rich neutral grassland habitat creation rather than simply reinstated to its former condition.
- 5.2.19 Following completion of construction activities for the Proposed Development, the existing grassland turf and the hardstanding of the car park will be removed to allow ground preparation and sowing with a site-appropriate native neutral wildflower grassland. Pending the results of soil testing it is expected that this grassland will also be of a type comparable with the Emorsgate EM4 Meadow Mixture for Clay Soils (see **Appendix A**).

5.2.20 The ground will be suitably prepared in advance of seeding. Once sown, the management regimes specified above for Area 1 will be applied. Monitoring will also be as specified above for Area 1.

5.2.21 The establishment of species-rich grassland will be monitored by an ecologist and a landscape architect as set out in Section 6.

Triangular Plot Land Immediately North-east of Mabey Bridge – Grassland Habitat Enhancement and Scrub Creation

5.2.22 Laydown Area 1 on **Figure 5.1** in ES Volume III – **Application Document Ref. 6.4**) comprises another plot of species-poor improved ('modified') grassland (0.2ha). Following use as laydown for the early construction works associated with the Mabey Bridge replacement and A18 junction improvement, this will be sown with a species-rich neutral grassland seed mixture. The specifications provided above for the other grassland areas will apply to this plot also. This location connects to the habitat corridor of the Hatfield Waste Drain LWS, so the proposed new grassland will enhance the LWS.

5.2.23 In addition, a 0.1ha stand of dense scrub will be planted to compensate for losses of scrub elsewhere during construction. This scrub will link the grassland with the new hedgerow along the access road. The final planting specification for this scrub will reflect the diversity of species included in the hedgerow planting but will be appropriate to the space available.

5.2.24 The planting mixture will comprise native flower and fruit-bearing species suitable to the location, as indicated by the existing baseline within the Proposed PCC Site and on adjacent land. Native species suitable to this location include:

- hawthorn (*Crataegus monogyna*);
- dog-rose (*Rosa canina* agg.);
- sweet-briar (*Rosa rubiginosa*);
- dogwood (*Cornus sanguinea* subsp. *sanguinea*);
- wild privet (*Ligustrum vulgare*);
- spindle (*Euonymus europaeus*); and
- buckthorn (*Rhamnus cathartica*).

5.2.25 All scrub planting would be notch planted at 1.5m and 2.5m spacings and protected with a plastic-free biodegradable spiral and stake.

5.2.26 The scrub planting would be subject to the draft maintenance regimes described in **Appendix C**, in which any plants found to be dead or dying within the initial five-year aftercare period will be replaced within the first available planting season. Following the completion of an initial five-year aftercare

period all new planting plots will undergo a biannual condition assessment and an appropriate programme of works developed to address changes in condition and site requirements. Such work may include additional replacement planting, fence repair/ removal, pruning, coppicing, or thinning out of plots to encourage establishment.

- 5.2.27 The establishment of species-rich grassland and scrub will be monitored by an ecologist and a landscape architect as set out in Section 6.

Access Road – Hedgerow Creation

- 5.2.28 There is an existing hedgerow on the eastern margin of the central section of the existing site access road between Mabey Bridge and North Palfrey Bridge. Additional plantings of 500m total length are proposed to extend the existing hedgerow at its northern and southern ends, and to connect with areas of scrub planting (see above).

- 5.2.29 The planting mixture will comprise native flower and fruit-bearing species suitable to the location. The final species selection will be made from the list of shrub species provided above for the new scrub habitat, with up to 50% of the planting stock comprising common hawthorn, and all other species contributing no more than 50% in aggregate.

- 5.2.30 The hedgerow planting method will be as follows:

- plants will be two-year-old transplants at least 450 millimetres (mm) to 600mm high;
- species will be planted so that no one species makes up more than 70% of the total;
- planted in a staggered double row 350mm apart with a minimum of seven plants per metre;
- plantings will be kept clear of weeds until they are established; and
- plantings will be fitted with an appropriate timber stake and a plastic-free biodegradable shrub shelter (all fitted as per manufacturer's recommendations).

- 5.2.31 The newly planted hedgerow will be trimmed in at least the first two years to encourage bushy growth, allowing the hedge to become taller and wider at each cut.

- 5.2.32 Once established the hedgerow will be managed so it attains a minimum average height and width of 1.5m. To achieve this the hedgerow will be trimmed no more frequently than once every other year.

- 5.2.33 Trimming will be timed for during January and February when the majority of fruit has been taken by local wildlife and carried out according to best practice guidance. Access for this is possible via the existing site access road.

- 5.2.34 The sides, ends and tops of the hedgerow will be trimmed as far as practicable to achieve an 'A' profile.
- 5.2.35 Following trimming operations all significant arisings (cuttings) will be removed so as not to impede grassland growth or management.
- 5.2.36 The establishment of the hedgerow will be monitored by an ecologist and a landscape architect as set out in Section 6.

Keadby Common Drains

- 5.2.37 The final LBMEP, secured through a Requirement of the draft DCO (**Application Document Ref. 2.1**), will include details of a programme of field drain enhancement works to re-instate areas with open water more suitable to support a greater range of aquatic biodiversity, including water vole. The target drains are those on the southern, eastern and western boundaries of Keadby Common (800m total length/ 0.08ha).
- 5.2.38 The programme of enhancement works will commence before construction to provide enhanced habitat suitable for occupation by any water voles present at that time within the field drain (Drain 4) to be infilled during construction.
- 5.2.39 The works will be planned to avoid any water vole burrows present at that time. Given existing survey data the sub-optimal habitat conditions currently present, water voles are not anticipated to be a significant constraint at the time of these works.
- 5.2.40 The following specific actions will be included in the final LBMEP:
- removal of excess silt and emergent (swamp) vegetation to re-instate open water conditions;
 - cutting back of overhanging trees to reduce over-shading, in support of the successful establishment of aquatic vegetation suitable to sustain a more diverse faunal assemblage, including water vole;
 - possible tie-in with the surface water drainage scheme for the Proposed Development to improve water supply;
 - sowing of adjacent land, as described above, with species-rich wildflower grassland.

Species Specific Measures

- 5.2.41 Additional enhancement measures for species are proposed within the Proposed Development Site and the adjacent former Keadby Ash Tip. The latter is also land within the control of the Applicant. Habitat creation is not appropriate in this area given the existing biodiversity value (see **Appendix 11C: Preliminary Ecological Appraisal Report, ES Volume II – Application Document Ref. 6.3**), and currently there is no anticipated need for habitat management or intervention over the medium-term.

- 5.2.42 The following species features will be provided:
- 3 No. pole mounted barn owl towers - located on Figure 1 and specified in **Appendix B**;
 - 5 No. Schwegler 1FD or comparable bat boxes suitable for maternity roosting – to be located on suitable trees within the former Keadby Ash Tip;
 - 5 No. Schwegler 2F universal bat boxes, or comparable boxes – to be located on suitable trees within the former Keadby Ash Tip;
 - 5 No. tawny owl nesting boxes (suitable also for other bird species requiring larger nesting cavities) – to be located on suitable trees within the former Keadby Ash Tip; and
 - ring-barking of suitable trees within the former Keadby Ash Tip to enhance the resource of standing deadwood available to willow tit.
- 5.2.43 The target species listed above are those that require mature trees or standing deadwood for roosting or nesting, conditions that are currently absent or in short supply due to the relatively young age of the woodland and scrub present within and adjacent to the Proposed Development Site.
- 5.2.44 Prior to submission and agreement of final specifications with NLC, an ecologist will undertake a walkover survey to identify suitable locations for the identified interventions. These locations will be marked on a plan to accompany the final specification.
- 5.2.45 Once installed, the artificial barn owl, bird and bat boxes will be inspected annually in January or February to confirm their ongoing presence and to identify any requirements for remedial action. All artificial boxes that cannot be re-found, that are found to be damaged, or that require other remedial action will be replaced/ rectified before the end of March in the same year, subject to the commercial availability of suitable replacement features to meet this deadline.

5.3 Comparison of Permanent Habitat Losses and Gains

- 5.3.1 The permanent losses of habitat for the Proposed Development are summarised in Section 3.2 and have been carried forward as the basis for structured comparison and quantification of habitat losses and gains. To support this and demonstrate engagement with planning policy on no net loss and net gain, use has been made of the calculator tool published by Natural England for this purpose (Natural England, 2019). This is not otherwise a formal requirement for NSIP as long as it is demonstrated how the Proposed Development has '*taken advantage of opportunities to conserve and enhance biodiversity*' (paragraph 5.3.4, DECC, 2011a).
- 5.3.2 It should be noted that the assessment provided focusses on land affected by permanent land take as well as the land to be used solely for enhancement.

As such, all other land encompassed within the very large Proposed Development Site that would not be directly used or affected has been excluded from the assessment. While there might be additional temporary habitat disturbances during construction, these are all localised and minor and not all are certain to occur, as explained elsewhere in this LBMEP (see Sections 3.2 and 4.10). All land temporarily disturbed by such activities will be reinstated in accordance with the habitat reinstatement approach set out in Section 4.10.

- 5.3.3 Given these considerations and the lack of any legal or planning policy driver for a different approach, it is considered that clarity is aided by this highly focussed approach. It is also consistent with typical expectations for reporting of habitat losses and gains for the purposes of ecological impact assessment and EIA, while providing greater confidence that no net loss and a measurable biodiversity gain can be achieved. The Natural England calculator is therefore only used to support transparency and interrogation of the assessment by stakeholders.
- 5.3.4 The assessment of the balance between habitat losses and gains has been based on the provision of the identified habitat creation measures in all of the indicative areas shown on **Figure 1**, although not all of this land would be required to achieve the stated gain. The location and extent of land for biodiversity enhancement is subject to ongoing review and will be confirmed in the final LBMEP. However, the level of biodiversity gain to be provided would remain as committed in this LBMEP.
- 5.3.5 A conservative approach has been used within the calculations to account for uncertainties regarding the final layout for the Proposed Development. The current assessment is therefore precautionary (i.e. worst-case, both in terms of losses and in the gains achievable) and there are a number of reasons why the land required to achieve the committed gain and its location may change later. Specifically:
- the current assessment takes a worst-case position and assumes that all land within the Proposed PCC Site that has not been allocated for biodiversity enhancement would be permanently lost to buildings and hard landscaping. This is overly precautionary, but it is a necessary assumption until the final site layout is fixed following detailed design.
 - the potential condition (a quality indicator) achievable for all new habitats is precautionary and likely overly so. So, as example of this, all new grasslands have been assumed to achieve 'moderate' condition even though 'fairly good' condition is realistically achievable. Similarly, the attenuation pond is assumed to achieve 'poor' condition even though a higher condition might be achievable later after consideration of the design options available (but noting the preference for a concrete liner).
 - realistic precautionary timeframes are adopted for the committed habitat creation i.e. up to ten years to achieve target condition of grassland

habitats. This represents a typical management period when establishing new habitats. In reality, given the proposed management regimes, measurable biodiversity gains for wildlife (e.g. invertebrates) from the new grasslands can be expected by Year 5 and before the final target condition is achieved for the habitat itself.

- no claims are made that the new habitats would represent priority habitats. Instead, the only aim is to achieve a genuine enhancement. So, for example, the existing poor quality 'modified grasslands' will be replaced with habitat more typical of favourably managed semi-natural grasslands i.e. 'other neutral grassland'. The management regimes necessary to achieve this are committed in this LBMEP (see above), and the standard guidance (Natural England, 2019) advises that such habitat has a 'low difficulty of creation'. Given this it is reasonable to assume that the committed habitats can and will be delivered.

5.3.6 It is not possible to compensate like for like for two habitat types experiencing minor habitat losses to the Proposed development i.e. scrub and OMH. However, functionally comparable habitat is delivered:

- a shortfall in replacement plantings of hawthorn scrub is addressed through the proposed hedgerow plantings of comparable composition and structure described in this LBMEP; and
- a shortfall in OMH is addressed through the proposed native flower-rich grassland habitat described in this LBMEP i.e. habitat that can be expected to benefit pollinators and other terrestrial invertebrates.

5.3.7 In specific relation to the OMH, the current approach for assessing the balance between habitat losses and gains requires like for like replacement of OMH regardless of the specific quality and scale of loss i.e. there is no flexibility to consider context despite the related guidance advising (and relevant to the current situation) '*artificially created areas that mimic semi-natural habitats such as species-rich grassland would also be in scope [of this habitat type]*' (Natural England, 2019). Creation of new OMH is not possible as suitable ground conditions are not available and, even then, there would be low confidence in the ability to reinstate comparable OMH. The affected OMH is otherwise, as explained in **Chapter 11** (ES Volume I, **Application Document Ref. 6.2**), not typical of the wider OMH resource (although moderate condition is assumed to permit precautionary assessment) so it is considered that creation of flower-rich grassland is a valid approach to address the small loss of OMH to the Proposed Development. The proposed new grassland habitat adds to the diversity and complexity of existing flower-rich habitats associated with the former Keadby Ash Tip and the connected Stainforth and Keadby Canal Corridor LWS (extending this into adjacent land), and therefore directly complements and diversifies habitat quality for the notable terrestrial invertebrate assemblage that is focussed on the former Keadby Ash Tip (as described in **Appendix 11C** – ES Volume II (**Application Document Ref. 6.3**)).

- 5.3.8 The additionally proposed species-specific interventions cannot be factored into the habitat assessment, but otherwise represent site-appropriate biodiversity enhancement. Similarly, no attempt is made to quantify the additional biodiversity gain achievable from management of retained areas of grassland or from inclusion of a minor scattered scrub component within grassland areas. This is not considered necessary given the assessment is more precautionary (less favourable to the Applicant) without these inclusions. The potential gains achievable from these additional measures are also harder to demonstrate unequivocally, so the terms of reference for assessment are simpler if they are excluded. Consequently, there can be greater confidence in the likely outcome of a gain for biodiversity.
- 5.3.9 The data entered into the calculator tool and its results are provided in **Appendix D**.
- 5.3.10 The summary findings confirm:
- a gain in habitat units of 10.6% is achievable;
 - a gain in hedgerow units of 35.9% is achievable; and
 - the broad aims of planning policy to achieve no net loss and a net gain are met.

6.0 MONITORING

- 6.1.1 A landscape architect and/ or an ecologist will undertake post-intervention habitat monitoring annually in June or July for a period of ten years. This timeframe reflects the advised time period for the establishment of the committed grassland habitats and is also considered appropriate to provide sufficient time to confirm a net gain for biodiversity.
- 6.1.2 The monitoring approach will be provided with the final LBMEP and will involve a condition assessment walkover survey to complete the following:
- review of the establishment of seed mixtures and shrub planting, and review of any requirements for remedial actions e.g. replacement of failed stock or re-seeding, or identification and rectification of damage;
 - review of grassland structure and composition, and associated implications for the agreed management regimes;
 - review of any native or non-native weed issues requiring treatment, or requirements for scrub control where the cover exceeds 5% of the total grassland area; and
 - review of establishment of vegetation within the pond and any requirements for management e.g. periodic vegetation clearance.
- 6.1.3 An ecologist will also make a ground level check of the barn owl, bird and bat boxes in January or February each year to identify any requirements for remedial action.
- 6.1.4 A brief monitoring report will be prepared in each year and provided to NLC as a record of compliance.

7.0 ROLES AND RESPONSIBILITIES

7.1 The Applicant and/ or the Appointed Main Contractor

7.1.1 The Applicant and/ or appointed main contractor will be responsible for:

- correct instruction of all parties contributing to delivery of the final approved LBMEP (including but not restricted to the Applicant's staff and their appointed ecologists, landscape architects, CoW, landscape contractors, construction contractors and management organisations);
- compliance with the final approved LBMEP, relevant legislation and any relevant planning commitments. This includes appropriate maintenance of new habitats for a minimum period of 25 years;
- keeping the appointed ecologist/ landscape architect/ arboriculturalist/ CoW informed of work activities that require support and supervision, so that it is clear when attendance on-site is required;
- enacting/ enforcing recommendations made by the ecologist/ landscape architect/ arboriculturalist/ CoW, or otherwise agreeing an appropriate alternative course of action, if it is subsequently determined that previous advice is not practicable or is out of date; and
- keeping a record of measures taken to deliver the requirements of the final LBMEP, to provide an auditable record of compliance.

7.2 The Appointed Ecologist

7.2.1 The appointed ecologist (including ecological CoW) will be responsible for:

- advising the Applicant on ecological matters and requirements for compliance with relevant legislation and protected species licences, providing support as instructed, and monitoring compliance with the final approved LBMEP;
- monitoring and assessing progress with delivery of biodiversity objectives and target condition of habitats on an annual basis for the first ten years following commencement of operation of the Proposed Development;
- reviewing the LBMEP at appropriate periodic intervals and revising management requirements as necessary at least once every five years thereafter for the duration of the LBMEP (minimum of 25 years); and
- providing the Applicant with survey reports and other written evidence required in accordance with the agreed scope of work and contractual obligations.

7.3 The Appointed Landscape Architect/ Arboriculturalist

7.3.1 The appointed landscape architect/ arboriculturalist (including landscape and arboricultural CoW) will be responsible for:

- monitoring and assessing the landscape related elements of the approved LBMEP for their effectiveness on an annual basis for the first five years following commencement of operation of the Proposed Development and then for the following five-year period and least once every five years subsequently for the duration of the LBMEP (minimum of 25 years);
- ensuring that the landscape related elements of the approved LBMEP are reviewed at the end of the five year initial monitoring and assessment stage and amended accordingly for the following five year period and subsequently for the duration of implementation of the LBMEP. The LBMEP shall be amended accordingly to suit any changing landscape conditions and ultimately inform the maintenance operations throughout the operational life of the Proposed Development; and
- ensuring that any reviews associated with landscape related elements of the approved LBMEP clearly identifies any changes to site conditions and circumstances, whether the aims and objectives of the approved LBMEP are being met, and where identified changes are needed to existing management practices and timeframes.

8.0 REFERENCES

British Standard (BS) 5837: 2012. *Trees in relation to design, demolition and construction – Recommendations*

Council of Europe (2000) *European Landscape Convention*

Department for Energy and Climate Change (2011a). *National Policy Statement NPS for Overarching Energy (EN-1) Secretary of State for Energy and Climate Change*. London: The Stationery Office.

Department of Energy and Climate Change (2011b). *National Policy Statement for Fossil Fuel Electricity Generating Infrastructure (EN-2)*. London: The Stationery Office.

Defra (2014) *The National Pollinator Strategy: for bees and other pollinators in England*. Available online: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/794706/national-pollinator-strategy.pdf

Forestry Commission (2007) *Forest Reproductive Material. Regulations controlling seed, cuttings and planting stock for forestry in Great Britain*.

HM Government (2020a) *Energy White Paper, Powering our Net Zero Future*. Available online: <https://www.gov.uk/government/publications/energy-white-paper-powering-our-net-zero-future>

Lincolnshire Biodiversity Partnership (2011) *Lincolnshire Biodiversity Action Plan*. Available online: <https://www.nelincs.gov.uk/wp-content/uploads/2016/02/201110-LincolnshireBAP-3rd-edition.pdf>

Ministry of Housing, Communities and Local Government (2019) *National Planning Policy Framework*. Available online: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

National Joint Utilities Group (2007) *Volume 4. Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees*.

Natural England (2014) *NCA 39: Humberhead Levels*. Available online: <http://publications.naturalengland.org.uk/publication/1843305?category=587130>

Natural England (2019) *Biodiversity Metric 2.0*. Available online: http://nepubprod.appspot.com/publication/5850908674228224?cache=1564421772.98&sm_au=iVV0WQ2rfngRSV22

North Lincolnshire Council. (1999) *North Lincolnshire Landscape Character Assessment and Guidelines*. Estell Warren Landscape Architects. Available online:

<http://www.planning.northlincs.gov.uk/planningreports/localplan/spg5landscapecharacterassessment.pdf>

North Lincolnshire Council (2003a). *North Lincolnshire Local Plan Saved Policies*. Available online: <http://www.planning.northlincs.gov.uk/planningreports/localplan/savedpolicies/direction.pdf>

North Lincolnshire Council (2003b). *North Lincolnshire Supplementary Planning Guidance (SPG) 3: Design in the Countryside*. Available online: <http://www.planning.northlincs.gov.uk/planningreports/localplan/spg3designinthecountryside.pdf>

North Lincolnshire Council (adopted 2011). *North Lincolnshire Local development Framework. Core Strategy*. Available online: <http://www.planning.northlincs.gov.uk/planningreports/corestrategy/adopteddpd/FullCoreStrategy.pdf>

North Lincolnshire Council (2020) *North Lincolnshire Local Plan Preferred Options, February 2020*. Available online: https://localplan.northlincs.gov.uk/downloads/preferred_options.pdf

SSE (2020) *A Greenprint for Building a Cleaner More Resilient Economy*. Available online: <https://www.sse.com/media/l52kojcn/sse-a-greenprint-for-building-a-cleaner-more-resilient-economy.pdf>

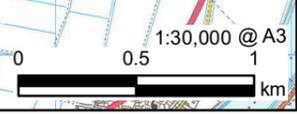
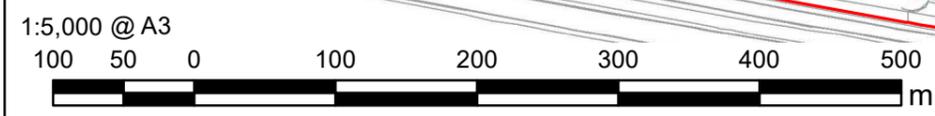
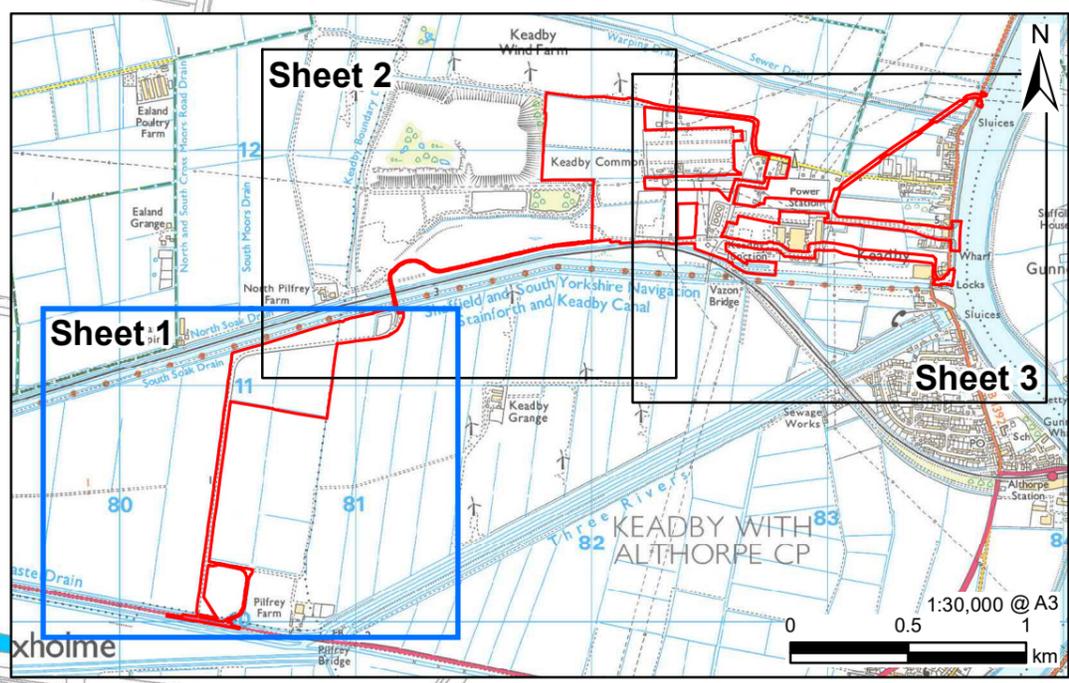
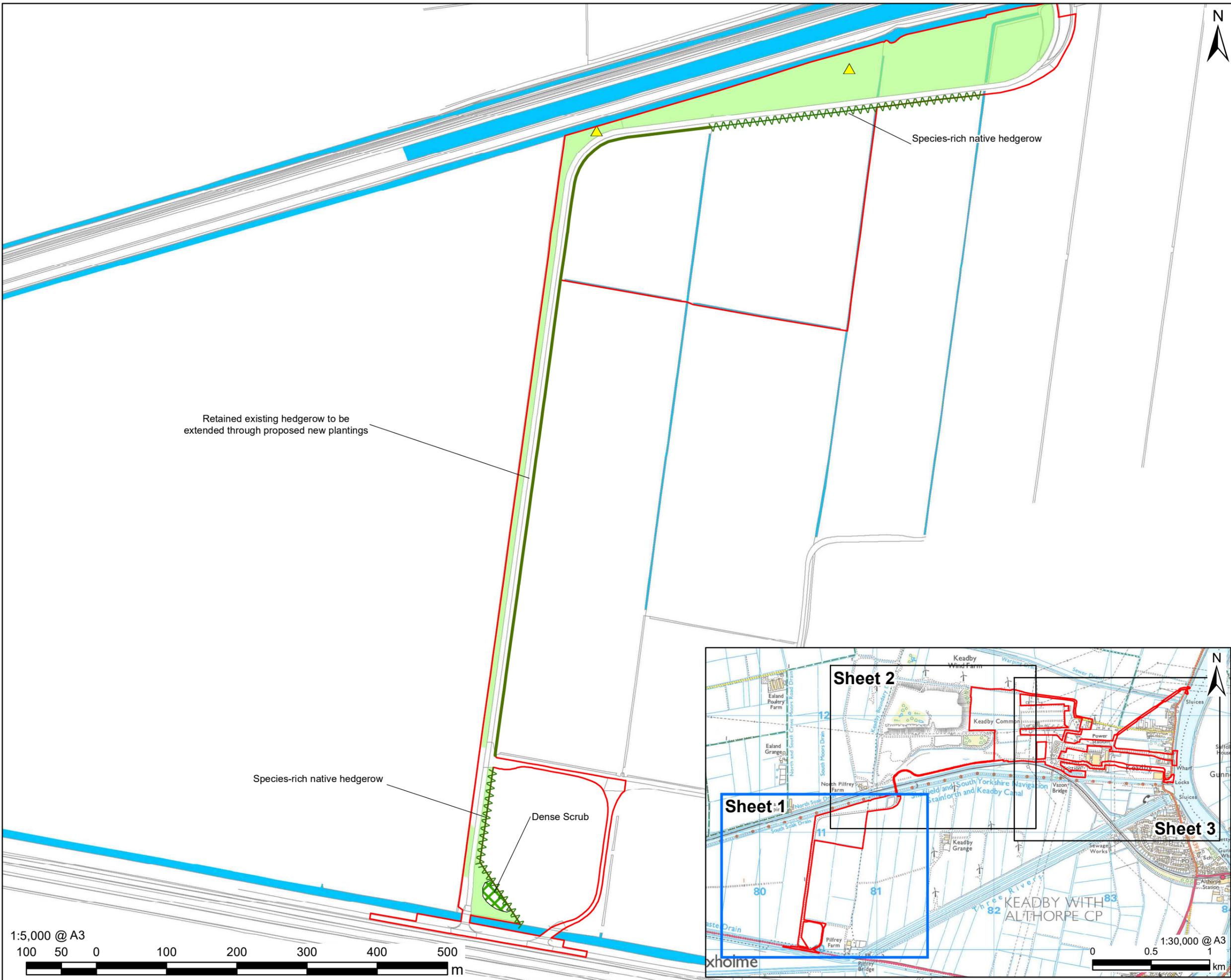
SSE (2020b) *Our Strategy*. Available online: <https://www.sse.com/who-we-are/our-strategy/>

FIGURES

Figure 1: Indicative Landscape and Biodiversity Enhancement Proposals

LEGEND

	The Order Limits
	Running Water
	Proposed Dense Scrub
	Grassland Creation
	Proposed Species-Rich Native Hedgerow
	Retained existing hedgerow
	Indicative Locations for Barn Owl Towers



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The Keadby 3 (Carbon Capture Equipped Gas Fired Generating Station) Order Regulation 5(2)(o) - Infrastructure Planning (Applications: Prescribed Forms and Procedures) Regulations 2009

ISSUE PURPOSE
DCO APPLICATION

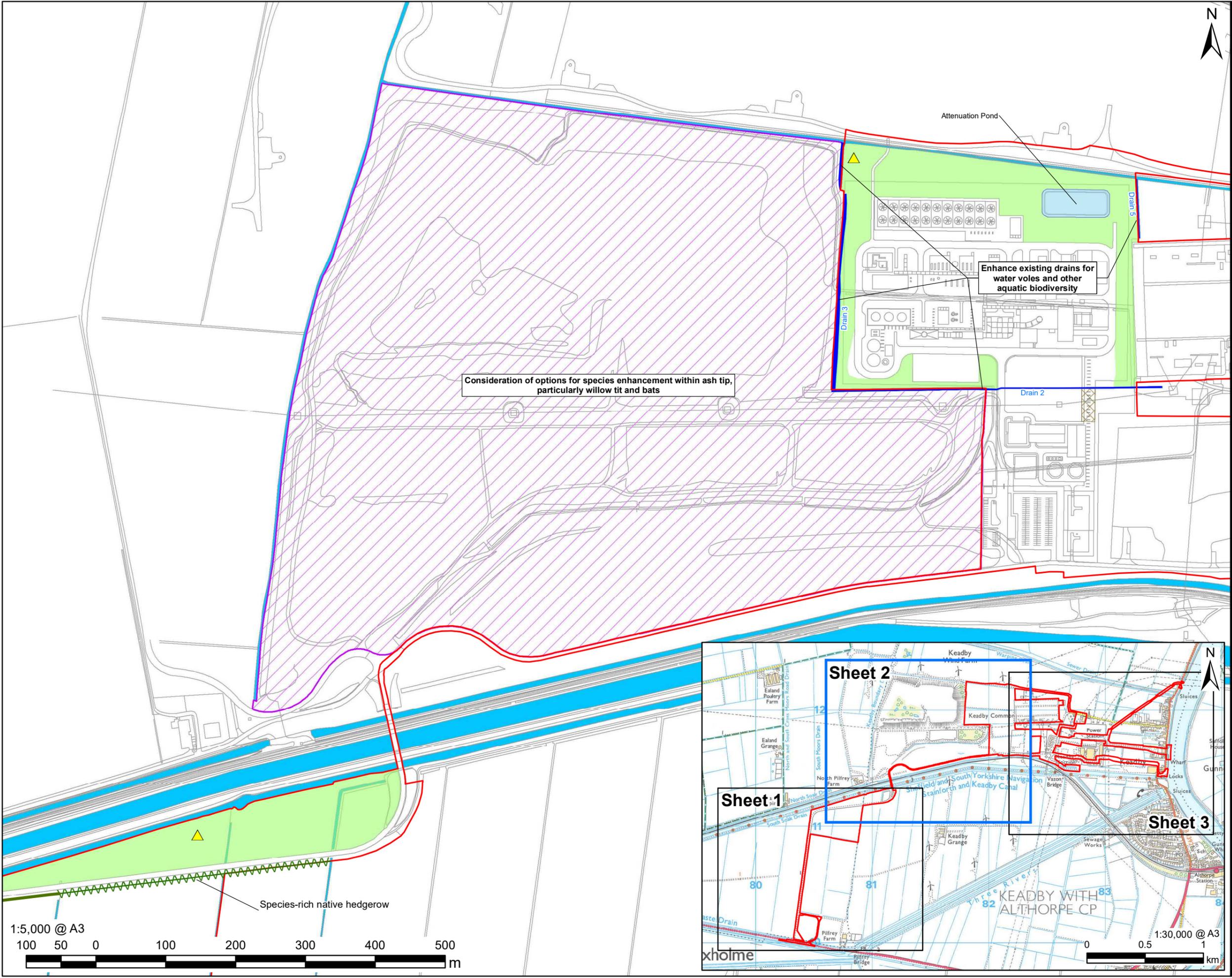
PROJECT NUMBER
60625943

SHEET TITLE
Landscaping and Biodiversity Management and Enhancement Plan
Sheet 1 of 3
Figure 1

SHEET NUMBER
Application Document Ref. 5.10

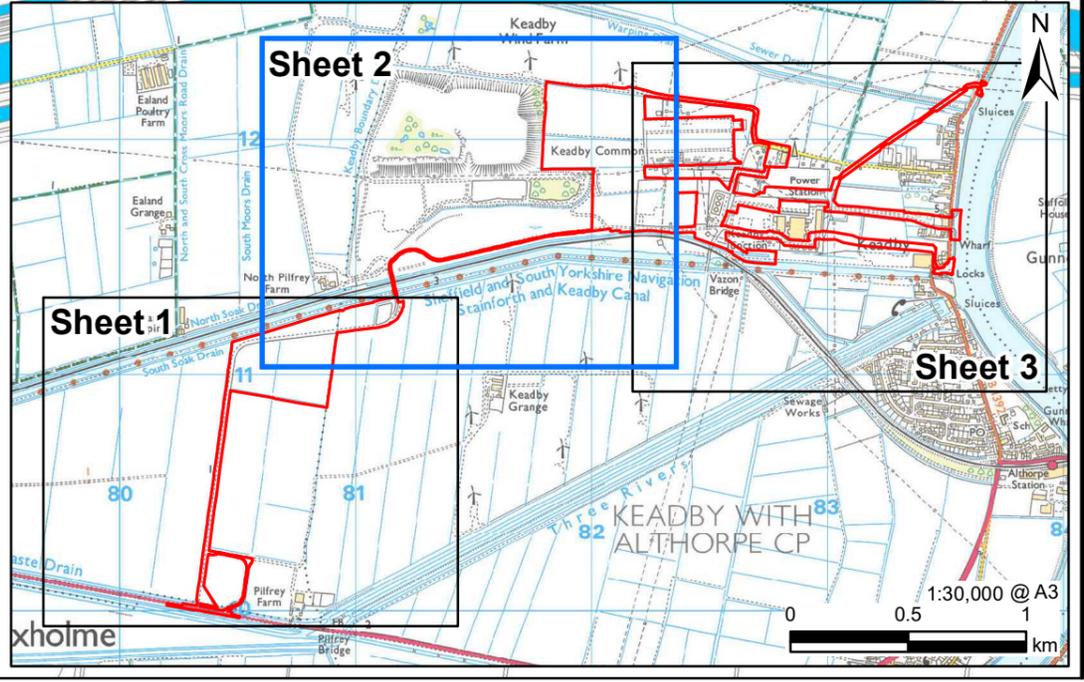
LEGEND

- The Order Limits
- Keadby Ash Tip
- Running Water
- Enhancement of Drains
- Attenuation Pond
- Grassland enhancement over electric cable
- Grassland Creation
- Proposed Species-Rich Native Hedgerow
- Retained existing hedgerow
- ▲ Indicative Locations for Barn Owl Towers



Consideration of options for species enhancement within ash tip, particularly willow tit and bats

Enhance existing drains for water voles and other aquatic biodiversity



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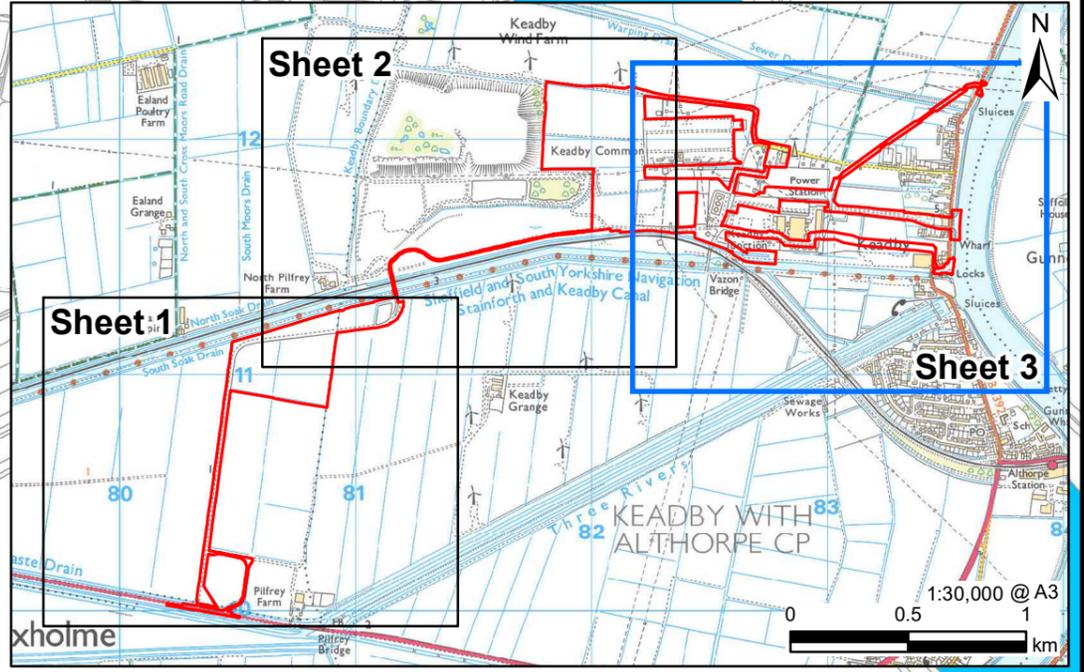
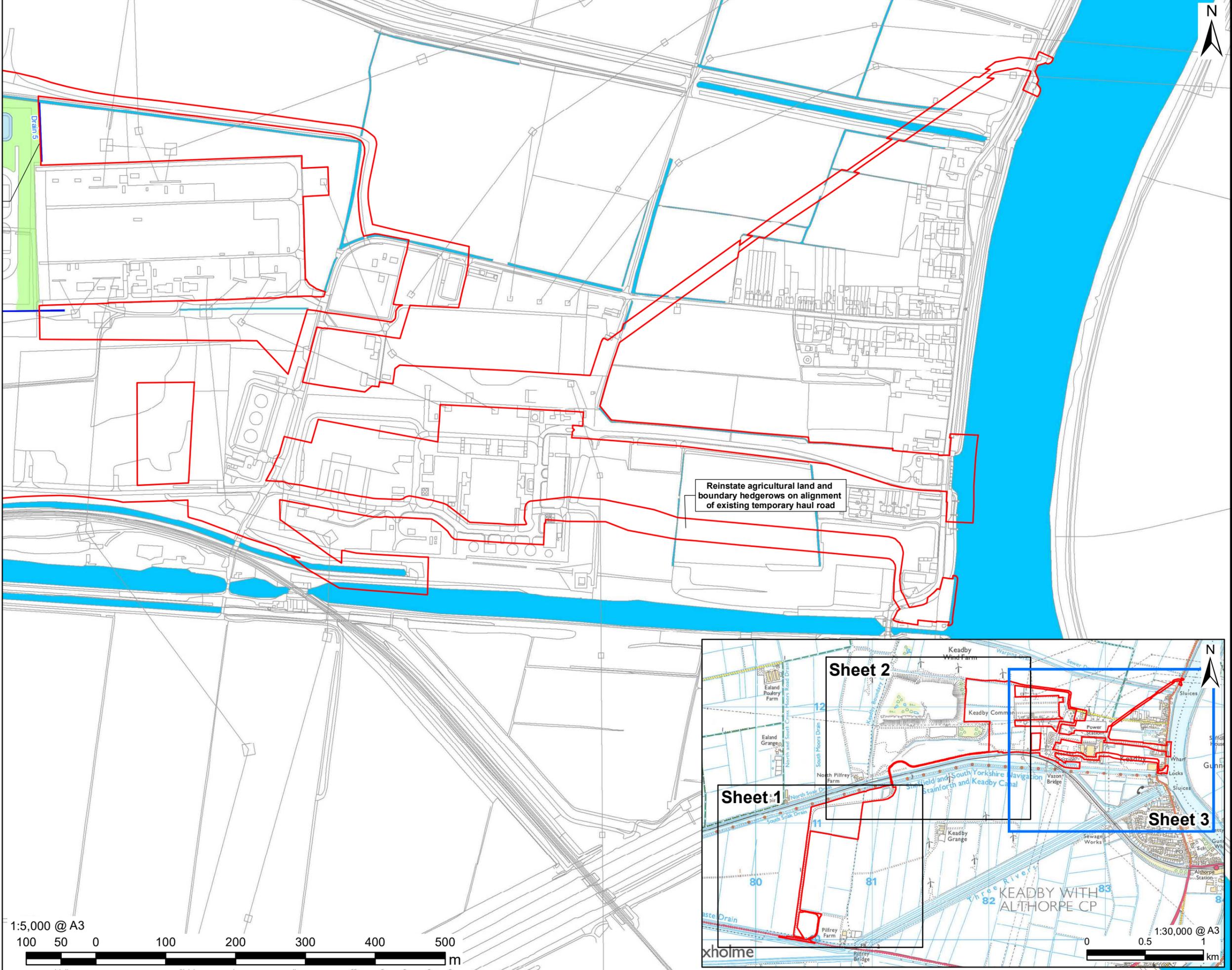
The Keadby 3 (Carbon Capture Equipped Gas Fired Generating Station) Order Regulation 5(2)(o) - Infrastructure Planning (Applications: Prescribed Forms and Procedures) Regulations 2009

ISSUE PURPOSE
DCO APPLICATION

PROJECT NUMBER
60625943

SHEET TITLE
Landscaping and Biodiversity Management and Enhancement Plan
Sheet 2 of 3
Figure 1

SHEET NUMBER
Application Document Ref. 5.10



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ISSUE PURPOSE
DCO APPLICATION

PROJECT NUMBER
60625943

SHEET TITLE
Landscaping and Biodiversity Management and Enhancement Plan
Sheet 3 of 3
Figure 1

SHEET NUMBER
Application Document Ref. 5.10

APPENDIX A SEED MIXTURES

A.1.1 EM4 Meadow Mixture for Clay Soils

% Contribution	Common name	Latin name
0.6	Yarrow	<i>Achillea millefolium</i>
4.5	Common knapweed	<i>Centaurea nigra</i>
0.5	Meadowsweet	<i>Filipendula ulmaria</i>
0.2	Lady's bedstraw	<i>Galium verum</i>
0.4	Meadow crane's-bill	<i>Geranium pratense</i>
0.2	Rough hawkbit	<i>Leontodon hispidus</i>
4	Oxeye daisy	<i>Leucanthemum vulgare</i>
0.3	Birdsfoot trefoil	<i>Lotus corniculatus</i>
0.4	Cowslip	<i>Primula veris</i>
4.4	Selfheal	<i>Prunella vulgaris</i>
0.5	Meadow buttercup	<i>Ranunculus acris</i>
0.8	Yellow rattle	<i>Rhinanthus minor</i>
1.2	Common sorrel	<i>Rumex acetosa</i>
0.5	Great burnet	<i>Sanguisorba officinalis</i>
0.4	Pepper saxifrage	<i>Silaum silaus</i>
0.1	Devil's-bit scabious	<i>Succisa pratensis</i>
1	Tufted vetch	<i>Vicia cracca</i>
10	Common bent	<i>Agrostis capillaris</i>
1	Meadow foxtail)	<i>Alopecurus pratensis</i>
3	Sweet vernal-grass	<i>Anthoxanthum odoratum</i>
1	Quaking grass	<i>Briza media</i>

% Contribution	Common name	Latin name
26	Crested dogstail	<i>Cynosurus cristatus</i>
24	Slender-creeping red-fescue	<i>Festuca rubra</i>
1	Meadow barley	<i>Hordeum secalinum</i>
4	Smaller cat's-tail	<i>Phleum bertolonii</i>
10	Smooth-stalked meadow-grass	<i>Poa pratensis</i>

APPENDIX B BARN OWL TOWER DESIGN PARAMETERS

Pole-box Design

An outdoor Barn Owl nestbox suitable for erection on a large pole



LEAFLET No 50

Reg. Charity No 299 835

This leaflet describes how to make a Barn Owl nestbox suitable for erection on a large telegraph pole. The information includes plans, dimensions, materials, safety advice and erection tips.

Please note:

Nestboxes in buildings are generally the best option, followed by nestboxes in trees. Pole boxes are usually only erected where these options are not available. Nestboxes should never be erected on operational telegraph/electricity poles and erecting your own telegraph pole is expensive. Building and erecting a pole nestbox is a lot of work so before deciding to proceed make sure there is no alternative. See *Nestboxes for use in Barns & Other Buildings* (leaflet no. 3) and *Nestboxes for use on Trees* (leaflet no. 2).

Suitability of the area

The Barn Owl is not a woodland bird. In the UK, Barn Owls hunt mainly by flying over areas of rough grassland, ditch sides, young tree plantations etc. that support a high population of small mammals. In areas with an abundance of food but a shortage of suitable sites, nestboxes can be of great benefit. They should always be placed in areas with some good Barn Owl habitat or they are unlikely to be used. See *Habitat Management* (leaflet no. 1)

Selecting a suitable pole

A pole box is big and heavy and cannot be adequately supported by a thin or flexible pole. A good pole will not only support the box for many years but will also be strong enough to take the weight of someone climbing a ladder leaned against it during inspection or clearing out. Most proper telegraph or electricity poles are suitable and just need to be cut to the right length.

You should be aiming for an erection height over 4 metres above ground level using a substantial pole of not less than 150mm diameter and 6 metres long (1.5m underground and 4.5m in height). In areas where climbing nest-predators are a problem (such as Beech Martens in mainland Europe) position the pole away from buildings or trees and wrap a 1.5m section of the pole with thin aluminium or other very slippery material.

Pole-box construction

The basic box should be built using exterior grade rot-resistant or Tanalith E treated sheet material. The Barn Owl Trust uses 12mm tanalised ($\frac{1}{2}$ ") softwood ply, 25 x 50mm (2" x 1") tanalised batten and 30mm ($1\frac{1}{4}$ ") rust resistant screws. There's also a small amount of 50 x 50mm timber and a piece of 18mm ply used in this design. Please avoid using hardwood ply, unless it is

stamped "FSC Approved".

You may use any type of wood preservative on the box where tanalised (CCA-treated) ply is not available. The preservative should be applied to all component parts before the box is assembled so that all the edges are properly treated. Make sure the treated wood is dry before you assemble the box. During construction a waterproof sealant (such as EVER BUILD – WEATHER MATE) should be applied to all the wood joints to increase weather protection. If you need proof that this is necessary, try leaving your box under a sprinkler for a few hours and then look inside it.



Although tanalised timber is very rot-proof it's not very waterproof so the roof sheets should also be treated with Creosote or some other water-resistant preservative. The apex should be covered with a strip of aluminium or copper. The front, back and sides **MUST** overhang the floor of the box and as an extra precaution a large drainage hole (20mm - ¾" - diameter) should be drilled in each corner of the floor of the box.

All the dimensions are given as a guide and variations of + or - 10% are quite acceptable. The box must have a large access panel to enable nest debris to be cleared out periodically.

You can see a cutting plan and watch a slideshow of a pole-box being constructed on our website www.barnowltrust.org.uk

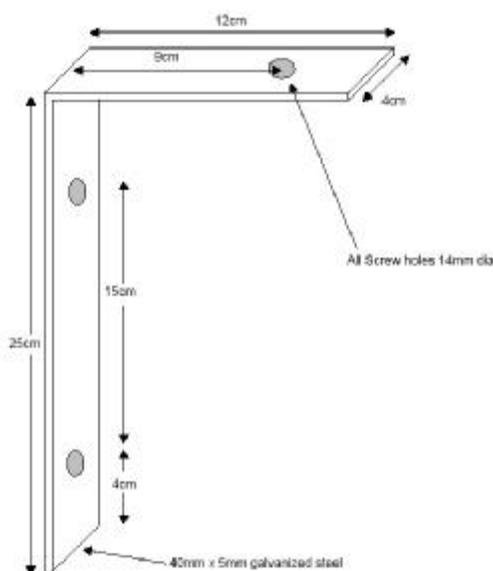
Siting the pole-box

Time spent in reconnaissance is seldom wasted. Please avoid siting your box within 1km (½ mile) of a dual-carriageway, motorway or similar modern road because of the high risk of road mortality. Nestboxes placed in a patch or strip of good (rough grassland) habitat are likely to be discovered more quickly as are boxes placed at existing roost sites. However, neither of these factors is essential.

The box should face open ground so that the main entrance hole is obvious to a passing owl. Don't hide it between big trees or tall buildings – if an entrance can't be seen easily the box is less likely to be discovered. Try to avoid facing the box towards prevailing wind and rain. Generally this means avoiding the west or south-west. The ridge of the roof should lie north-south or northwest-southeast.

The box will need to be cleaned out in future so think about where the ladder could stand and position the box so that this can be done safely.

POLE-BOX BRACKET DIMENSIONS



Erecting the box

By far the simplest and safest option is to attach the box to

the pole before the pole is erected. If the pole has already been erected you may consider the use of tower scaffolding or a "cherry-picker" hydraulic platform. It is possible to erect a pole-box (on a pole that's already up) without using any machinery. However, a pole-box is heavy and awkward to lift by hand and the use of ladders is potentially dangerous. The Barn Owl Trust has placed pole-boxes onto previously-erected poles on numerous occasions with a team of three people using three ladders but a detailed description of the method is beyond the scope of this leaflet. Heavy duty galvanised steel brackets, coach bolts, and coach screws are used to secure the box to the pole.

The most important thing when erecting the box is your own safety (for which you are responsible), the safety of your helpers, and the safety of anyone going up to the box in future years. Make sure you carry out a detailed assessment of the risks associated with whatever method you choose and do not attempt to erect a pole-box when working alone!

Each half of the exercise platform should be slid onto the box after erection and retained by screwing through the two outer battens. To facilitate this the box has ladder rests on both sides as well as below the inspection hatch.

Important advantages of this pole-box design

The nestbox described in this leaflet is very deep which makes it almost impossible for the young to emerge prematurely. This reduces the chances of nestlings falling from the box and dying as a result of neglect or predation. By the time a young Barn Owl is big and strong enough to get out of the box it will soon be fully fledged. The design also provides emerging young with a very generous exercise platform enabling them to do lots of wing-flapping before their first flight. They can even get onto the roof of the box and safely back inside before they are able to fly.

The combination of box depth and safe exercise area means that when a young owl leaves the box for the first time it stands a very good chance of being able to fly up and get back inside. This period of returning to the box is important for their survival. Boxes with low entrance holes allow young to leave the box before they are big or strong enough to fly back up again. Young on the ground are generally ignored by the adults and either starve or are predated. Whereas young emerging from a tree-mounted nestbox stand some chance of being able to climb back up, a pole box does not allow the same possibility.

This design has other important features and detailed criteria for the evaluation of Barn Owl nestbox designs may be found at:

www.barnowltrust.org.uk/infopage.html?id=231

Clearing out the box

As the box fills up with nest debris its effective depth is reduced and so it gradually becomes less safe for emerging young. After four or five broods of young have been produced (normally after about four years) the nest debris should be removed. Boxes used by Jackdaws will fill rapidly with sticks and should be

cleared out every year. When clearing out nest debris it is advisable to wear gloves and a dust mask. It's usually best to clear out nestboxes in November, December or January (but please try to avoid flushing birds out during severe weather conditions). Under the Wildlife and Countryside Act 1981, it is an offence to disturb breeding Barn Owls.

Safety tips

Before erecting your nestbox take time to consider the hazards you might face and what steps you could take to minimise the risks. Hazards might include: an injury at a remote location, falling from a ladder, injury from heavy lifting, dropping a nestbox onto another person, or poor positioning of a box resulting in additional hazards for anyone monitoring the box at a later date. The following are examples of precautions you should take to reduce the risks.

- 1 Don't work alone. If erecting a nestbox at an isolated site, let someone know where you are going and when you expect to be back before you set off. Carry a mobile phone if you have one.
- 2 Time spent in reconnaissance and preparation is seldom wasted. Never lift a box up into position until all preparatory work is complete. Double-check your measurements to confirm that the box will fit.
- 3 Ensure that any ladder you use is secure before climbing it. If possible tie it off at the top and bottom.
- 4 Avoid over-reaching - never attempt to carry out any task up a ladder if you cannot reach comfortably.
- 5 When planning how to position, support and fix a nestbox, try to create a situation where the box can rest in position without being held. This will allow you to have both hands free to fix it safely.

- 6 If carrying a nestbox up a ladder, ensure that it is kept low relative to your body (ideally not above waist height). This will keep your centre of gravity down. Try to keep the box in front of you or to the side - never hold a nestbox behind or above you.
- 7 You are responsible for your own safety - assess all the risks and be careful.

Please let us know when your box is occupied.

Good Luck!

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The Barn Owl Trust is a registered charity dedicated to the conservation of the Barn Owl and its environment. You can become a **Friend of the Barn Owl Trust** and support our work by making a regular donation.

Friends receive our bi-annual magazine Feedback, our Annual Report and an enamel pin badge.

The Trust provides a wide range of free leaflets on Barn Owl related matters. For details of these and further information about the Trust and its work, please write including a large SAE to:

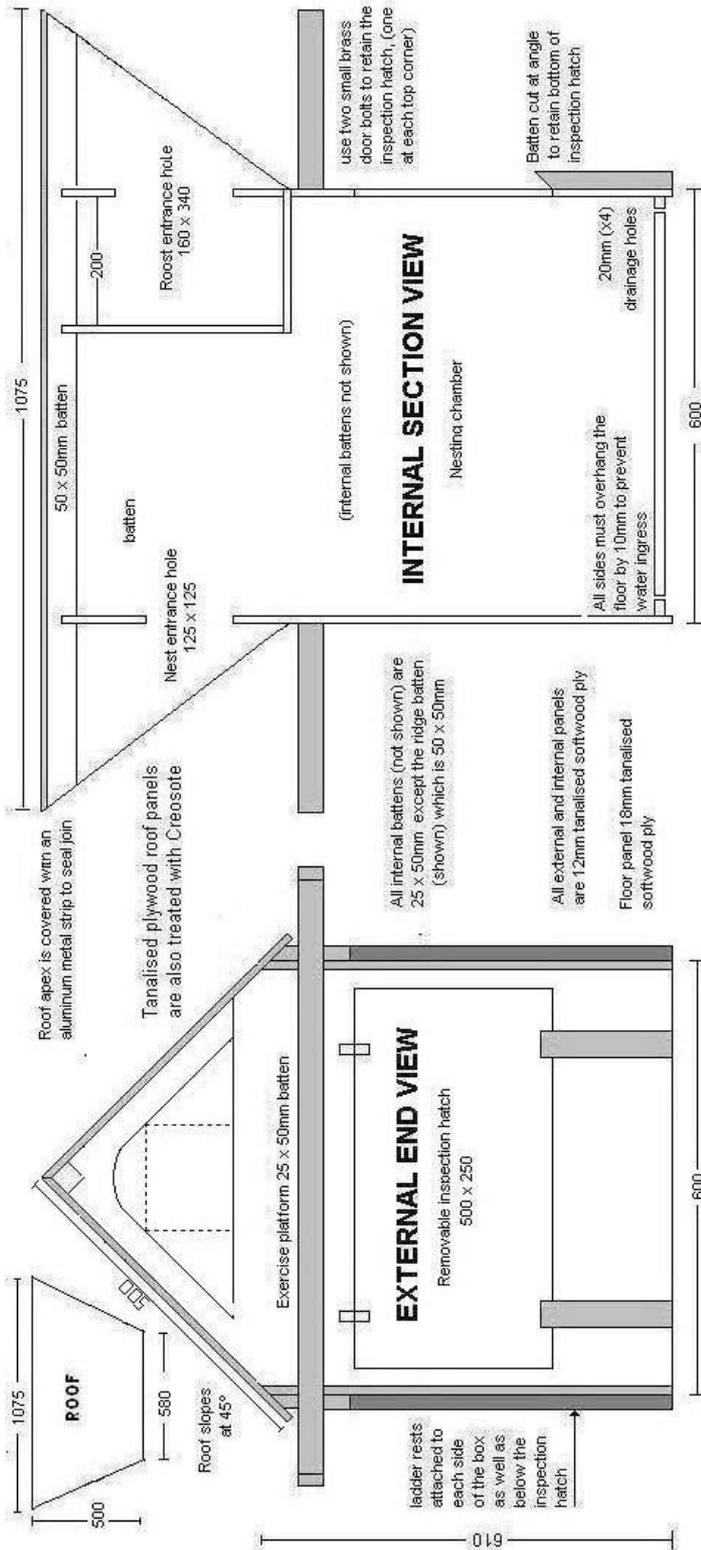
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Email: info@barnowltrust.org.uk
Web: www.barnowltrust.org.uk





Leaflet No. 50—Pole-box design—an outdoor Barn Owl nestbox suitable for erection on a large pole



Photographs of this box under construction may be viewed at www.barnowltrust.org.uk

BARN OWL TRUST POLE BOX DESIGN.

The platform is made in two parts. After the box has been erected the platform halves simply slide onto the box and the outer extended battens (already attached to one half of the platform) are screwed to the other half. To facilitate this, the box has ladder rests on both sides. Please note that the light grey shaded battens in this diagram are flat and level with the bottom of all the other timbers. This effectively gives the tray an edge that is easy for young birds to grip.

Drawing NOT to scale

all dimensions are millimetres

APPENDIX C MAINTENANCE REGIMES

C.1.1 The landscape and biodiversity management and enhancement area will be managed and maintained for 10 years, with a review after 5 years to potentially integrate the management and maintenance.

Landscape Element Type	Maintenance Year 1												Maintenance Years 2, 3 and 4												Maintenance Year 5 and ongoing (to be reviewed and amended as required)											
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Low Maintenance Grassland																																				
Remove litter, rubbish and debris	█				█				█				█				█				█				█				█				█			
Spot-treat undesirable species				█		█			█							█		█			█							█		█			█			
Establishment cuts (may occur pre-practical completion)					█	█	█																													
Subsequent cuts																█		█		█								█		█		█				
Control emerging scrub								█												█												█				
Species Rich Grassland																																				
Remove litter, rubbish and debris	█				█				█				█				█				█				█				█				█			
Spot-treat undesirable species				█		█			█							█		█			█							█		█			█			
Establishment cuts (may occur pre-practical completion)					█	█	█																													
Subsequent cuts																█				█								█				█				
Removal of arisings					█	█	█									█				█								█				█				
Control emerging scrub								█												█												█				

APPENDIX D OUTPUT FROM HABITAT LOSS/ GAIN CALCULATOR

Keadby 3		Return to results menu	
Headline Results			
On-site baseline	Habitat units	30.09	
	Hedgerow units	3.60	
	River units	0.00	
On-site post-intervention <small>(Including habitat retention, creation, enhancement & succession)</small>	Habitat units	33.27	
	Hedgerow units	4.89	
	River units	0.00	
Off-site baseline	Habitat units	0.00	
	Hedgerow units	0.00	
	River units	0.00	
Off-site post-intervention <small>(Including habitat retention, creation, enhancement & succession)</small>	Habitat units	0.00	
	Hedgerow units	0.00	
	River units	0.00	
Total net unit change <small>(including all on-site & off-site habitat retention/creation)</small>	Habitat units	3.18	
	Hedgerow units	1.29	
	River units	0.00	
Total net % change <small>(including all on-site & off-site habitat creation + retained habitats)</small>	Habitat units	10.56%	
	Hedgerow units	35.92%	
	River units	0.00%	

Keadby 3 A-1 Site Habitat Baseline																		
Condense / Show Columns Condense / Show Rows																		
Main Menu Instructions																		
Ref	Habitats and areas			Habitat distinctive	Habitat condition	Ecological connectivity	Strategic significance	Suggested action to address habitat losses	Ecological Total habitat units	Retention category biodiversity value						Bespoke compensation agreed for unaccepta	Comments	
	Broad Habitat	Habitat type	Area (hectare)							Area retained	Area enhanced	Area success	Baseline units retained	Baseline units	Baseline units success			Area lost
2	Grassland	Grassland - Modified grassland	113	Low	Fairly Poor	Low	Area compensation not in local strategy no local strategy	Same distinctiveness or better habitat required	3.39									PCC - Land connected to wagleave/Unmanaged. This grassland is typical of the wider semi-improved neutral grassland within the site. Grasses include tall fescue (<i>Schedonorus arundinaceus</i>), cock's-foot (<i>Dactylis glomerata</i>), York-shire-fog (<i>Holcus lanatus</i>) and false oat-grass (<i>Arrhenatherum elatius</i>). Herbs are generally restricted to common ragwort (<i>Senecio jacobaeae</i>) and basal. Scrub invades.
3	Lakes	Lakes - Ditches	0.04	Medium	Poor	Low	Area compensation not in local strategy no local strategy	Same broad habitat or a higher distinctiveness	0.16				0.00	0.00	0.00	0.04	0.16	PCC - Drain lost. Minor ditch across centre of site, ditch out, dominated by tall wetland grasses.
4	Urban	Urban - Artificial unvegetated, unsealed surface	4.58	V.Low	N/A - Other	N/A	Area compensation not in local strategy no local strategy	Compensation Not Required	0.00				0.00	0.00	0.00	4.58	0.00	PCC - K2 soil storage. Complies with UKHab definition for this habitat.
5	Heathland and shrub	Heathland and shrub - Mixed scrub	0.08	Medium	Fairly Poor	Low	Area compensation not in local strategy no local strategy	Same broad habitat or a higher distinctiveness habitat required	0.48				0.00	0.00	0.00	0.08	0.48	PCC - Dense scrub at edge of Ash Tip. Diverse, but dense with even age structure. No glades or clearings, no tall herb fringe (straight into sphermeral).
6	Urban	Urban - Open Mosaic Habitats on Previously Developed Land	0.25	High	Moderate	Low	Area compensation not in local strategy no local strategy	Same habitat required	3.00				0.00	0.00	0.00	0.25	3.00	PCC - While part of the DMV by virtue of its connection to the wider habitat resource, it lacks the characteristics of the wider habitat resource.
7	Grassland	Grassland - Modified grassland	0.24	Low	Fairly Poor	Low	Area compensation not in local strategy no local strategy	Same distinctiveness or better habitat required	0.72				0.00	0.00	0.00	0.24	0.72	ATB widening - assume worst case loss (all verge in red line on north side of carriageway). Species-poor grassland affected by highway regime.
8	Heathland and shrub	Heathland and shrub - Hawthorn scrub	0.01	Medium	Poor	Low	Area compensation not in local strategy no local strategy	Same broad habitat or a higher distinctiveness habitat required	0.04				0.00	0.00	0.00	0.01	0.04	PCC - dense scrub in powerline wagleave. Species poor recent secondary origin. True area 0.003ha but rounded to 0.01 for purposes of precautionary assessment. Compensated through scrub planting and new hedgerows.
9	Grassland	Grassland - Modified grassland	0.3	Low	Poor	Low	Area compensation not in local strategy no local strategy	Same distinctiveness or better habitat required	0.60				0.00	0.00	0.00	0.30	0.60	Enhancement area - the "Triangle" area. Assume habitat removal for replacement of Mabeq Bridge.
10	Lakes	Lakes - Ditches	0.08	Medium	Poor	Low	Area compensation not in local strategy no local strategy	Same broad habitat or a higher distinctiveness habitat required	0.32				0.00	0.32	0.00	0.00	0.00	Enhancement area - Keadby Common drains. Minor ditches drying in summer, dominated by tall wetland grasses.
11	Urban	Urban - Developed land; sealed surface	0.5	V.Low	N/A - Other	N/A	Area compensation not in local strategy no local strategy	Compensation Not Required	0.00				0.00	0.00	0.00	0.00	0.00	Enhancement area - car park to be broken out and improved.
12	Grassland	Grassland - Modified grassland	1.2	Low	Poor	Low	Area compensation not in local strategy no local strategy	Same distinctiveness or better habitat required	2.40				12	0.00	2.40	0.00	0.00	Enhancement area - field by access road. Recently sown improved grassland (agricultural grass mixture) regular mown.
13	Grassland	Grassland - Modified grassland	0.5	Low	Poor	Low	Area compensation not in local strategy no local strategy	Same distinctiveness or better habitat required	1.00				0.5	0.00	1.00	0.00	0.00	Enhancement area - field by access road. Recently sown improved grassland (agricultural grass mixture) regular mown.
14																		
15																		
16																		
17																		
18																		
Total site area ha			17.90						30.09	0.00	2.28	0.00	0.00	3.72	0.00	15.62	26.37	

Keadby 3											
A-2 Site Habitat Creation											
Condense / Show Columns			Condense / Show Rows								
Main Menu			Instructions								
Post development/ post intervention habitats											
Proposed habitat	Area (hectares)	Distinctiveness	Condition	Ecological				Temporal multiplier	Difficulty of creation category	Habitat units delivered	Comments
				Ecological connectivity	Strategic significance	Strategic significance	Time to target condition/years				
Grassland - Other neutral grassland	3	Medium	Moderate	Low	Area/compensation not in local strategy/ no local strategy	Area/compensation not in local strategy/ no local strategy	10	Low	16.81	PCC - reinstate/replace prior improved grassland with Emorsgate EM4 or similar. Limited scrub planting to provide a scrub/grassland matrix grading to habitats in powerline wayleave to south and ash tip to west.	
Urban - Developed land; sealed surface	1.84	V.Low	N/A - Other	N/A	Area/compensation not in local strategy/ no local strategy	Area/compensation not in local strategy/ no local strategy	0	Low	0.00	Remainder of PCC land is assumed to be permanent loss.	
Urban - Sustainable urban drainage feature	0.37	Low	Poor	Low	Area/compensation not in local strategy/ no local strategy	Area/compensation not in local strategy/ no local strategy	1	Medium	0.48	PCC surface water attenuation. Would be designed later as a Requirement. Assume minimum condition (poor)	
Grassland - Modified grassland	0.02	Low	Poor	Low	Area/compensation not in local strategy/ no local strategy	Area/compensation not in local strategy/ no local strategy	1	Low	0.04	A18 widening works - reinstate grassland like for like on north bank of drain.	
Grassland - Other neutral grassland	0.09	Medium	Moderate	Low	Area/compensation not in local strategy/ no local strategy	Area/compensation not in local strategy/ no local strategy	10	Low	0.50	Powerline wayleave - reinstate grassland over the electricity cable linking PCC.	
Grassland - Other neutral grassland	0.2	Medium	Moderate	Low	Area/compensation not in local strategy/ no local strategy	Area/compensation not in local strategy/ no local strategy	10	Low	1.12	Triangle' by Mabey Bridge resow with EM4 after construction.	
Heathland and shrub - Mixed scrub	0.1	Medium	Fairly Poor	Low	Area/compensation not in local strategy/ no local strategy	Area/compensation not in local strategy/ no local strategy	2	Low	0.56	Triangle' area at Mabey Bridge. Compensation for scrub loss at PCC.	
Totals	15.62								19.51		

