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Balfour Beatty

National Grid Viking Link

Document Title: Ecological Mitigation Strategy

Aconex Document Number: See Cover Page

Date and Version Control: 30/07/2020 Version 02

This document has been submitted to fulfil the requirements of the following planning condition(s):

Local Planning Authority (LPA)	Planning Permission Reference	Condition Number	Requirement
East Lindsey District Council	N/110/01549/17 (APP/D2510/W/18/3208088)	6	Construction Environmental Management Plan (CEMP)
Boston Borough Council	B/17/0340	28	Environment Mitigation Strategy (EMS)
North Kesteven District Council	17/1200/FUL	2	Construction Ecological Management Plan (CEMP)
North Kesteven District Council	17/1200/FUL	3	Construction Ecological Management Plan (CEMP) and Environment Mitigation Strategy (EMS)
North Kesteven District Council	17/1200/FUL	4	Environment Mitigation Strategy (EMS)

Planning condition(s) full requirement:

East Lindsey District Council (6)
No phase of the development (other than survey work) shall be commenced until a Construction Environmental Management Plan (CEMP) for that phase has been submitted to the Local Planning Authority and approved in writing. The CEMP shall include: (xi) an ecological and biodiversity management plan, to be informed by updated pre-commencement surveys.
Boston Borough Council (28)
Surveys must be undertaken prior to commencement of each section of the works, to supplement and update the existing baseline and include botanical surveys and water vole assessments at the locations of culverted crossing points of wet drains.
North Kesteven District Council (2)
<p>Prior to the commencement of any phase of the development a Construction Ecological Management Plan shall be submitted to and approved in writing by the district planning authority. The Construction Ecological Management Plan shall define the relevant habitats and species to be protected, and how protection will be achieved over the different phases of the development. It shall include the following:</p> <ul style="list-style-type: none"> I. Risk assessment of all potentially damaging pre-commencement, site clearance and construction activities; II. Identification of biodiversity protection zones; III. Measures to avoid or reduce impacts during construction, to include protective fencing to BS:5837 and other exclusion barriers and warning signs; IV. Location and timings of sensitive works to avoid harm to biodiversity features, including nesting birds and bats; sensitive works to avoid harm to biodiversity features, including nesting birds and bats; V. Requirements for update surveys at key points or phases of this development; VI. The times during construction when specialist ecologists need to be present on site to oversee works; and VII. Responsible persons and lines of communication.
North Kesteven District Council (3)
The submitted Construction Ecological Management Plan (condition 2) shall be informed and accompanied by up-dated pre-commencement surveys to supplement and update the existing baseline and shall include detailed botanical surveys and water vole assessments at the locations for culverted points of wet drains.
North Kesteven District Council (4)
The development hereby approved shall not be commenced until such time as a scheme for a programme of mink control has been submitted to and approved in writing by the District Planning Authority. The development shall be carried out in accordance with the approved details.

Table of Contents

1	PROJECT INTRODUCTION	9
1.2	The Project	9
2	ECOLOGY INTRODUCTION	12
2.1	Purpose of this document.....	12
2.2	General Method Statement for Species and Habitat Protection and General Mitigation Measures	15
3	ECOLOGY BASELINE	16
3.1	Water Vole	16
3.2	Otter.....	18
3.3	Great Crested Newt	21
3.4	Bats	26
3.5	Badger	33
3.6	Birds (Including Schedule 1)	40
3.7	Designated Sites and Habitats	42
3.8	Reptiles.....	46
3.9	Brown Hare.....	46
3.10	Invasive Non-Native Species (Including Nuttall's Pondweed)	46
4	MITIGATION STRATEGY	47
4.1	Water Vole	47
4.2	Otter.....	56
4.3	Great Crested Newt	59
4.4	Bats	68
4.5	Badger	71
4.6	Birds (Including Schedule 1)	81
4.7	Designated Sites and Habitats	103
4.8	Reptiles.....	117
4.9	Brown Hare.....	118
4.10	Invasive Non-Native Species (Including Nuttall's Pondweed)	118
4.11	Pollution Prevention	119
5	APPENDIX – WATER VOLE.....	121
6	APPENDIX – GREAT CRESTED NEWT.....	128
7	APPENDIX – BATS.....	135
8	APPENDIX – BADGER.....	146
9	APPENDIX – DESIGNATED SITES AND HABITATS	156

List of Figures

Figure 1: Google Earth Image showing the Route of the 67km Cable	11
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List of tables

Table 1: Key documents to be read in conjunction with this Ecological Mitigation Strategy	12
Table 2: Water vole survey results summary - route section 1	16
Table 3: Water vole survey results summary – route section 2	17
Table 4: Water vole survey results summary – route section 3	17
Table 5: Water vole survey results summary – route section 4	18
Table 6: Otter survey summary – route section 1	18
Table 7: Otter survey summary – route section 2	19
Table 8: Otter survey summary – route section 3	19
Table 9: Otter survey summary – route section 4	19
Table 10: Waterbodies unable to be surveyed due to access restrictions in route section 1	21
Table 11: Summary of great crested newt survey results for waterbodies in route section 1	22
Table 12: Waterbodies unable to be surveyed due to access restrictions in route section 2	23
Table 13: Summary of great crested newt survey results for waterbodies in route section 2	23
Table 14: Waterbodies unable to be surveyed due to access restrictions in route section 3	24
Table 15: Summary of great crested newt survey results for waterbodies in route section 3	24
Table 16: Summary of great crested newt survey results for waterbodies in route section 4	26
Table 17: Trees with bat roosting features of moderate to high potential within route section 2	27
Table 18: Trees with bat roosting features of moderate to high potential within route section 3	30
Table 19: Trees with bat roosting features of moderate to high potential within route section 4	32
Table 20: 2019 classification and status of setts within route Section 1	33
Table 21: 2019 classification and status of setts within route section 2	34
Table 22: 2019 classification and status of setts within route section 3	35
Table 23: 2019 classification and status of setts within route section 4	36
Table 24: Route section 1 water vole mitigation requirements (to be updated following pre- construction surveys)	50
Table 25: Route section 2 water vole mitigation requirements (to be updated following pre- construction surveys)	53
Table 26: Route section 3 water vole mitigation requirements (to be updated following pre- construction surveys)	54
Table 27: Route section 4 water vole mitigation requirements (to be updated following pre- construction surveys)	55
Table 28: A summary of waterbodies found within 250 of the base scheme design within route section 1	59
Table 29: A summary of waterbodies found within 250 of the base scheme design within route section 2	61
Table 30: A summary of waterbodies found within 250 of the base scheme design within route section 3	62

Table 31: A summary of waterbodies found within 250 of the base scheme design within route section 4.....	67
Table 32: Setts with no works anticipated within 30 m	72
Table 33: Badger setts within 30 m of the working area in route section 1	73
Table 34: Badger setts within 30 m of the working area in route section 2	74
Table 35: Badger setts within 30 m of the working area in route section 3	75
Table 36: Badger setts within 30 m of the working area in route section 4	78
Table 37: Features identified within and up to 60 m of the red line boundary that have the potential to be suitable for nesting barn owls – route section 1.....	88
Table 38: Features identified within and up to 60 m of the red line boundary that have the potential to be suitable for nesting barn owls – route section 2.....	90
Table 39: Features identified within and up to 60 m of the red line boundary that have the potential to be suitable for nesting barn owls – route section 3.....	91
Table 40: Features identified within and up to 60 m of the red line boundary that have the potential to be suitable for nesting barn owls – route section 4.....	94
Table 41: Additional survey requirements for water vole	121
Table 42: Timetable of water vole mitigation based on construction timetable	127
Table 43: Waterbodies requiring further survey during spring 2020	130
Table 44: Ponds with assumed great crested newt populations 0-250 m from the base scheme design.....	131
Table 45: Ditches crossed by the DC cable route	133
Table 46: Trees with moderate / high bat roosting potential across the route that will be impacted by construction activities	136
Table 47: Trees with moderate to high bat roosting features to be directly impacted by the construction activities – work timings	140
Table 48: Timetable of mitigation based on construction timetable - details of badger setts that will require closure.....	154
Table 49: Timetable of mitigation in the vicinity of designated sites and important habitats	162

Abbreviations & Glossary

Abbreviation	Definition
ALEP	Artificial Light Emissions Plan
BAP	Biodiversity Action Plan
BPZ	Biodiversity Protection Zone
CEMP	Construction Environmental Management Plan
DSI	Drain Suitability Index
ECoW	Ecological Clerk of Works
ELCS	East Lindsey Core Strategy
ELDC	East Lindsey District Council
EMF	Electric and Magnetic Field
EMS	Ecological Mitigation Strategy
ERIC PD	Eliminate, Replace, Isolate, Controls, PPE and Discipline
HDD	Horizontal Directional Drilling
HRA	Habitat Regulations Assessment
HSI	Habitat Suitability Index
HVDC	High Voltage Direct Current
IDB	Internal Drainage Board
NGVL	National Grid Viking Link
NKDC	North Kesteven District Council
NVC	National Vegetation Classification
PMW	Precautionary Method of Working
PPEIRP	Pollution Prevention and Emergency Incident Response
RAMS	Risk Assessment Method Statements
SHDC	South Holland District Council
SHSP	Soil Handling and Storage Protocol

TEP	The Environment Partnership
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1 PROJECT INTRODUCTION

- 1.1.1 This document comprises the Ecological Mitigation Strategy as part of the Viking Link UK Onshore Project as required by North Kesteven District Council (NKDC), East Lindsey District Council (ELDC) and Boston Borough Council (BBC).
- 1.1.2 This document will be submitted for approval to NKDC, ELDC and BBC as the relevant local planning authorities for the discharge of the required planning conditions.

1.2 The Project

- 1.2.1 The Viking Link Interconnector is a proposed 1400-megawatt (MW) high voltage direct current (DC) electricity link between the British and Danish transmission systems, connecting at Bicker Fen substation in Lincolnshire and Revsing substation in southern Jutland, Denmark. The project will involve the construction of a converter station in each country, the installation of submarine and underground cables between each converter station, and underground cables between the converter station and substation in each country.
- 1.2.2 Viking Link will be approximately 760 km long and will allow electricity to be exchanged between Great Britain and Denmark.
- 1.2.3 It will be made up of the following components:

The North Sea

- A pair of high voltage direct current (DC) submarine cables extending for approximately 620 km between Great Britain and Denmark crossing Dutch and German waters. The cables will be buried in the seabed.

Great Britain

- A pair of onshore underground high voltage DC cables from a landfall site at Boygriff, East Lindsey, to a converter station at North Ing Drove, South Holland.
- The converter station will convert the electricity from direct current (DC) to alternating current (AC). The installation of the converter station is not included within this report.
- High voltage alternating current (AC) underground cables from the converter station to the existing National Grid 400 kV substation at Bicker Fen, Lincolnshire.
- New equipment within the existing National Grid substation.

Denmark

- A pair of onshore underground high voltage DC cables from the west coast of Jutland to the existing 400 kilo volt (kV) substation at Revsing near Vejen.
- Converter station to convert electricity between DC and AC.
- New equipment within the existing 400 kV substation at Revsing.

- 1.2.4 The onshore cable route will, for the UK part of the project, be approximately 67m long. The onshore DC and associated fibre optic cables will be buried in one cable trench 1400mm wide.

Converter stations

- 1.2.5 The Viking Link Interconnector will involve the construction of two converter stations, sited in Great Britain and Denmark. The converter stations will occupy a footprint each of approximately 4 to 5 hectares. Additional land is required for access and environmental mitigation. There will also be some additional temporary land requirements during the construction period for laydown and contractor facilities. A typical converter station includes a range of technical equipment, some of which must be located indoors in a series of large buildings, up to 24m tall. A typical converter station includes:

- Control room;
- Converter power electronics and associated DC equipment;
- Alternating Current (AC) switchgear;
- Transformers and other associated AC equipment; and
- Ancillary equipment and spares buildings.

Underground cables

- 1.2.6 The converter stations are connected by a pair of high voltage DC underground and submarine cables. Typically, the cables are 150mm in diameter and will operate at a voltage of 525kV. Within Great Britain buried AC cables will connect the converter station to the existing high voltage electricity transmission system substation.

- 1.2.7 All the UK onshore elements have been granted planning permission under the Town and Country Planning Act 1990 from:

- East Lindsey District Council (ref: N/110/01549/17; Appeal ref: APP/D2510/W/18/3208088);
- North Kesteven District Council (ref: 17/1200/FUL);
- Boston Borough Council (ref: B/17/0340); and
- South Holland District Council (ref: H04-0823-17).

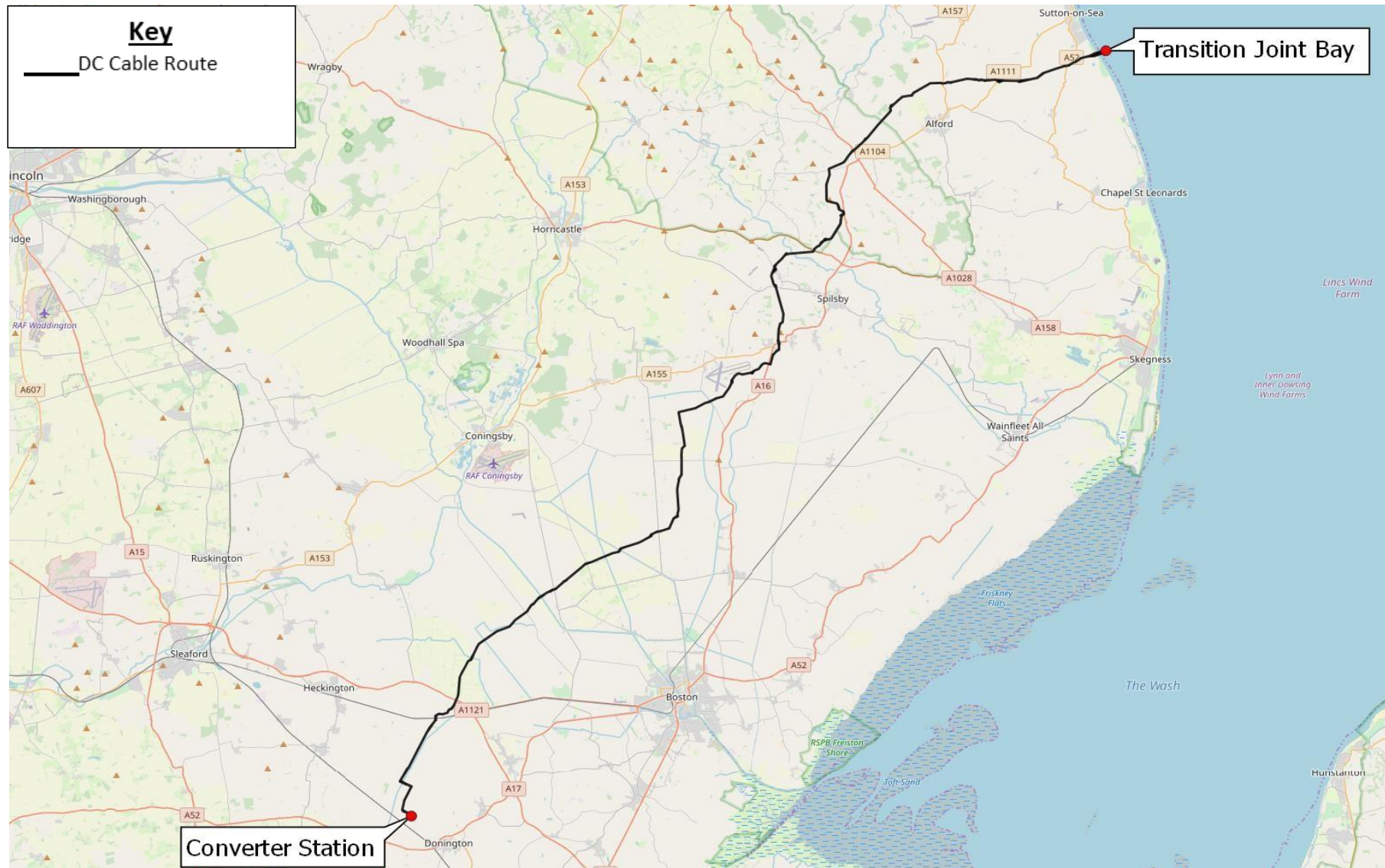


Figure 1: Google Earth Image showing the Route of the 67km Cable

2 ECOLOGY INTRODUCTION

2.1 Purpose of this document

2.1.1 This Ecological Mitigation Strategy is an addendum to the Construction Environmental Management Plan (CEMP VKL-BB-ENV-00-PL-EN-20528) and provides the key information required by NKDC, ELDC and BBC to show that sufficient survey effort has been completed and a suitable strategy has been put in place to protect each of the protected species and habitats known to be present within the proposals.

2.1.2 The project has been split into four route sections, and for clarity the council which each of the route sections falls within has been detailed below:

- Route section 1 - Proposed Landfall to Well High Lane. Route section 1 is located within ELDC;
- Route section 2 - Well High Lane to A16 (Keal Road). Route section 2 is located within ELDC;
- Route section 3 - A16 (Keal Road) to River Witham. The majority of route section 3 is located within ELDC (comprising 51.6 km) and a short element to the west of the River Witham (comprising 9.78 km) is located in BBC; and
- Route section 4 - River Witham to the Proposed Converter Station. The majority of route section 4 is located in BBC. A short element of the northern section of route section 4 (comprising 4.8 km) is located in NKDC. The southern extent of route section 4 (comprising 0.98 km) is located in South Holland District Council.

2.1.3 A number of key documents have been used to produce this document as detailed in **Table 1** below.

Table 1: Key documents to be read in conjunction with this Ecological Mitigation Strategy

Title of document	Description
Environmental Statement (August 2017) Volume 2 Document ES-2-B.06 Chapter 10 Ecology (Proposed Underground DC Cable)	This document was submitted as part of planning permission and reports the results of baseline studies and the assessment of the potential impacts of the proposed Direct Current (DC) cable route on ecology ¹ .
Vegetation Surveys Technical Report – DC Cable Route	This document outlines the 2019 surveys including: <ul style="list-style-type: none"> • Phase 1 habitat survey of areas where access was previously not possible • National Vegetation Classification (NVC) survey of two Local Wildlife Sites which may

¹ A Habitat Regulations Assessment (HRA) was undertaken for the offshore elements of the project. HRA of the onshore works was screened out as part of the Environmental Statement.

	<p>be affected by pre-construction drainage works; and</p> <ul style="list-style-type: none"> • Completion of hedgerow assessment survey on Langton/ Hawkes land.
Aquatic Vegetation Survey 2019 – DC Cable Route	<p>This document provides information on aquatic vegetation surveys undertaken at ditches to be crossed by the DC cable route that fall within NKDC and BBC.</p> <p>Please note that this document contains information that meets the specific requirements of the planning conditions set out by both Boston Borough Council and North Kesteven District Council.</p>
Bat Survey Technical Report 2019 – DC Cable Route	<p>This document provides information on updated preliminary ground-level roost assessments of trees along the DC cable route and nocturnal roost surveys of trees identified, which may require removal.</p>
Water Vole and Otter Survey 2019 – DC Cable Route	<p>This document includes updated water vole and otter surveys that have been undertaken on all suitable watercourses / ditches, where accessible, in connection with the proposed works.</p> <p>Please note that this document contains information that meets the specific requirements of the planning conditions set out by North Kesteven District Council.</p>
Badger Survey 2019 – DC Cable Route	<p>This document includes updated badger surveys undertaken of the site and surrounding 30 m, where accessible, in connection with the proposed Viking Link development, specifically the proposed DC cable route.</p>

2.1.4 Ecological surveys, to include water voles, were completed in 2019. Additional ecological surveys will also be undertaken during 2020. The results and the findings of the completed surveys will be made available to the relevant Local Planning Authority as to comply with any subsequent conditions.

2.1.5 This document should not be considered a final document. Some species-specific surveys will still need to be completed, subject to additional health and safety restrictions related to Covid-19, including:

- Schedule 1 bird surveys;
- A small area of extended Phase 1 habitat survey, where access has only just been granted and surveys are seasonal;

- Three potential priority woodland habitats (in route sections 2 and 3) through which the scheme passes, (including Hocker Holt LWS), where no assessment has been made to confirm if the habitats are priority (please note that conversations are currently on-going with the Balfour Beatty design / construction team to ensure that any impacts to these habitats are avoided where possible. In the scenario that no impacts are perceived on specific areas, then these areas identified will not require further surveys. However, there is a seasonal issue with these surveys. If the design cannot be finalised before the start of May 2020, further surveys will need to be started);
- Two ditches (D84 and D552) where access was previously unavailable, and these will need to be surveyed for aquatic vegetation and protected species;
- Surveys of 17 additional watercourses (five need surveying twice to ensure survey guidelines are followed) where water vole surveys have not been possible to date (including issues with landowner access);
- A number of bat trees (eight in total – 329, 334, 223, 303, 353, 363, 369, 413) are now likely to be within 20 m of the cable route and therefore these trees will need nocturnal surveys to be completed to determine if roosting bats may be affected by the proposed works (please note that conversations are currently on-going with the Balfour Beatty design / construction team to ensure that any impacts to these trees are avoided where possible. In the scenario that no impacts are perceived on individual trees, then further surveys of these specific trees will not be necessary. However, there is a seasonal issue with these surveys. If the design cannot be finalised before mid-May 2020, further surveys will need to be started); and
- Habitat Suitability Index (HSI) assessments and e-DNA presence/absence surveys in June 2020 of 13 ditches and 13 ponds where access issues have not allowed for surveys to be completed. Surveys at these locations are only required where impacts to suitable newt habitat within 250m of these waterbodies cannot be avoided.

Conversations are currently on-going with the Balfour Beatty design / construction team to ensure that any impacts to suitable newt habitat within 250m of these waterbodies is avoided where possible. However, to avoid the reliance on HSI alone as evidence of GCN presence/absence, we are also undertaking e-DNA surveys of the 26 waterbodies. This will provide an evidence-based approach to the GCN risk assessment process.

- 2.1.6 Information obtained from updated surveys will be appended as supplementary documents to update the mitigation strategy. Mitigation will be via obtaining the necessary licences or through Precautionary Method of Works (PMW) documents². The PMW documents will be appended to this EMS document. The PMW will be in an easy to read document, the contents of which will be delivered to site teams by site ecologists through toolbox talks.

² Balfour Beatty will be consulted on each of the different PMW species documents and adherence to each PMW will be followed.
Page 14 of 167

2.2 General Method Statement for Species and Habitat Protection and General Mitigation Measures

2.2.1 This document seeks to make clarification on the proposed mitigation strategies for the following:

- Water vole and otter;
- Great crested newts;
- Bats;
- Badger;
- Birds (including Schedule 1);
- Habitats and Designated Sites;
- Reptiles;
- Brown hare;
- Invasive non-native species (including Nuttall's pondweed);
- Working near watercourses; and
- Fish.

2.2.2 Within each section, baseline data information is provided (including details of further survey requirement where necessary) along with the proposed mitigation strategy for that species/habitat type (including details of where updated baseline surveys are required).

2.2.3 This document also makes clear the proposed appointment of an Ecological Clerk of Works (ECoW), and the types of works in which they will be required to be present.

2.2.4 All the details within this ecological mitigation strategy will be overseen by the Atkins' ecology team. Details of the key personnel can be found below:

- Ecology Project Manager – contact details can be provided upon request.
- Assistant Ecology Project Manager – contact details can be provided upon request.

3 ECOLOGY BASELINE

3.1 Water Vole

- 3.1.1 Across the scheme in 2017, 148 watercourses and ditches within or adjacent to the DC cable route were surveyed for water vole as part of the ES. In 2019, 163 watercourses and ditches within or adjacent to the DC cable route were surveyed for water vole.

Route Section 1

- 3.1.2 Water voles are prevalent across route section 1. Surveys undertaken in 2017 and 2019 found water vole to be present on 12 ditches. Ten of these ditches were within or adjacent to the scheme boundary. Two (ditches 182 and 196) were over 200m from the scheme boundary and are not considered further within this report. **Table 2** provides a brief summary of survey results.

Table 2: Water vole survey results summary - route section 1

Watercourse number	Water vole presence		
	2017	Visit 1 2019 (May – June)	Visit 2 2019 (August - September)
Route Section 1			
4	Present (burrows and feeding remains)	Present (3 latrines and feeding remains)	Likely absent ³
107	Present (burrows)	Likely absent	Likely absent
141	Not Surveyed	Present	Likely absent
143	Present (feeding remains)	Likely absent	Likely absent
144	Likely absent	Likely absent	Present (1 latrine)
146	Present (feeding remains)	Present	Present (3 latrines, multiple paths and feeding remains)
157	Present (latrine, burrow, feeding remains, pathway)	Present	Present (1 latrine)
179	Present (latrine, burrow, feeding remains, pathway)	Present	Present (3 latrines)
184.02	Not Surveyed	Present	Likely absent
191	Present (burrow, pathway)	Likely absent	Likely absent

Route Section 2

- 3.1.3 Water voles are present within route section 2 on the River Lymn and on one further ditch (ditch 249). The River Lymn was not surveyed in 2017 but water voles were found on both surveys in 2019 and on a connecting ditch (ditch 249). **Table 3** provides a brief summary of survey results.

³ These results are taken from the previous TEP survey results. Although these have been marked as likely absent based on the survey results, where presence was found in the initial 2019 surveys (ditches 4, 141 and 184.02), a precautionary approach has been taken and it has been assumed that water vole may be present and mitigation on this basis is in place.

Table 3: Water vole survey results summary – route section 2

Watercourse number	Water vole presence		
	2017	Visit 1 2019 (May – June)	Visit 2 2019 (August - September)
Route Section 2			
249	Likely absent	Present	Present (3 latrines)
R. Lymn 1	Not Surveyed	Present (3 latrines, 3 feeding remains & footprints)	Present (2 latrines)
R. Lymn 2	Not Surveyed	Present	Present (1 latrine and feeding remains)

Route Section 3

- 3.1.4 Water voles are present within route section 3. Between 2017 and 2019 water voles were found on 10 ditches surveyed. Nine of these ditches were within or adjacent to the scheme boundary. One (ditch 326) was over 500m from the scheme boundary and is not considered further within this report. Within this route section, water voles have not been found on any of the same ditches in both 2017 and 2019. **Table 4** provides a brief summary of survey results.

Table 4: Water vole survey results summary – route section 3

Watercourse number	Water vole presence		
	2017	Visit 1 2019 (May – June)	Visit 2 2019 (August - September)
Route Section 3			
35	Present (burrows, pathways)	Likely absent	Likely absent
300	Likely absent	Likely absent	Present (1 latrine)
320	Present (pathway, feeding remains)	Likely absent	Likely absent
323	Present (disused burrow)	Likely absent	Likely absent
422 (inc. 426)	Present (burrow)	Likely absent	Likely absent
443	Not Surveyed	Present	Present (1 latrine and 1 burrow)
446	Likely absent	Present	Present (Multiple latrines, footprints and feeding remains)
447	Present	Likely absent	Likely absent
731	Present	Likely absent	Likely absent

Route Section 4

- 3.1.5 Water voles are present within route section 4. Between 2017 and 2019 water voles were found on 4 ditches surveyed within or adjacent to the scheme boundary.
- 3.1.6 Water voles were found to be present in three of the ditches within route section 4 on the first 2019 visit. Due to intensive management no evidence of their presence was found during the second visit. Ditch 732, where water voles were recorded during the second visit is connected to two ditches where water vole were found previously (ditch 504 and 508). Ditch 732 had not been subject to management

activities and it is therefore assumed that the water voles had moved from ditch 504 or 507 and colonised this adjacent ditch. **Table 5** provides a brief summary of survey results.

- 3.1.7 In Route Section 4 there are five ditches that have not been surveyed for water vole in either 2017 or 2019. These ditches include 551 and 552 (both sections of the Great Hale Eau), 84, 630 and 719. These ditches are a priority for survey in spring 2020 to ensure water vole mitigation can be implemented appropriately where required.

Table 5: Water vole survey results summary – route section 4

Watercourse number	Water vole presence		
	2017	Visit 1 2019 (May – June)	Visit 2 2019 (August - September)
Route Section 4			
60	Likely absent	Present	Likely absent
504	Not Surveyed	Present	Likely absent
508	Likely absent	Present	Likely absent
732 (Skerth Drain)	Present (<i>4x burrows. pathway in vegetation; cropped grass around tunnel entrance; feeding remains</i>)	Likely absent	Present (1 latrine)

3.2 Otter

- 3.2.1 Across the scheme in 2019, 163 watercourses and ditches within influencing distance of the DC cable route were surveyed for otter.

Route Section 1

- 3.2.2 Evidence of otter was recorded on five watercourses in 2017 (see Table 6). Of these, only two watercourses were found to have evidence of otter in 2019 (ditches 114 and 144) in the form of spraints. A potential couch/resting site was found on ditch 4 in 2017 but was not found during the 2019 surveys. No further potential holt features or resting sites have been recorded within Route Section 1. Otters are known to be prevalent in the area and will likely use these ditches for foraging and commuting to foraging sites as well as potentially connective corridors within their territories. **Table 6** provides a brief summary of survey results.

Table 6: Otter survey summary – route section 1

Watercourse number	Otter presence		
	2017	Visit 1 2019 (May – June)	Visit 2 2019 (August - September)
Route Section 1			
4	Present (resting site)	Likely absent	Likely absent
111	Present (spraint)	Likely absent	Likely absent
114	Present (spraint)	Present (1 spraint)	Likely absent
144	Present	Likely absent	Present (1 spraint)
146	Present (unidentified run)	Likely absent	Likely absent

Route Section 2

- 3.2.3 Evidence of otter has only been found on one watercourse within Route Section 2 (River Lymn1) in the form of spraints and feeding remains in 2019. No evidence of otter was found in 2017. No potential holt features or laying up sites have been recorded although the River Lymn does offer potential habitat for holts/laying up sites to be created. Otters are known to be prevalent in the area and will likely use ditches within the scheme for foraging and commuting to foraging sites. **Table 7** provides a brief summary of survey results.

Table 7: Otter survey summary – route section 2

Watercourse number	Otter presence		
	2017	Visit 1 2019 (May – June)	Visit 2 2019 (August - September)
Route Section 2			
R. Lymn 1	Not Surveyed	Likely absent	Present (Multiple spraints & feeding remains)

Route Section 3

- 3.2.4 Evidence of otter has only been found on one watercourse within Route Section 3 (ditch 422) in 2017. No evidence of otter was found in 2019. No potential holt features or laying up sites have been recorded. Otters are known to be prevalent in the area and will likely use these ditches for foraging and commuting to foraging sites. **Table 8** provides a brief summary of survey results.

Table 8: Otter survey summary – route section 3

Watercourse number	Otter presence		
	2017	Visit 1 2019 (May – June)	Visit 2 2019 (August - September)
Route Section 3			
422 (inc. 426)	Present	Likely absent	Likely absent

Route Section 4

- 3.2.5 Evidence of otter has only been found on two watercourses within Route Section 4 (ditches 393 and 587) in the form of spraints, in 2019. No evidence of otter was found on route section 4 in 2017. No potential holt features or laying up sites have been recorded. Otters are known to be prevalent in the area and will likely use these ditches for foraging and commuting to foraging sites.

- 3.2.6 **Table 9** provides a brief summary of survey results.

- 3.2.7 In route section 4 there are five ditches that have not been surveyed for otter in either 2017 or 2019. These ditches include 551 and 552 (both sections of the Great Hale Eau), 84 and 630. These ditches are a priority for survey in spring 2020 to ensure otter mitigation can be implemented appropriately where required.

Table 9: Otter survey summary – route section 4

Watercourse number	Otter presence		
	2017	Visit 1 2019 (May – June)	Visit 2 2019 (August - September)

Route Section 4			
393	Likely absent	Likely absent	Present (1 spraint)
587	Likely absent	Likely absent	Present (1 spraint)

3.3 Great Crested Newt

- 3.3.1 A total of 33 ponds and 70 ditches were identified for preliminary scoping through aerial and Ordnance Survey (OS) maps within the designated survey area (base scheme design area plus a 250 m buffer) during the 2017 surveys, as outlined within the Environmental Statement. This involved undertaking Habitat Suitability Assessments (HSI) and Ditch Suitability Assessments (DSI) and identifying suitable waterbodies for presence / likely absence surveys and further population surveys. Thirteen ponds and 29 ditches were not accessible as permission for survey was not granted in 2017.
- 3.3.2 Generally, the terrestrial habitats within the survey area were sub-optimal for shelter, comprising predominantly of arable farmland with patches of improved and semi-improved grassland.
- 3.3.3 Overall, two small populations of great crested newt were recorded in route section 1 and route section 4, however, unless likely absence can be established within the ponds and ditches with access restrictions, great crested newts will be assumed present in each of these waterbodies also.

Route Section 1

- 3.3.4 The wider landscape within route section 1 of the proposed DC cable route is predominantly arable and generally provides sub-optimal habitat for amphibian refuge and foraging, however, provides suitable opportunities for commuting.
- 3.3.5 A total of nine ponds were identified for HSI assessment and 22 ditches for DSI assessment within the designated survey area within route section 1.
- 3.3.6 Seven ponds and four ditches in route section 1 were unable to be surveyed within 250 m due to access restrictions. Great crested newt presence will be assumed within these waterbodies, unless likely absence can be determined through further survey. The waterbodies with access restrictions during the 2017 surveys are outlined within **Table 10**.

Table 10: Waterbodies unable to be surveyed due to access restrictions in route section 1

Pond Reference	Distance from Scheme (m)	Ditch Reference	Distance from Scheme (m)
P7	51-250	D8	0-50
P9	51-250	D15	51-250
P11	51-250	D108	0-50
P27	51-250	D109	0-50
P198	51-250		
P200	51-250		
P32	51-250		

- 3.3.7 Two ponds and 18 ditches were subject to HSI/DSI assessments within route section 1. Of these, eight ditches were taken forward for presence / likely absence surveys with the remainder scoped out due to being dry, absent, or scoring below 'below average' on the HSI/DSI assessments. **Table 11** summarises the findings of the surveys and rationale for scoping out. Great crested newt was confirmed present in D3 (located 0-50 m from the base scheme design) by means of eDNA

survey only. Traditional pond survey methods did not detect the presence of great crested newt within D3, and subsequently, a 'small' population is assumed which is likely non-breeding.

- 3.3.8 As seven ponds and four ditches (and three ponds for further survey) were unable to be surveyed due to access restrictions; great crested newt presence will be assumed in these waterbodies unless further survey effort can be achieved in spring 2020.

Table 11: Summary of great crested newt survey results for waterbodies in route section 1

Pond/Ditch Ref.	Distance from the Base Scheme Design (m)	HSI/DSI Score	Presence/Absence Results	Population Size Class Results
Ponds				
P4	51-250 m	0.53 (Below-average)	n/a – scoped out of further survey	N/A
P199	51-250 m	0.45 (Poor)	n/a – scoped out of further survey	N/A
Ditches				
D3	0-50	5	Present (eDNA confirmation)	Small ⁴
D4	0-50	3	n/a (no access)	n/a
D13	0-50	3	n/a (dried out)	n/a
D101	0-50	0	n/a (no access)	n/a
D102	51-250	3	Absent	n/a
D105	00-50	0	n/a (dried out)	n/a
D106	0-50	3	Absent	n/a
D110	0-50	5	n/a (no access)	n/a
D130	51-250	5	Absent	n/a
D143	0-50	5	Absent	n/a
D158	0-50	5	Absent	n/a
D179	0-50	1	n/a – scoped out of further survey	-
D186	0-50	1	Absent	n/a
D187	51-250	1	n/a – scoped out of further survey	-
D191	0-50	1	Absent	n/a
D192	51-250	1	n/a – scoped out of further survey	-
D195	51-250	-2	n/a – scoped out of further survey	-
D735	0-50	3	n/a – scoped out of further survey	-

Route Section 2

- 3.3.9 No pre-existing records of amphibians were returned within the base scheme design for route section 2. Eight records of great crested newt were returned by the desktop study within 1 km of the base scheme design.
- 3.3.10 The wider landscape within route section 2 of the base scheme design is largely arable, intensively farmed and overall provides sub-optimal habitat for amphibian refuge and foraging, however, provide suitable opportunities for commuting.
- 3.3.11 Eleven ponds and three ditches were identified from OS maps or satellite images within the designated survey area in route section 2. Of these, one pond was

⁴(assumed, no great crested newt recorded during traditional surveys)

unable to be assessed due to access restrictions. Great crested newt presence will be assumed within this waterbody, unless likely absence can be determined through further survey. The waterbody with access restriction during the 2017 surveys is outlined within **Table 12**.

Table 12: Waterbodies unable to be surveyed due to access restrictions in route section 2

Pond Reference	Distance from Scheme (m)
P71	51-250

3.3.12 Ten ponds and two ditches were subject to HSI/DSI assessments. No ditches were subsequently identified for further survey due to poor suitability for breeding amphibians. Eight ponds were assessed to have 'Good' or 'Excellent' habitat suitability for great crested newt and were taken forward for presence / likely absence survey, leaving two ponds scoped out for further survey following HSI assessment average or poor suitability scores. No evidence of great crested newt was detected during the further surveys, however one pond (P183) was unable to be surveyed further, following the HSI assessment, due to access restrictions. The results of the HSI/DSI and further survey are provided within **Table 13**.

3.3.13 As one pond was unable to be initially surveyed and one pond unable to survey further due to access restrictions, small populations will be assumed unless further survey effort can be achieved in spring 2020 to determine otherwise.

Table 13: Summary of great crested newt survey results for waterbodies in route section 2

Pond/Ditch Ref.	Distance from the Base Scheme Design (m)	HSI/DSI Score	Presence/Absence Results	Population Size Class Results
Ponds				
P72	51-250	0.73 (Good)	Likely Absent	n/a
P75	0-50	0.77 (Good)	Likely Absent	n/a
P80	0-50	0.75 (Good)	Likely Absent	n/a
P81	0-50	0.76 (Good)	Likely Absent	n/a
P85	51-250	0.77 (Good)	Likely Absent	n/a
P86	51-250	0.84 (Excellent)	Likely Absent	n/a
P182	51-250	0.62 (Average)	n/a – scoped out of further survey	n/a
P183	51-250	0.84 (Excellent)	n/a (no access)	n/a
P184	51-250	0.78 (Good)	n/a (dried out)	n/a
P185	51-250	0.48 (Poor)	n/a – scoped out of further survey	n/a
Ditches				
D264	51-250	3	n/a – scoped out of further survey	-

D753	51-250	1	n/a – scoped out of further survey	-
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Route Section 3

- 3.3.14 Route section 3 of the proposed DC cable route is largely arable, intensively farmed and overall provides sub-optimal habitat for amphibian refuge and foraging, however, provides suitable opportunities for commuting.
- 3.3.15 No pre-existing records of amphibians were returned within the base scheme design for route section 3. One record of great crested newt was returned within 1 km of the base scheme design during the desktop study.
- 3.3.16 A total of 12 ponds and 30 ditches were identified on maps or aerials within the designated survey area in route section 3.
- 3.3.17 Four ponds and nine ditches were unable to be assessed due to access restrictions. Great crested newt presence will be assumed within these waterbodies, unless likely absence can be determined through further survey in spring 2020. The waterbodies with access restrictions during the 2017 surveys are outlined within **Table 14**.

Table 14: Waterbodies unable to be surveyed due to access restrictions in route section 3

Pond Reference	Distance from Scheme (m)	Ditch Reference	Distance from Scheme (m)
P154	51-250	D29	0-50
P155	51-250	D31	51-250
P164	51-250	D32	51-250
P165	51-250	D35	51-250
		D40	51-250
		D41	0-50
		D45	0-50
		D46	0-50
		D49	51-250

- 3.3.18 No great crested newts were recorded in any of the waterbodies taken forward for further survey with all returning absent or scoped out due to being dry at the time of survey. The findings are summarised within **Table 15**.

Table 15: Summary of great crested newt survey results for waterbodies in route section 3

Pond/ Ditch Ref.	Distance from Base Scheme Design (m)	HSI/DSI Score	Presence/ Absence Results	Population Size Class Results
Ponds				
P83	0-50	0.87 (Excellent)	Absent	n/a

P141	51-250	0.59 (Below average)	n/a – scoped out of further survey	-
P153	51-250	0.3 (below average)	n/a – scoped out of further survey	-
P159	51-250	0.3 (below average)	n/a – scoped out of further survey	-
P178	0-50	0.6 (Below average)	n/a – scoped out of further survey	-
P186	0-50 m	0.74 (Good)	Absent	n/a
P190	51-250 m	0.4 (IPoor)	n/a – scoped out of further survey	-
P191	51-250	0.3 (Poor)	n/a – scoped out of further survey	-
Ditches				
D24	51-250	1	n/a – scoped out of further survey	-
D27	0-50	0	n/a – scoped out of further survey	-
D30	0-50	1	n/a – scoped out of further survey	-
D42	51-250	3	n/a – scoped out of further survey	-
D43	0-50	3	n/a – scoped out of further survey	-
D44	0-50	5	Absent	n/a
D47	0-50	5	n/a – scoped out of further survey	-
D48	0-50	5	Absent	n/a
D55	51-250	5	Absent	n/a
D301	51-250	-1	n/a – scoped out of further survey	-
D302	51-250	-2	n/a – scoped out of further survey	-
D320	0-50	5	n/a (dried out)	n/a
D321	51-250	5	n/a (dried out)	n/a
D364	0-50	1	Absent	n/a
D373	51-250	1	Absent	n/a
D738	51-250	3	n/a – scoped out of further survey	-
D755	51-250	-1	n/a – scoped out of further survey	-
D761	0-50	-1	n/a – scoped out of further survey	-
D762	51-250	-2	n/a – scoped out of further survey	-
D763	51-250	3	n/a (dried out)	n/a
D771	0-50	3	n/a – scoped out of further survey	-

Route Section 4

- 3.3.19 Route section 4 of the proposed DC cable route is largely arable, intensively farmed and overall provides sub-optimal habitat for amphibian refuge, foraging and commuting.
- 3.3.20 Five records for great crested newt were returned within 1 km of the base scheme design of route section 4.
- 3.3.21 One pond and 16 ditches were identified on OS maps or aerials within 250 m of the base scheme design in route section 4. Of these, eight ditches were subject to further survey, with the remainder being scoped out due to being unsuitable for great crested newt or the waterbody being dry or no longer present.
- 3.3.22 One ditch was unable to be surveyed (D84) due to access restrictions and subsequently great crested newts will be assumed present unless further surveys can be undertaken to establish likely absence. A peak count of 1 adult great crested newt was recorded within D83 with no evidence of breeding. The findings are summarised within **Table 16**.

Table 16: Summary of great crested newt survey results for waterbodies in route section 4

Pond/ Ditch Ref.	Distance from Base Scheme Design (m)	HSI/DSI Score	Presence/ Absence Results	Population Size Class Results
Pond				
P181	51-250 m	0.45 (poor)	n/a - scoped out of further survey	-
Ditches				
D59	51-250	-2	n/a – scoped out of further survey	-
D60	0-50 m	1	Absent	n/a
D61	51-250 m	1	n/a (dried out)	-
D62	51-250 m	1	Absent	n/a
D64	0-50 m	1	Absent	n/a
D66	51-250	-2	n/a – scoped out of further survey	-
D75	0-50 m	5	n/a (dried out)	-
D79	0-50 m	5	Absent	n/a
D83	0-50 m	3	Present	Small (peak count 1 adult)
D84	0-50 m	5	n/a (no access)	n/a
D470	51-250	-2	n/a – scoped out of further survey	-
D473	0-50	-2	n/a – scoped out of further survey	-
D493	0-50	-1	n/a – scoped out of further survey	-
D521	51-250	-2	n/a – scoped out of further survey	-
D737	0-50 m	5	Absent	n/a
D747	0-50	-1	n/a – scoped out of further survey	-

3.4 Bats

- 3.4.1 Baseline surveys along the DC cable route were undertaken in 2016/2017 that identified a total of 34 trees of varying bat roost potential, including five of unconfirmed bat roost potential⁵.
- 3.4.2 Brick culverts and bridges were also included in the 2016/17 preliminary roost assessment. However, all bridges and brick culverts were scoped out of any further assessment in 2019 due to the distance from the DC cable route red line boundary. Therefore, in 2019, only trees were taken forwarded as part of the further survey requirements for roosting bats.
- 3.4.3 Further surveys were later completed in March and April 2019, due to the time elapsed since the previous survey effort and subsequent refinement of the proposed DC cable route.
- 3.4.4 Preliminary Roost Assessments (PRA) identified 113⁶ in trees in 2019 of varying potential to support roosting bats along the DC cable route, which may be affected by construction activities. This increase in the number of trees is due to the alterations in the cable route design, which brought new trees into the considered

⁵ National Grid (2017) Viking Link: UK Onshore Scheme Environmental Statement

⁶ TEP (2019) Viking Link Lincolnshire Bat Survey Technical Report 2019 – DC Cable Route

area, and to undertaking surveys in previously un-accessed areas. These were comprised of nine High potential, 27 Moderate and 77 Low potential tree roosts, with regards to the varying levels of importance assigned to different types of bat roost, as per the Bat Conservation Trust (BCT) guidelines⁷.

- 3.4.5 Fifteen trees classified as either High or Moderate (four and 11 respectively) were considered likely to be affected by the proposed works and these trees were therefore subject to nocturnal bat surveys, as per BCT guidelines. Of these 15 trees, one tree in route section 3 (tree #233) had a confirmed bat roost (see below). Nocturnal surveys of trees with Low potential were not undertaken, as per the BCT guidelines.
- 3.4.6 Bat activity around the 15 surveyed trees was recorded and the following six European and nationally protected species were noted (bat activity rather than roosting): common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, brown long-eared bat, Noctule and a *Myotis* species⁸.

Route Section 1

- 3.4.7 Only three trees with bat roost potential were identified in route section 1: one with Moderate potential (Tree #323, which was not subject to nocturnal surveys, as no impacts on this tree were predicted) and two with Low potential (trees #10 and #304)⁹.
- 3.4.8 Trees #323 and #304 are sited outside the DC cable route red line boundary, whilst tree #10 is located outside the stated limits of the DC working width. As such, all three trees located in route section 1 are considered unlikely to be affected by the proposed works.
- 3.4.9 It is certain that all the ditches/drains will be crossed by trenchless techniques and will have only a temporary bridge or culvert crossing for the construction haul road, which will be approximately 10 m wide. A total of 16 sections of hedgerow will need to be removed to facilitate cable installation in route section 1, totaling 824 m of hedgerow. Since fragmentation effects, including potential abandonment of a commuting route, can occur when gaps in excess of 10 m are present in a formerly intact feature for common bat species, mitigation is considered necessary¹⁰.

Route Section 2 - Well High Lane to A16 (Keal Road)

- 4.4.8 The ES identified 34 trees with bat roost potential in route section 2, including six with High potential (trees #65, #329, #333, #339, #341 and #342) and 11 with Moderate potential, (trees #30, #148, #315, #328, #330, #331, #334, #336, #338, #368 and #406)¹¹. The ES did not predict any impacts on a further tree with Moderate potential (tree #145). However, this is included in **Table 17** below, as it is now considered that there could be impacts on this tree (also see Appendix – Bats).

Table 17: Trees with bat roosting features of Moderate to High potential within route section 2

⁷ Collins, J. (ed.) (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines*. (3rd edn). The Bat Conservation Trust, London.

⁸ TEP (2019) Viking Link Lincolnshire Bat Survey Technical Report 2019 – DC Cable Route.

⁹ Ibid

¹⁰ National Grid (2017).

¹¹ TEP (2019).

Tree number	Roost characterisation	Further notes
#65	High	Subject to three nocturnal surveys where no roosts were identified.
#329	High	Not subject to any nocturnal surveys as it was not predicted to be impacted, however it is considered in 2020 that impacts on this tree may occur.
#333	High	Subject to three nocturnal surveys where no roosts were identified.
#339	High	Not subject to any nocturnal surveys as it was not predicted to be impacted.
#341	High	Not subject to any nocturnal surveys as it was not predicted to be impacted.
#342	High	Not subject to any nocturnal surveys as it was not predicted to be impacted.
#30	Moderate	Subject to two nocturnal surveys where no roosts were identified.
#145	Moderate	Subject to two nocturnal surveys where no roosts were identified. This tree was removed from consideration after the initial ES surveys, following alteration of the cable route design, however it is considered in 2020 that impacts to this tree may occur.
#148	Moderate	Subject to two nocturnal surveys where no roosts were identified.
#315	Moderate	Subject to two nocturnal surveys where no roosts were identified.
#328	Moderate	Not subject to any nocturnal surveys as it was not predicted to be impacted.
#330	Moderate	Subject to two nocturnal surveys where no roosts were identified.
#331	Moderate	Subject to two nocturnal surveys where no roosts were identified.
#334	Moderate	Not subject to any nocturnal surveys as it was not predicted to be impacted,

Tree number	Roost characterisation	Further notes
		however, it is considered in 2020 that impacts to this tree may occur.
#336	Moderate	Subject to two nocturnal surveys where no roosts were identified.
#338	Moderate	Not subject to any nocturnal surveys as it was not predicted to be impacted.
#368	Moderate	Subject to two nocturnal surveys where no roosts were identified.
#406	Moderate	Subject to two nocturnal surveys where no roosts were identified.

3.4.9 Seventeen trees with Low potential were also recorded, and no further surveys were required on these trees, as per the BCT guidelines. No bat emergence / re-entry was recorded during the nocturnal surveys undertaken for the High and Moderate potential trees carried forward in this section and therefore they require no further nocturnal bat activity surveys, as per the BCT guidelines.

3.4.10 The likely impact on the 18 trees classified as having High or Moderate bat roost potential in route section 2 can be differentiated as follows:

- Trees #30, #65, #148, #330, #331, #333, #336 and #406 are situated within a defined 20 m buffer zone from the DC working area [see section 4.4]: all these trees are very likely to be affected by the proposed works.
- Trees #329 and #334 have subsequently been identified in 2020 as lying inside 20 m of the DC working area and will require nocturnal bat activity surveys to determine if a bat roost is present.
- Tree #145 has subsequently been identified in 2020 as lying within 20 m of the proposed Temporary Working Area T8 and must be considered for potential impacts.
- Trees #315, #328, #338, #339, #341, #342 and #368 are sited inside the red line boundary but are greater than 20 m from the proposed works, or outside the red line boundary and as such are considered unlikely to be affected by the works.

3.4.11 The ES identified one ditch in this section that will be crossed using open cut measures and will also require a temporary culvert. The rest of the ditches and watercourses will be crossed using a temporary bridge. A total of 19 sections of hedgerow will be required to be removed to facilitate cable installation in route section 2, totaling 858 m of hedgerow. Since fragmentation effects i.e. potential abandonment of a commuting route, can occur when gaps in excess of 10 m are present in a formerly intact feature for common bat species, mitigation is proposed (see section 4.4).

Route Section 3

- 3.4.12 There were 77 trees with bat roost potential identified in route section 3: two with High potential (trees #223 and #233), 10 with Moderate potential (trees #193, #228, #303, #353, #359, #363, #364, #365, #369 and #401) and 65 with Low potential. Tree #233 had a confirmed day roost, with the emergence of a single common pipistrelle bat during a dusk survey completed in July 2019. No bat emergence / re-entry was recorded for the other numbered trees carried forward in this section.

Table 18: Trees with bat roosting features of Moderate to High potential within route section 3

Tree number	Roost characterisation	Further notes
#233	Day (confirmed)	Subject to three nocturnal surveys. Emergence by 1x common pipistrelle bat at 22:08 during a dusk survey completed on July 9 th 2019.
#223	High	Not subject to any nocturnal surveys as it was not predicted to be impacted, however it is considered in 2020 that impacts to this tree may occur.
#193	Moderate	Subject to two nocturnal surveys where no roosts were identified.
#228	Moderate	Not subject to any nocturnal surveys as it was not predicted to be impacted.
#303	Moderate	Not subject to any nocturnal surveys, however it is considered in 2020 that impacts to this tree may occur.
#353	Moderate	Not subject to any nocturnal surveys as it was not predicted to be impacted, however it is considered in 2020 that impacts to this tree may occur.
#359	Moderate	Subject to two nocturnal surveys where no roosts were identified.
#363	Moderate	Not subject to any nocturnal surveys, however it is considered in 2020 that impacts to this tree may occur.
#364	Moderate	Not subject to any nocturnal surveys as it was not predicted to be impacted.
#365	Moderate	Not subject to any nocturnal surveys as it was not predicted to be impacted.

Tree number	Roost characterisation	Further notes
#369	Moderate	Not subject to any nocturnal surveys as it was not predicted to be impacted, however it is considered in 2020 that impacts to this tree may occur.
#401	Moderate	Not subject to any nocturnal surveys as it was not predicted to be impacted.

- 3.4.13 The confirmed day roost tree #233 is sited adjacent to the stated DC working area and a proposed access road and lies within 20 m of proposed Temporary Construction Compound S5. Therefore, it is very likely to be affected by the proposed works. There will be a requirement to obtain a European Protected Species (EPS) mitigation licence from Natural England (NE) with regard to the common pipistrelle day roost if micro siting to avoid felling this tree cannot be undertaken (see further details below).
- 3.4.14 As part of the licensing procedure a further aerial inspection of tree #233 will be undertaken to provide further information regarding the confirmed roost feature and access point, and to verify the species of bat using the roost, by collecting a DNA sample of bat droppings if possible. The proposed works for building Temporary Construction Compound S5 are scheduled to be undertaken between March and April 2021. This further aerial inspection will ideally be undertaken between November 2020 and February 2021, in order to comply with this schedule, avoid the bird nesting season and ensure potential roost features are clearly visible at this time and not obscured by leaves.
- 3.4.15 The likely impact on the 18 trees classified as having High or Moderate bat roost potential in route section 3 can be differentiated as follows:
- Tree #233, the confirmed day roost considered very likely to be affected by the proposed works (see above).
 - Tree #193 is situated within a defined 20 m buffer zone from the DC working area [see section 4.4] and is considered very likely to be affected by the proposed works.
 - Trees #223, #303, #353, #363 and #369 have subsequently been identified in 2020 as lying inside 20 m of the DC working area and will require nocturnal bat activity surveys to determine if a bat roost is present.
 - Trees #228, #359, #364, #365 and #401 are all sited inside the red line boundary but at greater than 20 m from the proposed working footprint, or outside the red line boundary: these five remaining trees are considered unlikely to be affected by the proposed works.
- 3.4.16 Nine ditches will require a temporary culvert in this route section. A further 36 ditches including one watercourse will also be crossed using a temporary bridge. A total of 19 sections of hedgerow will be required to be removed to facilitate cable installation in route section 3, totaling 1,100 m of hedgerow. Since fragmentation

effects i.e. potential abandonment of a commuting route, can occur when gaps in excess of 10 m are present in a formerly intact feature for common bat species, mitigation is proposed (see section 4.4).

Route Section 4 - River Witham to the Proposed Converter Station

- 3.4.17 There were six trees with bat roost potential identified in route section 4: one with High potential (tree #414), four with Moderate potential (#410, #411, #412 and #413) and one with Low potential. No bat emergence / re-entry was recorded during the nocturnal surveys undertaken for the surveys completed on tree #414.

Table 19: Trees with bat roosting features of Moderate to High potential within route section 4

Tree number	Roost characterisation	Further notes
#414	High	Subject to three nocturnal surveys where no roosts were identified.
#413	Moderate	Not subject to any nocturnal surveys, however it is considered in 2020 that impacts to this tree may occur.
#410	Moderate	Not subject to any nocturnal surveys.
#411	Moderate	Not subject to any nocturnal surveys.
#412	Moderate	Not subject to any nocturnal surveys.

- 3.4.18 The likely impact on the five trees classified as having High or Moderate bat roost potential in route section 3 can be differentiated as follows:

- Tree #413 has subsequently been identified in 2020 as lying inside 20 m of the DC working area and will require nocturnal bat activity surveys to determine if a bat roost is present.
- Trees #410, #411, #412 and #414 are all located inside the red line boundary but are greater than 20 m from any proposed works: these four remaining trees are considered unlikely to be affected by the proposed works.

- 3.4.19 One ditch in this section will be crossed using open cut measures and will also require a temporary bridge crossing. A further 34 ditches including one watercourse will also be crossed using a temporary bridge. Two other ditches will require a temporary culvert. A total of three sections of hedgerow will be required to be removed to facilitate cable installation in route section 1, totaling 165 m of hedgerow. Since fragmentation effects i.e. potential abandonment of a commuting route, can occur when gaps in excess of 10 m are present in a formerly intact feature for common bat species, mitigation is proposed (see section 4.4).

3.5 Badger

3.5.1 Badger surveys were undertaken in 2017 and 2019 and the results of those surveys demonstrated that badgers are prevalent along the entire cable route. The Scheme is split into four route sections and the details of the setts identified within each route section are provided below.

3.5.2 The distances of setts from the scheme boundary have been assessed and measured based on the Red Line Boundary detailed in the Route Layout drawings¹² and the GIS shapefiles provided. It is understood that the scheme boundary provided is correct as of February 2020. As such, there is some variation between the sett distances from the scheme boundary discussed below to those provided in the results summary within the 2019 DC Cable Route¹³ Badger Survey Report.

3.5.3 Results from the 2017 surveys have not been provided or discussed in detail below. The limitations included within the 2019 DC Cable Route Badger Survey Report do not indicate that there were any specific land access limitations. It is therefore assumed that the 2019 surveys were robust and that there was full coverage of all land within 30 m of the scheme boundary. As such, the 2019 data is considered to supersede the data provided within the ES¹⁴.

Route Section 1

3.5.4 Badgers were routinely found across route section 1 during the 2017 badger surveys that were undertaken to inform the ES. Badger setts and field evidence of badger foraging and commuting activity were recorded within 30 m of the proposed DC cable route.

3.5.5 The 2019 badger update surveys identified a total of seven active setts and one disused sett along route section 1, of which four were newly identified during the 2019 surveys. The setts identified within route section 1 comprised:

- Two setts within the scheme boundary (setts 10 and 146 [disused]);
- One sett within 10 m of the scheme boundary (sett 183);
- One sett within 20 m of the scheme boundary (sett 186); and
- Four setts over 30 m from the scheme boundary (setts 38, 136, 184 and 185).

3.5.6 **Table 20** below provides a summary of the classification and status of the setts identified within route section 1 during the 2019 update surveys. For detailed sett descriptions and locations see the 2019 DC Cable Route Badger Survey Report.

Table 20: 2019 classification and status of setts within route Section 1

Sett ID	2019 Sett Classification and Status
10	Outlier sett, partially active. Single hole.

¹² Balfour Beatty (2020). Route Layout_050220

¹³ TEP (2019). Badger Survey 2019 – DC Cable Route (5461.10.15.001)

¹⁴ National Grid (2017). Viking Link: UK Onshore Scheme Environmental Statement (ES-2-B.06), Chapter 10. Ecology (Proposed Underground DC Cable)

38	Annexe sett, active. Two holes.
136	Main sett, active. 12 holes.
146	Outlier sett, disused. Single hole with collapsed roof.
183	Outlier sett, active. Two holes.
184	Outlier sett, active. Single hole.
185	Outlier sett, active. Single hole.
186	Outlier sett, active. Single hole.

Route Section 2

3.5.7 Badgers were less prevalent across route section 2 during the 2017 surveys, comparative to route section 1, although field evidence of badger foraging and commuting activity was recorded across the section. One main badger sett was recorded within 30 m of the proposed DC cable route within route section 2.

3.5.8 The 2019 badger update surveys identified nine active setts and one disused sett along route section 2, of which eight were newly identified during the 2019 surveys. The setts identified within route section 2 comprised:

- Six setts within the scheme boundary (setts 147, 175, 176, 178, 180 and 181);
- Two setts within 20 m of the scheme boundary (setts 46 and 177 [disused]); and
- Two setts within 30 m of the scheme boundary (setts 179 and 182).

3.5.9 **Table 21** below provides a summary of the classification and status of the setts identified within route section 2 during the 2019 update surveys. For detailed sett descriptions and locations see the 2019 DC Cable Route Badger Survey Report¹⁵.

Table 21: 2019 classification and status of setts within route section 2

Sett ID	2019 Sett Classification and Status
46	Main sett, active. Approximately 12 holes, with two holes within scheme boundary (sett extends into area with restricted access).
147	Outlier sett, partially active. Single hole.
175	Subsidiary sett, active. Four holes.
176	Main sett, active. Approximately 20 holes.
177	Outlier sett, disused. Two holes.
178	Main sett, active. 12 holes.

¹⁵ TEP (2019). Badger Survey 2019 – DC Cable Route (5461.10.15.001)

179	Subsidiary sett, partially active. Single hole.
180	Main sett, active. Approximately 13 holes.
181	Annexe sett, active. Three holes.
182	Annexe sett, active. Two holes.

Route Section 3

- 3.5.10 Badgers were routinely found across route section 3 during the 2017 surveys with badger setts and field evidence of badger foraging and commuting activity recorded within 30 m of the proposed DC cable route.
- 3.5.11 The 2019 badger update surveys identified 15 active setts along route section 3, of which seven were newly identified during the 2019 surveys. The setts identified within route section 3 comprised:
- Ten setts within the scheme boundary (setts 59, 64, 75, 144, 145, 170, 171, 172, 173 and 174);
 - Three setts within 10 m of the scheme boundary (setts 66, 150 and 152);
 - One sett within 20 m of the scheme boundary (sett 187); and
 - One sett over 30 m from the scheme boundary (sett 169).
- 3.5.12 **Table 22** below provides a summary of the classification and status of the setts identified within route section 3 during the 2019 update surveys. For detailed sett descriptions and locations see the 2019 DC Cable Route Badger Survey Report¹⁶.

Table 22: 2019 classification and status of setts within route section 3

Sett ID	2019 Sett Classification and Status
59	Main sett, active. Eight holes.
64	Outlier sett, partially active. Three active holes, four disused holes.
66	Subsidiary sett, partially active. Four active holes, two disused holes.
75	Main sett, active. Seventeen holes. The 2017 surveys recorded a larger number of entrances, with 30 holes.
144	Main sett, active. Four holes. The 2017 surveys recorded a larger number of entrances, with 25 entrances, but noted that a number of entrances were disused or blocked with chicken wire.
145	Outlier sett, active. Two holes.
150	Outlier sett, active. Three holes. 2017 surveys recorded sett as a 8-hole main sett.
152	Outlier sett, active. Five holes.

¹⁶ TEP (2019). Badger Survey 2019 – DC Cable Route (5461.10.15.001)

169	Outlier sett, active. Single hole.
170	Outlier sett, active. Two holes.
171	Outlier sett, active. Single hole.
172	Outlier sett, partially active. Two holes.
173	Outlier sett, partially active. Two holes.
174	Outlier sett, partially active. Two holes.
187	Outlier sett, active. Two holes.

Route Section 4

3.5.13 Badgers were routinely found across route section 4, with multiple setts and field evidence of badger foraging and commuting activity recorded within 30 m of the proposed DC cable route.

3.5.14 The 2019 badger update surveys identified 19 active setts and two disused setts along route section 4, of which 12 were newly identified during the 2019 surveys. The setts identified within route section 4 comprised:

- 11 setts within the scheme boundary (setts 79, 80, 89 [disused], 90, 92 [disused], 96, 155, 159, 162, 163 and 165);
- Three setts within 10 m of the scheme boundary (setts 95, 166 and 168);
- One sett within 20 m of the scheme boundary (sett 158);
- Five setts within 30 m of the scheme boundary (setts 110, 112, 160, 161 and 164); and
- One sett over 30 m from the scheme boundary (sett 167).

3.5.15 **Table 23** below provides a summary of the classification and status of the setts identified within route section 4 during the 2019 update surveys. For detailed sett descriptions and locations see the 2019 DC Cable Route Badger Survey Report¹⁷.

Table 23: 2019 classification and status of setts within route section 4

Sett ID	2019 Sett Classification and Status
79	Outlier sett, active. Single hole.
80	Main sett, active. Approximately 15 holes.
89	Outlier sett, disused. Single hole.
90	Outlier sett, active. Single hole.
92	Annexe sett, disused. Approximately five holes.

¹⁷ TEP (2019). Badger Survey 2019 – DC Cable Route (5461.10.15.001)

95	Annexe sett, partially active. Three holes, only one partially active.
96	Main sett, active. 11 holes.
110	Main sett, active. Approximately 27 holes.
112	Annexe sett, active. Single hole.
155	Outlier sett, active. Two holes.
158	Outlier sett, active. Single hole.
159	Outlier sett, active. Single hole.
160	Annexe sett, active. Three holes.
161	Outlier sett, active. Two holes.
162	Outlier sett, active. Three holes.
163	Outlier sett, active. Single hole.
164	Outlier sett, partially active. Two holes.
165	Outlier sett, active. Single hole.
166	Outlier sett, active. Three holes.
167	Annexe sett, active. Three holes.
168	Outlier sett, active. Three holes.

3.6 Birds (Including Schedule 1)

Wintering Birds

- 3.6.1 Surveys for wintering birds were undertaken by The Environment Partnership (TEP) between December 2014 and April 2015 and then from October 2015 to April 2016 to inform the ES.
- 3.6.2 An intertidal bird survey was undertaken at the proposed landfall site and within a 500 m buffer from Public Rights of Way and the shoreline. Surveys were focused on primary and secondary species. Primary species were waders, waterfowl, raptors and other species associated with The Wash Special Protection Area SPA/Ramsar site, Gibraltar Point SPA/Ramsar site and the Humber Estuary SPA/Ramsar site and Schedule 1 birds. Secondary species were all other Birds of Conservation Concern (BoCC).
- 3.6.3 Surveys were also undertaken along the proposed DC cable route from publicly accessible land. These surveys comprised a pre-determined point count and a transect survey technique. As with the intertidal bird survey, the surveys focused on the same primary and secondary species.

Route Section 1

- 3.6.4 Sixty-one desk study records of primary and secondary bird species were recorded within 1 km of route section 1 of the base scheme design. Records of the primary and secondary species which were recorded during the winter season but are known to breed in the UK are: black-tailed godwit, black-throated diver, common scoter, hen harrier, ruff, scaup and whimbrel. These species were predominantly recorded from Huttoft Bank Pit and Sandilands Pit in the winter months. The Schedule 1 birds recorded in winter are not a constraint unless they are also present in the breeding bird season. None of these species that are known to breed in the UK were recorded along this route section during the breeding season and are subsequently not relevant to the ecological mitigation strategy.
- 3.6.5 There were generally low numbers of waders and wildfowl recorded within 500 m of the base scheme design throughout the two years of wintering bird surveys. Schedule 1 species which are qualifying features of either The Wash SPA/Ramsar site or the Humber Estuary SPA/Ramsar site included Bewick's swan, whooper swan and marsh harrier. Bewick's and whooper swan are winter visitors and are non-breeding. The marsh harrier is a regular wintering raptor in the Humber with some birds being observed to remain throughout the year.
- 3.6.6 Wintering birds are of a greater constraint nearest The Wash SPA/Ramsar site (13.5 km south-east of the proposed DC cable route) and/or the Humber Estuary SPA/Ramsar (7.9 km north west of the proposed landfall). The presence of Schedule 1 birds is not a constraint during the winter months but is an issue if they are present during the breeding season near to any proposed works.

Route Section 2

- 3.6.7 Sixteen desk study records of primary and secondary bird species were recorded within 1 km of route section 2 of the base scheme design. Records of primary and secondary species which were recorded during the winter season but are known to breed in the UK are: hen harrier, greenshank and merlin. The largest peak counts relating to Schedule 1 recorded were for pink-footed goose and redwing but these are non-breeding species in the Lincolnshire.

- 3.6.8 The Schedule 1 birds recorded in winter are not a constraint unless they are also present in the breeding bird season. None of these species that are known to in the UK were recorded along this route section during the breeding season and are subsequently not relevant to the ecological mitigation strategy.
- 3.6.9 TEP stated that habitat within route section 2 is of low value for bird species associated with the SPA and Ramsar sites due to this section consisting of smaller, more undulating fields compared to other sections with taller field boundaries. TEP have deemed this section as being highly unlikely to support significant numbers of wintering bird species of interest.

Route Section 3

- 3.6.10 Twenty-nine desk study records of primary and secondary bird species were recorded within 1 km of route section 3 of the base scheme design. Records of primary and secondary species which were recorded during the winter season but are known to breed in the UK: black-tailed godwit, hen harrier, ruff, greenshank and whimbrel. Most records originated from Hagnaby Lock Nature Reserve (200 m south of the proposed access route). Wintering birds regularly use Hagnaby Lock Nature Reserve and the River Witham, albeit in low numbers.
- 3.6.11 Black-tailed godwit is the only Schedule 1 bird recorded during the winter bird surveys which is also a qualifying feature of The Wash SPA/Ramsar site. The black-tailed godwit is a non-breeding species at The Wash SPA/Ramsar site.
- 3.6.12 The only species recorded during the wintering bird surveys that was a Schedule 1 species and that also breeds in the UK were black tailed godwit, hen harrier, ruff and greenshank.
- 3.6.13 As with route section 1, the wintering birds are of a greater constraint nearest The Wash SPA/Ramsar site (13.5 km south-east of the proposed DC cable route) and/or the Humber Estuary SPA/Ramsar site (7.9 km north west of the proposed landfall). The presence of Schedule 1 birds is not a constraint during winter but it would be an issue if present during the breeding season.

Route Section 4

- 3.6.14 Twelve desk study records of primary and secondary¹ bird were recorded within 1 km of route section 4 of the base scheme design. Four Schedule 1 birds were identified; brambling, fieldfare, greenshank and whimbrel.
- 3.6.15 The largest counts of Schedule 1 birds were for fieldfare. South Forty Foot Drain is regularly used by wildfowl and the regular use of fields within 500 m of the base scheme design by low numbers of birds which are qualifying features of The Wash SPA/Ramsar site and/or the Humber Estuary SPA/Ramsar site.
- 3.6.16 Species which are qualifying features of either The Wash SPA/Ramsar site or the Humber Estuary SPA/Ramsar site which were recorded during the winter bird surveys and are Schedule 1 species are: hen harrier, marsh harrier and fieldfare.
- 3.6.17 Hen harrier and marsh harrier are listed as qualifying features of the Humber Estuary SPA/Ramsar site. Hen harriers are a non-breeding species at the Humber Estuary SPA/Ramsar site and marsh harriers are a breeding species.
- 3.6.18 Within the base scheme design the only Schedule 1 bird identified during field surveys was barn owl. Barn owls were regularly seen to the west of South Forty Foot Drain near to Ferry farm.

Breeding Birds

- 3.6.19 Surveys for breeding birds were undertaken by TEP at the proposed landfill between April and June 2016 and along the proposed DC cable route between April and June 2017. The transects were undertaken at selected sites based on review of satellite imagery and the results of the extended Phase 1 habitat survey.
- 3.6.20 The breeding bird survey employed a transect method, based on the British Trust for Ornithology's (BTO) Breeding Bird Survey (BBS) method with mapping techniques applied as described for the BTO Common Bird Census (CBC) method¹⁸. Bird species and activity patterns were recorded within a 100 m buffer along each transect. Any trees within the survey area were checked for signs of occupation by owls and raptors. The breeding bird methodology of the ES does not describe how data has been interpreted to indicate the breeding status of species that were recorded. It is not reported in the ES which Schedule 1 species are likely to be breeding.
- 3.6.21 In addition, the ES states that specialised surveys were undertaken where desktop records indicated that nesting Schedule 1 species were likely to be present within the study area and which could potentially be affected by the proposed works. This entailed marsh harrier and bearded tit surveys at Sea Bank Clay Pits SSSI (targeting Huttoft Bank Pit Nature Reserve). However, there are no survey results and no indication of nests sites have been reported in the ES. It is therefore assumed that these surveys have not been carried out.
- 3.6.22 All of the details below in the breeding bird's section is taken from the ES and Appendix produced in 2017.

Route Section 1

- 3.6.23 Twelve records of Schedule 1 birds were identified within 1 km of route section 1 of the base scheme design. These include hobby, little ringed plover, marsh harrier, barn owl, bittern, peregrine, goshawk and bearded tit. Specific breeding bird records include bearded tit, little ringed plover and marsh harrier. The majority of these records were located at Huttoft Bank Pit Nature Reserve.
- 3.6.24 82% of route section 1 was covered by the 2017 breeding bird survey, with the areas with greatest suitability for breeding birds targeted.
- 3.6.25 The 2017 breeding bird survey identified 57 bird species. Two of these were Schedule 1 species, marsh harrier and barn owl, although it is unknown if they are breeding. A single marsh harrier was recorded on all three visits of Transect 1 and a single barn owl was recorded during visit 2 of Transect 4A. In addition to this, figure VL_170815_ES10.17 details a single red kite observed during visit 3 of Transect 3 breeding bird surveys. However, this is not mentioned in the ES.
- 3.6.26 No interpretation of these recordings has been reported and there is no indication as to the possible locations of nest sites or even if these species are breeding.

Route Section 2

- 3.6.27 Thirty bird species were identified within 1 km of route section 2; the majority of desk study records were from East Keal. Two Schedule 1 species were recorded as breeding. These were hobby and marsh harrier. Three other Schedule 1

¹⁸ Harris, S.J., Massimino, D., Newson, S.E., Eaton, M.A., Balmer, D.E., Noble, D.G., Musgrove, A.J., Gillings, S., Procter, D. and Pearce-Higgins, J.W., 2015. The Breeding bird survey 2014. BTO Research Report, 673.

species were noted; barn owl, kingfisher and red kite but were not recorded as breeding. In addition to this, desk study records of common crossbill were provided in Table 10.3.10 in Appendix 10 but not mentioned within the ES.

- 3.6.28 The breeding bird survey covered 18.5% of route section 2.
- 3.6.29 The 2017 breeding bird survey identified 28 bird species. No records of Schedule 1 species were recorded in the field.

Route Section 3

- 3.6.30 Thirty-five species were identified within 1 km of route section 3; the majority of these records were located at Hagnaby Lock. Three Schedule 1 species were identified as breeding. These were hobby, little ringed plover and marsh harrier.
- 3.6.31 Approximately 44% of route section 3 was covered by the BBS.
- 3.6.32 During the 2017 breeding bird survey, 47 bird species were recorded, including three Schedule 1 species. These were marsh harrier, barn owl and kingfisher (all identified in Transect 10). A single observation of marsh harrier was recorded in Transect 11.
- 3.6.33 No interpretation of these recordings has been reported and there is no indication as to the possible locations of nest sites for these species.

Route Section 4

- 3.6.34 Nineteen species of breeding birds were previously recorded, as part of the desk study, within 1 km of route section 4. The majority of these records were located at Bicker Fen. Four of these records were Schedule 1 species, namely hobby, marsh harrier, barn owl and kingfisher, of which hobby and marsh harrier were classed as breeding.
- 3.6.35 Approximately 44% of route section 4 was covered by the breeding bird survey.
- 3.6.36 During the 2017 breeding bird survey 29 bird species were recorded; however, no Schedule 1 species were identified.

3.7 Designated Sites and Habitats

Designated Sites (Including Priority Habitats)

Route Section 1

- 3.7.1 There are four internationally designated sites within 10 km of this route section, and one nationally designated site approximately 300 m from the scheme. There will either be no impacts or no significant effects on the habitats within them, taking in to account the 'embedded mitigation' described in the Environmental Statement¹⁹ (ES).
- 3.7.2 There are four non-statutory designated sites within or adjacent to the scheme. Two of the sites (the Rigsby Road Verges Local Wildlife Site (LWS)/ Rigsby Roadside Nature Reserve and Rigsby Wood LWS/ Local Wildlife Trust reserve/ Ancient Woodland) are located at the southern extent of route section 1. A third site (the Sandilands Golf Course and Dunes LWS) is located at the start of route section 1 by the sea. There will be no significant effects on the habitats within these three sites, taking in to account the embedded mitigation relating to pollution prevention and demarcating working areas.
- 3.7.3 The fourth non-statutory designated site falls within the scheme, which crosses through it, the Firsby to Louth Dismantled Railway Site of Nature Conservation Importance, located at the southern end of route section 1. There will be no significant effects on the habitats within this designated site. The retained habitats will be protected by the embedded mitigation relating to pollution prevention and minimising and demarcating working areas. The 30 m section (maximum) of temporarily lost habitat within the 1 km SNCI will be left to naturally regenerate. This habitat includes grassland and some scrub. Trees and scrub will be avoided as much as possible by micro-siting the works away from it.
- 3.7.4 There are areas of priority habitat²⁰, within the designated sites mentioned above. In addition, there is a record of coastal and floodplain grazing marsh priority habitat, which is a Lincolnshire Biodiversity Action Plan (BAP)²¹ habitat, in a field near Wold View Farm near to the sea by Target Note (TN) 15²².
- 3.7.5 All drains within the scheme qualify²³ as Lincolnshire BAP habitat and Lindsey Marsh Internal Drainage Board (IDB) BAP habitat. All hedges qualify as priority habitat, Lincolnshire BAP and Lindsey Marsh IDB BAP habitat. There is one hedge (H55) that qualifies as important under the Hedgerows Regulations 1997²⁴ wildlife and landscape criteria. Hedge 55 is located south of Saleby, south of Rose Lane, that runs north to south and through which the scheme will pass. The bluebell, a Schedule 8 protected species²⁵, is present.

¹⁹ Viking Link: UK Onshore Scheme, Environmental Statement (ES-2-B.06), Chapter 10. Ecology (Proposed Underground DC Cable) August 2017

²⁰ Section 41 of the Natural Environment and Rural Communities (NERC) Act (2006) habitat of principal importance, referred to as priority habitat in this document

²¹ Greater Lincolnshire Nature Partnership website support the Lincolnshire BAP documents

<https://glnp.org.uk/admin/resources/lincs-bap-2011-2020-review-2015final.pdf>

²² Target notes can be found in the ES Appendix 10.4.1 Phase 1 Habitat Survey Target Notes Report

²³ Viking Link: UK Onshore Scheme, Environmental Statement (ES-2-B.06), Chapter 10. Ecology (Proposed Underground DC Cable) August 2017

²⁴ Hedgerow Regulations 1997. 1997 SI 1997/1160. London: HMSO.

²⁵ Wildlife and Countryside Act 1981 (as amended), section 13, schedule 8, it is a legal offence to intentionally pick, uproot or destroy this plant

Route Section 2

- 3.7.6 No internationally designated sites are present within 10 km of route section 2. There are five nationally designated SSSIs, three are within 2 km of the scheme, there will be no impacts on any of them.
- 3.7.7 There are twenty non-statutory designated sites located within 1 km, of which eight are either found within or adjacent to the scheme. These are the A16 Road Verge, Dalby Bar LWS, East Keal Clay Pit LWS, Hocker Holt LWS, Wheelabout Wood SNCI, Bluestone Heath Copse SNCI, Callow Carr LWS/ Ancient Woodland, Manor Farm, Mavis Enderby LWS, and Silver Pits Ulceby SNCI. There will be no significant effects on the habitats within any of the designated sites, taking in to account the 'embedded mitigation' set out in the ES relating to pollution prevention, hydrology mitigation and demarcating working areas. Encroachment into the habitats of only three of these sites is likely and will be minimised, for East Keal Clay Pit LWS, Hocker Holt LWS and Wheelabout Wood SNCI.
- 3.7.8 There are areas of priority habitat within the designated sites mentioned above. Parts of two locally designated sites, East Keal Clay Pit Local Wildlife Site (LWS), which comprises a grassland habitat, and Wheelabout Wood SINC, which comprises a woodland habitat, are located within the scheme design. The NVC survey results show that neither habitat qualifies as priority habitat. No NVC survey was undertaken for Hocker Holt LWS which may support wet woodland priority and Lincolnshire BAP habitat. It is assumed that no NVC was undertaken because the red line boundary has shifted and previously Hocker Holt LWS was outside the scheme. Completing an NVC survey will help determine if Hocker Holt supports priority habitat, and inform any replanting species mix that may be required.
- 3.7.9 All drains within the scheme qualify as the Lincolnshire BAP habitat and Lindsey Marsh IDB BAP habitat. All hedges qualify as priority habitat, Lincolnshire BAP habitat and Lindsey Marsh IDB BAP. There are three hedges (H32, H34 and H46) that qualify as important under the Hedgerows Regulations 1997 wildlife and landscape criteria. Hedges 32 and 34 are located outside the scheme boundary, near Spilsby. Hedge 46 is located south of Fordington, within and along the eastern edge of the scheme extent and consequently it will be lost.

Route Section 3

- 3.7.10 There are no internationally or nationally designated sites present within 10 km and 2 km respectively of this route section.
- 3.7.11 There are four non-statutory designated sites present within 1 km, of which Braygate Lane SNCI abuts the eastern edge of the scheme just south of the start of route section 3. There will be no significant effects on the habitats within any of the designated sites, taking in to account the 'embedded mitigation' set out in the ES.
- 3.7.12 There are areas of priority habitat within the designated sites mentioned above. There is a record of an area of coastal and floodplain grazing marsh priority habitat (as well as Lincolnshire BAP) near Hagnaby Lock (TN218 and TN219). There are records of two areas of lowland deciduous woodland priority habitat (as well as Lincolnshire BAP and Witham Fourth District IDB/ Black Sluice IDB BAP habitat) near Skirbeck Farm (TN234 and 236), and the River Witham (TN263 and 264)

respectively. It is unclear why none of these areas have been assessed against the priority habitat criteria and no NVC surveys were carried out on the woodlands.

- 3.7.13 All drains within the scheme qualify as Lincolnshire BAP habitat and Witham Fourth District IDB/ Black Sluice IDB BAP habitat. All the hedges qualify as priority habitat, as well as Lincolnshire BAP and Witham Fourth District IDB/ Black Sluice IDB BAP habitat. Two are important under the Hedgerows Regulations 1997 wildlife and landscape criteria and fall within the footprint of the scheme (H7 and H41). Hedge 7 runs east west across the scheme and will be affected by the works. It is located south east of Carrington and runs along a small track and drain. Hedge 41 is at the northern extent of section 3, east and south of East Keal. Only the western quarter of the extent of the hedge falls within the scheme and may be lost.

Route Section 4

- 3.7.14 There are no internationally or nationally designated sites present within 10 km and 2 km respectively of this route section.
- 3.7.15 There are seven non-statutory designated sites present within 1 km, of which, the scheme design crosses three: Great Hale Eau LWS, south of Great Heckington; Old Forty Foot Drain to South Forty Foot Drain LWS at the southern end of route section 4; and, South Forty Foot Drain LWS, which runs parallel to the scheme but is crossed by the scheme right at the southern end of route section 4. There will be no significant effects on the habitats within any of the designated sites, taking in to account the 'embedded mitigation' set out in the ES.
- 3.7.16 There are areas of priority habitat within the designated sites mentioned above. There is a record of an area of coastal and floodplain grazing marsh priority habitat (and Lincolnshire BAP) by Skerth Drain. It is unclear why this habitat wasn't assessed against the priority habitat criteria in the ES.
- 3.7.17 All drains, within the scheme, qualify as the Lincolnshire BAP habitat and Black Sluice IDB BAP habitat. All hedges qualify as priority habitat, Lincolnshire BAP and Black Sluice IDB BAP habitat, however, for this section none qualify as important.

Habitats

- 3.7.18 The ecology baseline habitats data is summarised in the route section paragraphs below, taking into account the 2019 survey data.
- 3.7.19 The extended Phase 1 habitat survey map data was checked in February 2020. Approximately 10% of the maps were compared to 2019 and 2020 aerial photography to ensure the data is broadly correct. The maps included in the check were identified using a random number generator to avoid any bias. The maps were found to be an accurate representation of the habitats within the scheme, and no update surveys are required. Small discrepancies in the survey data include a small number of trees not being mapped. For example, trees along the Sutton Road (A52) west of TN4 have not been mapped. Furthermore, a hedgerow (just south of TN4) was noted to extend approximately 90 m further west than has been mapped in the ES.
- 3.7.20 A check was performed on 10% of the hedgerow results, focusing on the hedgerows that have been identified as 'important' under the Hedgerow Regulations (i.e. hedgerows: H7, H20, H32, H34, H41, H46 and H55). The criteria for important hedges within the Hedgerow Regulations were used to check the

data. All the results were correct, except for H20 which does not qualify as 'important'²⁶. The survey of hedgerow H34 only included survey of two sections rather than the required three.

- 3.7.21 It was not possible to check the aquatic vegetation survey data using aerial photography.
- 3.7.22 A gap analysis review of the habitat data was carried out to identify any areas not surveyed that need additional survey. The following areas were found to require further survey:
- An area of land in the south of the scheme which has not been accessed yet for extended Phase 1 habitat survey, this will be undertaken as soon as access is available, preferably from mid-April 2020. There are two drains (D84 and D552), within this same area, which were not accessed for an aquatic vegetation survey. These drains will be surveyed from May/June 2020, access permitting.
 - There are records of six areas of priority habitat within route sections 1 to 4 through which the scheme will pass, that have not been assessed against the priority habitat criteria. These areas are: (1) coastal floodplain grazing marsh by Wold View farm, (2) wet woodland at Hocker Holt LWS, (3) coastal floodplain grazing marsh by Hagnaby Lock, (4) lowland deciduous woodland by Skirbeck Farm and (5) also by the River Witham, and (6) coastal floodplain grazing marsh by Skerth drain. No further survey of the potential coastal and floodplain grazing marsh priority habitat is required as the embedded mitigation will minimise any impacts. Access permitting, the potential priority woodland areas will be NVC surveyed in June 2020.
- 3.7.23 Some areas of land adjacent to the scheme have not been surveyed, these include habitats that are not likely to be of high value, therefore, no further surveys are required. However, there are areas of hedgerows and trees shown in the aerial photography that are not marked up in the maps of unsurveyed adjacent areas. These habitats have been identified, within the ES, as important ecological features and buffer zones should be maintained to protect them. The buffer zones are set out in the mitigation section below.

Route Section 1

- 3.7.24 All the woodland, hedges, scrub with trees and scattered trees, due to their rarity within the area, are considered important ecological features, as are the watercourses and drains.
- 3.7.25 No aquatic vegetation survey was completed for the drains but they may support the invasive non-native species Nuttall's pond weed, as it was present in route sections 3 and 4.

Route Section 2

- 3.7.26 All the woodland, hedges, scrub with trees and scattered trees, due to their rarity within the area, are considered important ecological features, as are the watercourses and drains.

²⁶ Hedgerow 20 supports on average 5 woody species but it does not have the four associated features required for it to qualify as important.

- 3.7.27 No aquatic vegetation survey was completed for the drains but they may support the invasive non-native species Nuttall's pond weed, as it was present in route sections 3 and 4.

Route Section 3

- 3.7.28 All the woodland, hedges, scrub with trees and scattered trees, due to their rarity within the area, are considered important ecological features, as are the watercourses and drains.
- 3.7.29 An aquatic vegetation survey was completed for drain 447, which was found to support the invasive non-native species Nuttall's pond weed.

Route Section 4

- 3.7.30 All the woodland, hedges, scrub with trees and scattered trees, due to their rarity within the area, are considered important ecological features, as are the watercourses and drains.
- 3.7.31 Aquatic vegetation surveys were completed for drains 459, 747, 481, 60, 496, 508, 507, 509, 737, 565, 574, 90, 786, 91 and 94, four of which support the invasive non-native species Nuttall's pond weed (drains 747, 481, 509 and 737).

3.8 Reptiles

Habitats with the potential to support reptiles were identified during the extended Phase 1 habitat surveys. Suitable habitats along the proposed DC cable route are limited and all comprised only small areas and therefore targeted reptile surveys were not considered necessary. However, the potential for their presence has been considered throughout the works.

3.9 Brown Hare

Incidental records of brown hare were recorded during other previous ecological surveys. The extensive arable nature of the DC cable route, interspersed with drains and unmanaged field margins, provide ample suitable habitat for brown hare species. Due to the presence of brown hare and the vulnerability of their young (leverets) to disturbance, specific mitigation is considered necessary.

3.10 Invasive Non-Native Species (Including Nuttall's Pondweed)

- 3.10.1 Schedule 9 invasive plant species Nuttall's pondweed was recorded within five ditches / drains (D447, D747, D481, D509, D737).
- 3.10.2 No other Schedule 9 invasive plant species were recorded within the DC cable route.

3.11 Fish

- 3.11.1 Records from within the base scheme design suggests that the watercourses which will be crossed by the proposed DC cable route are likely to support these species:

- European Eel (Listed on Section 41 of the NERC Act 2006 and on Policy 24 of the ELCS²⁷. Also listed on the Lincolnshire Biodiversity Action Plan (BAP) and the Lindsey Marsh Drainage BAP);
- Spined loach (An Annex 2 Habitats Directive species, listed on Section 41 of the NERC Act 2006 and on Policy 24 of the ELCS); and
- Brown trout (Listed on Section 41 of the NERC Act 2006 and on the Policy 24 of the ELCS).

- 3.11.2 No long term impacts are anticipated for fish (European eel, brown trout or spined loach) with respect to habitat recovery from the proposed DC cable route installation as water flow will not be affected for the majority of watercourse crossings. Where crossings are not via trenchless techniques, works will include a temporary bridge or culvert crossing for the construction haul road, which will be approximately 10 m wide through which water flow will be maintained.
- 3.11.3 It is possible that killing or injury during open cut crossing may occur. Embedded fish rescue measures for the dewatering process has been included in the fish mitigation section (**Section 4.12**) to ensure this impact is prevented.
- 3.11.4 With respect to operational impacts, certain fish species including European eel are electrosensitive and respond to magnetic fields in the environment (Electric and Magnetic Field, EMF). Some species such as European eel, have significant magnetically sensitive material (magnetite) within their skeletal structure which is commonly thought to be used for direction finding using the Earth's geomagnetic field. Research²⁸ on unburied subsea cables has suggested that there may be slight changes in swimming ability when eels are in close proximity to the cables but that this does not affect their migratory behaviour.
- 3.11.5 The possible effect of EMF from the proposed DC cable is recognised. However, given the expected low strength of the magnetic fields at ground level, and based on research, it is not anticipated that EMF would affect European eel migratory behaviour and therefore it is certain the effects would be not significant.

4 MITIGATION STRATEGY

4.1 Water Vole

- 4.1.1 The risks of all known potentially damaging pre-commencement, site clearance and construction activities has been assessed and suitable mitigation methods identified within this report. Known construction activities that could impact on water vole populations include horizontal directional drilling (HDD) and haul road crossings. **If any other construction activities become likely (for example the final drainage designs have not yet been provided and there may be discharges to watercourses) to affect water vole habitat, further mitigation will be required.**

²⁷ East Lindsey Core Strategy (Submissions Modifications Draft, March 2017) (Ref 10-44)

²⁸ Westerberg & Lagenfelt (2008) Sub-sea power cables and the migration behaviour of the European eel. Fisheries Management and Ecology 15: 369-375.

- 4.1.2 The mitigation for water vole primarily focuses on ensuring that no offence against the legislation²⁹ (including intentionally killing, injuring or taking water voles; intentionally or recklessly damaging, destroying or obstructing access to any structure or place used for shelter or protection by water voles or disturbing a water vole in such a place) occurs as a result of the works. Long term maintenance of habitat connectivity and maintaining/improving habitat quality will encourage distribution of the species within the wider area. The mitigation will ensure net conservation gain for water voles (as required by the A29 Conservation Licence) by implementing habitat management and reinstatement within the scheme to improve the overall quality of the habitat. This habitat management and reinstatement includes scrub clearance and post construction bank reseedling. Bank re-profiling would be undertaken as a post-construction re-instatement activity to return banks to their original profile and subject to securing any future agreements. (this is to ensure that the habitat remains suitable for water vole post construction activities). The habitat management will be carried out for a minimum of equal length of area cleared, to compensate for the temporary habitat loss.
- 4.1.3 Generic best practice methods of working along the ditches/watercourses will be adopted in areas which provide potential habitat for water voles.
- 4.1.4 Sensitive working procedures will be implemented throughout all construction activities which have the potential to impact water voles, such as ensuring all steep sided excavations are covered at night (or ramps provided for safe egress), seeking to avoid working at night unless unavoidable (e.g. some HDD and joint bay works will require night time working) and all potentially harmful materials are stored away from the watercourse at night. Where night time working is required, artificial lighting must be directional away from watercourses and ditches.
- 4.1.5 Where there are any works such as culverting of watercourses, maintenance works to watercourse crossings will be carried out throughout construction so as not to block passage for commuting water voles. Maintaining habitat connectivity during works and afterwards will be important to minimise impacts to commuting water voles.
- 4.1.6 All works will adhere to Guidance for Pollution Prevention (GPP)³⁰, Pollution Prevention Guidelines (PPGs) and CIRIA guidance. GPP5 for works and maintenance in or near water (which replaces PPG5 - works near or liable to affect watercourses) forms a key point of reference for the Project. In the absence of a complete set of new GPP documents, the existing PPGs should also be used as a source of information on good practice e.g. PPG1 (understanding your environmental responsibilities); PPG3 (use and design of oil separators in surface water drainage systems); PPG6 (working at construction and demolition sites); and PPG21 (pollution incident response planning). Key CIRIA guidance to which the Scheme will adhere include CIRIA C648 Control of water pollution from linear construction projects³¹. Further best practice methods in relation to water voles will be detailed in the PMW.

²⁹ Wildlife and Countryside Act 1981 (as amended), Schedule 5, Section 9

³⁰ <https://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/> - Not endorsed by the Environment Agency

³¹ <https://www.ciria.org/ProductExcerpts/C648.aspx>

- 4.1.7 A detailed water vole mitigation strategy can be found in Appendix 5. This strategy is based on the construction design outlined on the Route Layout drawing 050220. Should this design change, this strategy may need to be revised.

Rationale for displacement around works locations

- 4.1.8 This mitigation strategy is written on the assumption that the habitats up and downstream directly adjacent to the area to be displaced are suitable to act as receptor areas for displaced water voles. The 2019 raw survey data will be reviewed to ensure this is the case and that translocation is not required. Should there be any watercourses where the adjacent habitat is unsuitable for water voles to be displaced into (e.g. woodland) the mitigation strategy will be reviewed and the need for trapping and translocating reassessed. If there are any watercourses where the adjacent habitat has not been surveyed for its habitat suitability, further survey may be required. Where displacement is required, an A29 conservation licence application will be sent to Natural England for approval. This licence permits intentional disturbance, damage or destruction of water vole burrows, and/or disturbance to water voles occupying burrows for the purpose of conservation and includes displacement of water voles.

Rationale against displacement for HDD

- 4.1.9 It is understood that the HDD method will be used to install the DC cable under most watercourses and ditches across the scheme. It is considered that an illustrative plan showing the trajectory of the directional drill and how deep it is as it gets to within 5 m of the watercourse bank is necessary for a full assessment of the proposed impacts; this information is not currently available. It is understood that the HDD will start >9 m from the banks of the watercourses and will be drilled to a depth of at least 2.5 m underneath the watercourse bed, based on current information from the construction team as a worst-case scenario. This information must be provided as it becomes available and the rationale for not needing to displace for HDD will be reviewed at this stage if further impacts are perceived.
- 4.1.10 It has therefore currently been assessed that the disturbance (in the form of noise and vibrations) from the HDD is likely to be less disturbing to water voles than the method of displacing water voles which involves making their habitat in that area unsuitable, resulting in them having to relocate to more suitable habitat up or downstream. Given the habitat fidelity some of the water vole colonies have shown across the scheme, it is considered most suitable to conduct the HDD under a PMW.

Route Section 1

- 4.1.11 The surveys undertaken by TEP in 2019 (see **Table 24** in baseline section above in this document) identified the presence of water voles in ditches 4, 141, 144, 146, 157, 179, and 184.2. The location of these ditches is provided on Drawing G5461.10.14.001 in the Water Vole and Otter Survey 2019 - DC Cable Route report by TEP.
- 4.1.12 The high level of connectivity of ditches throughout route section 1 allows the potential for water voles to move into unoccupied areas³². This appears to have been the case where ditches unoccupied in 2017 were found to be occupied in

³² It is assumed that adjacent reaches of ditches are suitable for displacement (this is not clear from the previous survey information received to date). Further survey information from 2020 surveys is required to confirm this approach.

2019, and vice versa. The potential for water voles to occupy previously/ currently unoccupied habitats is considered in the proposed mitigation strategy detailed in Appendix 5.

- 4.1.13 Ditches where water vole presence was recorded in 2017 but not in 2019 are, for the purpose of this document, assumed to be currently absent of water vole (this includes ditches 107, 143 and 191). Should water voles be found at any of these ditches during the 2020 pre-construction surveys, the mitigation measures may change and the ditch may need to be added to the A29 conservation licence.
- 4.1.14 There will be no direct impact on watercourses as a result of the cable installation, due to the cable being installed via HDD. The HDD will start a minimum of 9 m from the top of the bank and will drill down to a depth of 2.5 m or more under the watercourse bed. As discussed in paragraph 3.5.5 HDD is not predicted to disturb water voles and will not, therefore, require displacement (subject to detailed design). A Biodiversity Protection Zone (BPZ) will be installed (as detailed in Appendix 5) and works will be carried out under a PMW.
- 4.1.15 There will be impacts on water vole habitat on the banks of a number of ditches due to the installation of temporary bridges or culverts for the haul road. This includes ditches 4, 144, 146, 157 and 179. Therefore, the works may fall within the criteria for a Natural England A29 Conservation Licence. It is considered that displacement is the most suitable method of mitigation on these ditches in the locations of the proposed haul road crossings due to the short lengths of the ditches being impacted (e.g. >50 m) and assuming suitability of adjacent habitats to provide displacement receptor areas. Further details are provided in Appendix 5.
- 4.1.16 Ditches 141 and 184.02 run parallel to the red line boundary, therefore no proposed works on these ditches and no direct impacts are anticipated (as confirmed with the Balfour Beatty Operations Team). A Biodiversity Protection Zone will be established (as detailed in Appendix 5) and works will be carried out under a PMW.

Table 24: Route section 1 water vole mitigation requirements (to be updated following pre-construction surveys)

Watercourse/ Ditch Number	Location within Scheme	Construction Activities	Proposed Ecological Mitigation
4	Crosses the scheme	- HDD No.12 - Haul road crossing	- PMW for HDD work. - Potential displacement of for haul road watercourse crossing under NE licence. - PMW for general construction works adjacent to watercourse (if any). 10 m BPZ to be established.

141	Parallel to the scheme along the north of the red line boundary. Although the red line boundary extends to this watercourse, no works are currently proposed within 10 m.	- None	- PMW for general construction works adjacent to watercourse (if any). 10 m BPZ to be established.
144	Starts at Crawford Ln in centre of scheme and goes south adjacent to farm access	- HDD No.6 - Haul road crossing	- PMW for HDD work. - Potential displacement of water vole for haul road watercourse crossing under NE licence. - PMW for general construction works adjacent to watercourse (if any). 10 m BPZ to be established.
146	Crosses the scheme and along potential access road	- HDD No.11 - Haul road crossing	- PMW for HDD work. - Potential displacement of water vole for haul road watercourse crossing under NE licence. - PMW for general construction works adjacent to watercourse (if any). 10 m BPZ to be established.
157	Crosses the scheme and along potential access road	- HDD No.9 - Haul road crossing	- PMW for HDD work. - Potential displacement of water vole for haul road watercourse crossing under NE licence. - PMW for general construction works adjacent to watercourse (if any). 10 m BPZ to be established.
179	Crosses the scheme and along potential access road. Joins Greenfield Ln north of the scheme	- HDD No.9 - Haul road crossing	- PMW for HDD work. - Potential displacement of water vole for haul road watercourse crossing under NE licence. - PMW for general construction works adjacent to watercourse (if any). 10 m BPZ to be established.

184.02	Parallel to the scheme along the north of the red line boundary at Tothby Ln. Although the red line boundary extends to this watercourse, no works are currently proposed within 10 m.	- None	PMW for general construction works adjacent to watercourse (if any). 10 m BPZ to be established.
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Route Section 2

- 4.1.17 The surveys undertaken by TEP in 2019 (see **Table 25** in the baseline section above in this document) identified presence of water voles in ditch 249 and two sections of the River Lymn. The location of these ditches is provided on Drawing G5461.10.14.001 in the Water Vole and Otter Survey 2019 - DC Cable Route report by TEP.
- 4.1.18 The high level of connectivity of ditches throughout route section 2 allows the potential for water voles to move into unoccupied areas. The potential for water voles to occupy previously unoccupied habitats is considered in the proposed mitigation strategy detailed in Appendix 5.
- 4.1.19 Should water voles be found at any ditches during the 2020 pre-construction surveys the mitigation measures may change, and the ditch may need to be added to the A29 conservation licence.
- 4.1.20 There will be no direct impact on watercourses as a result of the cable installation due to the cable being installed via HDD. The HDD will start a minimum of 9m from the top of the bank and will drill down to a depth of 2.5 m or more under the watercourse bed. As discussed in paragraph 3.5.5 it is assumed HDD will not require displacement (subject to detailed design). A BPZ will be established (as detailed in Appendix 5) and works will be carried out under a PMW.
- 4.1.21 There will be impacts on water vole habitat on the banks of ditches and watercourses due to the installation of temporary bridges or culverts for the haul road. This includes ditch 249 and the River Lymn 2. Therefore, the works may fall within the criteria for a Natural England A29 Conservation Licence. It is considered that displacement is the most suitable method of mitigation on these ditches in the locations of the proposed haul road crossings due to the short lengths of the ditches being impacted (e.g. >50 m) and assuming suitability of adjacent habitats to provide displacement receptor areas. Further details are provided in Appendix 5.
- 4.1.22 River Lymn 1 runs parallel to the red line boundary, therefore there are no proposed works on this watercourse and no direct impacts are anticipated (as confirmed with Balfour Beatty Operations Team). A BPZ will be established (as detailed in Appendix 5) and works will be carried out under a PMW.

Table 25: Route section 2 water vole mitigation requirements (to be updated following pre-construction surveys)

Watercourse/ Ditch Number	Location within Scheme	Construction Activities	Proposed Ecological Mitigation
249	Crosses the scheme and along red line boundary	<ul style="list-style-type: none"> - HDD No.28 - Haul road crossing 	<ul style="list-style-type: none"> - PMW for HDD work. - Potential displacement of water vole for haul road watercourse crossing under NE licence. - PMW for general construction works adjacent to watercourse (e.g. access road). 10 m BPZ to be established.
R. Lymn 1	Parallel to the scheme along the south of the red line boundary. Although the red line boundary extends to this watercourse, no works are currently proposed within 10 m.	- None	- PMW for general construction works adjacent to watercourse (if any). 10 m BPZ to be established.
R. Lymn 2	Crosses the scheme and along red line boundary	<ul style="list-style-type: none"> - HDD No.31 - Haul road crossing 	<ul style="list-style-type: none"> - PMW for HDD work. - Potential displacement of water vole for haul road watercourse crossing under NE licence. - PMW for general construction works adjacent to watercourse (e.g. access road). 10 m BPZ to be established.

Route Section 3

- 4.1.23 The surveys undertaken by TEP in 2019 (see **Table 26** in baseline section above in this document) identified a presence of water voles in ditches 300, 443, 446. The location of these ditches is provided on Drawing G5461.10.14.001 in the Water Vole and Otter Survey 2019 - DC Cable Route report by TEP.
- 4.1.24 The high level of connectivity of ditches throughout route section 3 allows the potential for water voles to move into unoccupied areas. This appears to have been the case where ditches unoccupied in 2017 were found to be occupied in 2019, and vice versa. The potential for water voles to occupy currently/previously unoccupied habitats that cross the scheme is considered in the proposed mitigation strategy detailed in Appendix 5.
- 4.1.25 Ditches where water vole presence was recorded in 2017 but not in 2019 are, for the purpose of this document, assumed to be currently absent from these watercourses (this includes ditches 35, 320, 323, 422 (inc. 426), 447 and 731). Should water voles be found at any ditches during the 2020 pre-construction

surveys the mitigation measures may change and the ditch may need to be added to the A29 conservation licence.

- 4.1.26 None of the known water vole colonies in route section 3 cross the scheme and therefore will not be impacted by the cable installation via HDD.
- 4.1.27 None of the known water vole colonies in route section 3 cross the scheme and therefore will not be impacted by the installation of temporary bridges or culverts for the haul road.
- 4.1.28 Ditches 300, 443 and 446 run parallel to the red line boundary, therefore there are no proposed works on these ditches and no direct impacts are anticipated (as confirmed with Balfour Beatty Operations Team). A BPZ will be established (as detailed in Appendix 5) and works will be carried out under a PMW.

Table 26: Route section 3 water vole mitigation requirements (to be updated following pre-construction surveys)

Watercourse/ Ditch Number	Location within Scheme	Construction Activities	Proposed Ecological Mitigation
300	Parallel to the scheme along the south of the red line boundary	- None	- PMW for general construction works adjacent to watercourse (if any). 10 m BPZ to be established.
443	Parallel to the scheme along the south of the red line boundary	- None	- PMW for general construction works adjacent to watercourse (if any). 10 m BPZ to be established.
446	Parallel to the scheme along the south of the red line boundary and along potential site access.	- None	- PMW for general construction works adjacent to watercourse (if any). 10 m BPZ to be established.

Route Section 4

- 4.1.29 The surveys undertaken by TEP in 2019 (see **Table 27** in baseline section above in this document) identified a presence of water voles in watercourses/ditches 60, 504, 508 and 732. The location of these ditches is provided on Drawing G5461.10.14.001 in the Water Vole and Otter Survey 2019 - DC Cable Route report by TEP.
- 4.1.30 The high level of connectivity of ditches throughout route section 4 allows the potential for water voles to move into unoccupied areas. This appears to have been the case where ditches unoccupied in 2017 were found to be occupied in 2019. The potential for water voles to occupy currently/previously unoccupied habitats is considered in the proposed mitigation strategy detailed in Appendix 5.

- 4.1.31 Should water voles be found at any ditches during the 2020 pre-construction surveys the mitigation measures may change and the ditch may need to be added to the A29 conservation licence.
- 4.1.32 There will be no direct impact on watercourses as a result of the cable installation due to the cable being installed via HDD. The HDD will start a minimum of 9m from the top of the bank and will drill down to a depth of 2.5 m or more under the watercourse bed. As discussed, in paragraph 3.5.5, HDD will not require displacement (subject to detailed design). A BPZ will be installed (as detailed in Appendix 5) and works will be carried out under a PMW.
- 4.1.33 There will be impacts on water vole habitat on the banks of the watercourse due to the installation of temporary bridges or culverts for the haul road. This includes ditches 60 and 508. Therefore, the works may fall within the criteria for a Natural England A29 Conservation Licence. It is considered that displacement is the most suitable method of mitigation on these ditches in the locations of the proposed haul road crossings due to the short lengths of the ditches being impacted (e.g. >50 m) and assuming suitability of adjacent habitats to provide displacement receptor areas. Further details are provided in Appendix 5.
- 4.1.34 Ditches 732 and 504 run parallel to the red line boundary, therefore there are no proposed works on these ditches and no direct impacts are anticipated (as confirmed with Balfour Beatty's Operation Team). A BPZ will be established (as detailed in Appendix 5) and works will be carried out under a PMW.

Table 27: Route section 4 water vole mitigation requirements (to be updated following pre-construction surveys)

Watercourse/ Ditch Number	Location within Scheme	Construction Activities	Proposed Ecological Mitigation
60	Crosses the scheme and along red line boundary along potential access road	- HDD No.79 - Haul road crossing	- PMW for HDD work. - Potential displacement of water vole for haul road watercourse crossing under NE licence. - PMW for general construction works adjacent to watercourse (if any). 10 m BPZ to be established.
504	Adjacent to the scheme (west)	- None	- PMW for general construction works adjacent to watercourse (if any). 10 m BPZ to be established.
508	Crosses the scheme and along red line boundary along potential access road	- HDD No.84 - Haul road crossing	- PMW for HDD work. - Potential displacement of water vole for haul road watercourse crossing under NE licence. - PMW for general construction works adjacent to watercourse (if any). 10 m BPZ to be established.
732	adjacent to the scheme (west)	- None	- PMW for general construction works adjacent to watercourse (if any). 10 m BPZ to be established.

Further survey requirements for water vole

- 4.1.35 Further survey requirements for water vole are detailed in Appendix 5.

4.2 Otter

- 4.2.1 The only potential couch/resting site recorded across the scheme was on ditch 4 in 2017, however, this was not recorded in the 2019 surveys. No other potential or confirmed holts or otter resting sites were recorded across the scheme between 2017 and 2019, with the only watercourse described as offering suitable habitat for the creation of holt features being the River Lymn 2 in Route Section 2.
- 4.2.2 Otters are likely to use the ditch network across the scheme for foraging and commuting.
- 4.2.3 There are currently no known licencing requirements for otter across the scheme.
- 4.2.4 On watercourses where no potential holt or resting site features are recorded works can commence under a PMW. This will include construction best practice methods with regards to otters and will be detailed in the PMW.
- 4.2.5 Disturbance to otter foraging and commuting may occur throughout the Scheme due to the construction operations, especially during night time works adjacent to watercourses/ditches (on HDD and joint bays). Otters are inquisitive animals and may investigate the construction works bringing them into contact with potentially harmful materials and excavations^{33, 34}.
- 4.2.6 Sensitive working procedures will be implemented throughout all construction activities which have the potential to impact otters, such as ensuring all steep sided excavations are covered at night (or ramps provided for safe egress), seeking to avoid working at night unless unavoidable (e.g. some HDD and joint bay works will require night time working) and all potentially harmful materials are stored away from the watercourse at night. Where night time working is required, artificial lighting must be directional away from watercourses and ditches.
- 4.2.7 Where there are any works such as culverting of watercourses, maintenance works to watercourse crossings will be carried out throughout construction so as not to block otter passage at times when otters are likely to be active. Maintaining habitat connectivity during works and afterwards will be important to minimise impacts to commuting and foraging otters. If over ground access is restricted, a review of whether the temporary culverts require mammal ledges to be incorporated to maintain habitat connectivity and safe commuting routes will be undertaken by a suitably experienced ecologist.
- 4.2.8 All works will adhere to Guidance for Pollution Prevention (GPP)³⁵, Pollution Prevention Guidelines (PPGs) and CIRIA guidance. GPP5 for works and maintenance in or near water (which replaces PPG5 - works near or liable to affect watercourses) forms a key point of reference for the Project. In the absence of a complete set of new GPP documents, the existing PPGs should also be used as

³³ Grogan, A., Philcox, C., Macdonald D. (2001). Nature Conservation and Roads: Advice in relation to otters. Wildlife Conservation Research Unit, Oxford

³⁴ Highways Agency (1999). Design manual for roads and bridges. Vol. 10 Environmental Design: Section 4 – Nature Conservation, Part 4 - nature conservation advice in relation to otters. HMSO, London

³⁵ <https://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/> - Not endorsed by the Environment Agency

a source of information on good practice e.g. PPG1 (understanding your environmental responsibilities); PPG3 (use and design of oil separators in surface water drainage systems); PPG6 (working at construction and demolition sites); and PPG21 (pollution incident response planning). Key CIRIA guidance to which the Scheme will adhere include CIRIA C648 Control of water pollution from linear construction projects³⁶.

4.2.9 Further measures will be detailed in the PMW document.

Further survey requirements for otter

- 4.2.10 A further survey of ditch 4 and the River Lymn 2 will be carried out in advance of the works to ensure no holt or otter resting site features have been created since the 2019 survey and to record whether the resting site on ditch 4 that was recorded in 2017 is active. This is considered necessary due to otter being a highly mobile species. If otter have moved back to this location (where they have been previously recorded and therefore the habitat is known to be suitable), then there is a high risk of causing an offence. This survey will also cover any adjacent terrestrial sites within 200m of the scheme.
- 4.2.11 In route section 2 the watercourse at HD 27 is not labelled as a watercourse in the ES or 2019 survey report and has never been surveyed for otter but it appears to be a watercourse on aerial imagery and on the phase 1 habitat mapping. This watercourse will therefore be surveyed in 2020 to ensure appropriate mitigation measures are implemented where required.
- 4.2.12 In route section 4 ditches 552, 551, 84, 630, 719 have never had access for survey. An otter survey will be required to ensure appropriate mitigation measures are implemented where required.
- 4.2.13 Pre-construction surveys will be carried out in combination with the water vole pre-construction surveys at least two months prior to works. These surveys will assess each ditch/watercourse for further evidence of otter and will concentrate on the presence of holts or other resting places. None were recorded in 2019 in the vicinity of the DC cable route, but if one is established, a European protected species licence from Natural England may be required.

³⁶ <https://www.ciria.org/ProductExcerpts/C648.aspx>

4.3 Great Crested Newt

- 4.3.1 The risks of all known potentially damaging pre-commencement, site clearance and construction activities have been assessed and suitable mitigation methods identified within this mitigation strategy. The mitigation measures have been separated into route sections along with the proposed dates and mitigation required.
- 4.3.2 The DC cable route passes directly over six ditches with confirmed or assumed populations of great crested newts and these will require directional drilling to avoid any potential impacts and to avoid the need for any licencing or timing constraints.
- 4.3.3 Generally, it is considered that the working area contains sub-optimal terrestrial habitat for great crested newt due to the abundance of arable farmland and lack of suitable refuge. However, due to the presence of hedgerows, ditches and small areas of semi-improved grassland, there are potential constraints in regard to maintaining connectivity and killing and injuring during the construction stage. To ensure connectivity is maintained, key commuter corridors have been identified within each route section which will be retained and protected during the construction stage. Furthermore, an ecologist will be present during any vegetation removal to prevent the killing or injuring of any great crested newts.
- 4.3.4 Detailed mitigation strategy for all route sections can be found in Appendix 6 – Great Crested Newt with a summary breakdown for each route section provided below.
- 4.3.5 TEP contacted Natural England regarding their proposed approach to great crested newt mitigation on this project as part of the Environmental Impact Assessment. In principle³⁷, Natural England agreed that if work was carried out using Reasonable Avoidance Measures (RAMs) and consideration was given to any risk of habitat connectivity disruptions, then further surveys would not be needed. This approach has been adopted within this document. The one addition is that TEP assumed that all waterbodies that had not been surveyed were absent of great crested newts. Atkins has not adopted this approach and have instead assumed presence in all of these waterbodies until proved otherwise. It is felt that this approach will allow for suitable RAMs to be utilised and ensure no breach in wildlife legislation.

Route Section 1

- 4.3.6 In total, 15 waterbodies (seven ponds and eight ditches) are located within 250 m from the base scheme design in which great crested newt have been confirmed or assumed present. A summary of the waterbodies with the proposed working date can be found in **Table 28**.

Table 28: A summary of waterbodies found within 250 of the base scheme design within route section 1

Waterbody ID	Current Status	Crossed by the DC cable
P7	No access granted – assumed present	-
P9	No access granted – assumed present	-

³⁷ Natural England clearly state that a definitive answer could not be given until seeing further documents / plans.

P11	No access granted – assumed present	-
P27	No access granted – assumed present	-
P32	No access granted – assumed present	-
P198	No access granted – assumed present	-
P200	No access granted – assumed present	-
D3	Confirmed great crested newt population	-
D4	No access granted – assumed present	Yes
D8	No access granted – assumed present	-
D15	No access granted – assumed present	-
D101	No access granted – assumed present	-
D108	No access granted – assumed present	-
D109	No access granted – assumed present	-
D110	No access granted – assumed present	-

- 4.3.7 The proposed construction works within route section 1 will result in the short-term temporary loss of sub-optimal terrestrial habitat within the base scheme area.
- 4.3.8 D3 supports a confirmed small population of great crested newt and runs parallel to and within 50 m of the working area. The ditch is part of a wider network which intersects with D4, which will be crossed by the DC cable route. D4 was unable to be surveyed further due to access restrictions, and therefore great crested newts are assumed as present in this ditch. No waterbodies will be temporarily or permanently lost as part of the proposed development.
- 4.3.9 D4 is the only ditch which the DC cable route passes, and directional drilling will be utilised to avoid any impacts upon this waterbody.
- 4.3.10 Temporary fragmentation impacts may occur where watercourses and suitable terrestrial habitat (hedgerows, scrub, coarse grassland) are crossed by the proposed DC cable route. These activities could prevent travel between breeding waterbodies or between hibernation sites and breeding waterbodies in the absence of mitigation measures. There is also a risk of killing and injuring during construction work. Key commuting corridors have been identified within 250 m of the ponds with confirmed or assumed great crested newt presence. These habitats will be avoided and protected during the active great crested newt period through the utilisation of directional drilling. Furthermore, to prevent the killing and injuring of great crested newts, an ecologist will be present during any vegetation removal.
- 4.3.11 Due to the small and temporary nature of the works, and that no breeding ponds will be lost through the proposed development, it is not considered that the works will require the submission of a European Protected Species Mitigation (EPSM)

licence if the works are undertaken under the strict Precautionary Working Methodology (PMW) outlined within this report.

- 4.3.12 A PMW detailing specific RAMs will be implemented within 250 m of all waterbodies with confirmed and assumed presence of great crested newts unless further surveys can confirm likely absence. Further mitigation details are provided within Appendix 6 – Great Crested Newt

Route Section 2

- 4.3.13 In total, two ponds are located within 250 m from the base scheme design in which great crested newt have been confirmed or assumed present. A summary of the waterbodies with proposed working dates can be found in **Table 29**.

Table 29: A summary of waterbodies found within 250 of the base scheme design within route section 2

Waterbody ID	Current Status	Crossed by the DC cable
P71	No access granted – assumed present	-
P183	No access granted – assumed present	-

- 4.3.14 The proposed construction works within route section 2 will result in the short-term temporary loss of amphibian terrestrial habitat within the working area of the proposed DC cable route. No ditches or drains will be crossed by the proposed DC cable route in route section 2 which have great crested newt suitability.
- 4.3.15 The proposed construction works within route section 2 will result in the short-term temporary loss of amphibian terrestrial habitat within the base scheme area.
- 4.3.16 Temporary fragmentation impacts may occur where suitable terrestrial habitat (hedgerow, scrub, coarse grassland) is crossed by the proposed DC cable route. These activities could prevent travel between breeding waterbodies or between hibernation sites and breeding waterbodies in the absence of mitigation measures. There is also a risk of killing and injuring during construction work. Suitable commuting corridors have been identified within 250 m of the ponds with confirmed or assumed great crested newt presence. These habitats will be avoided and protected during the active great crested newt period. Furthermore, to prevent the killing and injuring of great crested newts, an ecologist will be present during any vegetation removal.
- 4.3.17 Due to the small and temporary nature of the works, and that no breeding ponds will be lost through the proposed development, it is not considered that the works will require the submission of an EPSM Licence if the works are undertaken under a strict PMW. However, if the further outlined surveys demonstrate that the works may have an impact upon great crested newts within close proximity or the proposed methodology of work changes, an EPSM licence may be required.
- 4.3.18 A PMW will be implemented within 250 m of all ponds with assumed presence of great crested newts unless further surveys can confirm likely absence. Further mitigation details are provided within Appendix 6 – Great Crested Newt.

Route Section 3

- 4.3.19 Thirteen waterbodies (four ponds and nine ditches) are located within 250 m from the base scheme design in which great crested newt have been assumed present. A summary of the waterbodies with proposed working date can be found in **Table 30**.

Table 30: A summary of waterbodies found within 250 of the base scheme design within route section 3

Waterbody ID	Current Status	Crossed by the DC cable
P154	No access granted – assumed present	-
P155	No access granted – assumed present	-
P164	No access granted – assumed present	-
P165	No access granted – assumed present	-
D29	No access granted – assumed present	Yes
D31	No access granted – assumed present	-
D32	No access granted – assumed present	-
D35	No access granted – assumed present	-
D40	No access granted – assumed present	-
D41	No access granted – assumed present	Yes
D45	No access granted – assumed present	Yes
D46	No access granted – assumed present	Yes
D49	No access granted – assumed present	-

- 4.3.20 The proposed construction works within route section 3 will result in the short-term temporary loss of amphibian terrestrial and potentially aquatic habitat within the base scheme area.
- 4.3.21 The DC cable route passes directly over D29, D41, D45, and D46, and therefore directional drilling will be utilised when crossing these areas. Further details are provided within Appendix 6 – Great Crested Newt.
- 4.3.22 Temporary fragmentation impacts may occur where suitable terrestrial habitat (hedgerow, scrub, coarse grassland) is crossed by the proposed DC cable route. These activities could prevent travel between breeding waterbodies or between hibernation sites and breeding waterbodies in the absence of mitigation measures. There is also a risk of killing and injuring during construction work. Suitable commuting corridors have been identified within 250 m of the ponds with confirmed or assumed great crested newt presence. These habitats will be avoided and protected during the active great crested newt period. Furthermore, to prevent the killing and injuring of great crested newts, an ecologist will be present during any vegetation removal.
- 4.3.23 Due to the small and temporary nature of the works, and that no breeding ponds will be lost through the proposed development, it is not considered that the works will require the submission of an EPSM Licence if the works are undertaken under a strict Precautionary Working Methodology. However, if the further outlined surveys demonstrate that the works may have an impact upon great crested newts within close proximity or the proposed methodology of work changes, an EPSM licence may be required.

4.3.24 A PMW will be implemented within 250 m of all ponds with assumed presence of great crested newts unless further surveys can confirm likely absence.

4.3.25 Further mitigation details are provided within

Route Section 4

4.3.26 In total, two ponds are located within 250 m from the base scheme design in which great crested newt have been confirmed or assumed present. A summary of the waterbodies with proposed working date can be found in **Table 31**.

Table 31: A summary of waterbodies found within 250 of the base scheme design within route section 4

Waterbody ID	Current Status	Crossed by the DC cable
D83	Small (peak count 1 adult)	-
D84	No access granted – assumed present	Yes

4.3.27 The proposed construction works within route section 4 will result in the short-term temporary loss of amphibian terrestrial habitat within the working area of the proposed DC cable route. D84 will be crossed by the proposed DC cable route in Route Section 4 which has an assumed population of great crested newt as access for further survey was not granted. Furthermore, D84 is part of a wider ditch network connected to D83 which has a confirmed population of great crested newt.

4.3.28 The proposed construction works within route section 4 will result in the short-term temporary loss of amphibian terrestrial habitat within the base scheme area.

4.3.29 Temporary fragmentation impacts may occur where suitable terrestrial habitat (hedgerow, scrub, coarse grassland) is crossed by the proposed DC cable route. These activities could prevent travel between breeding waterbodies or between hibernation sites and breeding waterbodies in the absence of mitigation measures. There is also a risk of killing and injuring during construction work. Suitable commuting corridors have been identified within 250 m of the ponds with confirmed or assumed great crested newt presence. These habitats will be avoided and protected during the active great crested newt period. Furthermore, to prevent the killing and injuring of great crested newts, an ecologist will be present during any vegetation removal.

4.3.30 Due to the small and temporary nature of the works, and that no breeding ponds will be lost through the proposed development, it is not considered that the works will require the submission of an EPSM Licence if the works are undertaken under a strict PMW. However, if the further outlined surveys demonstrate that the works may have an impact upon great crested newts within close proximity or the proposed methodology of work changes, an EPSM licence may be required.

4.3.31 A PMW will be implemented within 250 m of all ponds with assumed presence of great crested newts unless further surveys can confirm likely absence. Further mitigation details are provided within Appendix 6 – Great Crested Newts.

4.4 Bats

Route Section 1

- 4.4.1 Initial baseline surveys to inform the Environmental Statement carried out in 2016/2017 and subsequent update surveys undertaken by TEP throughout 2019 have determined there are **no** trees of High or Moderate suitability for roosting bats that are considered likely to be impacted by the proposed construction works located in route section 1. There are no further survey requirements for the trees located within route section 1.
- 4.4.2 There will be a total hedgerow loss of **824 m** across 16 sub-sections, which will likely cause temporary disturbance to bat foraging and commuting routes³⁸. However, this will be mitigated in the short-term by the use of temporary fences to bridge gaps in the hedgerow (see Appendix 7 for further details). All hedgerows will be replaced as soon as possible after the works are completed (see Appendix 9 for further details on hedgerow re-instatement and management). Replacement hedgerow growth is expected to reach functional maturity within five years, meaning there is likely to be no permanent loss to foraging and commuting habitat for bats.
- 4.4.3 Lighting of work areas in route section 1 (see Appendix 7 for further details) is anticipated to be only intermittent and likely to not cause a significant negative impact on bats. Where lighting is required, it will be employed sensitively, in a downward direction, using directional hoods and if necessary supplemented with shields/baffles/cowls and only used for the shortest duration possible. Lighting will not point at any feature likely to be used by bats. More information on temporary lighting can be found in the ALEP VKL-BB-ENV-00-PL-X-20488.

Route Section 2

- 4.4.4 Initial baseline surveys to inform the Environmental Statement carried out in 2016/2017 and subsequent surveys undertaken by TEP throughout 2019 have determined there are **11** trees of High or Moderate suitability for roosting bats which have had bat activity surveys and shown no bat roosts are present but are considered likely to be impacted by the proposed construction works in Route Section 2³⁹. Construction works impacting these trees will be undertaken as per the requirements of a PMW and with a suitably licensed Ecologist present (see Appendix 7 for further details regarding the PMW). A further suite of nocturnal bat activity surveys will be undertaken for the following trees in route section 2 to determine potential bat roost activity, as per BCT guidelines (see Appendix 7): tree #329 (high roost potential) and tree #334 (moderate roost potential).
- 4.4.5 There will be a total hedgerow loss of **858 m** across 19 sub-sections, which will likely cause temporary disturbance to bat foraging and commuting routes⁴⁰. However, this will be mitigated in the short-term by the use of temporary fences to bridge gaps in the lost hedgerow (see Appendix 7 for further details). Replacement hedgerow growth is expected to reach functional maturity within five years, meaning there is likely to be no permanent loss to foraging and commuting habitat for bats.
- 4.4.6 Lighting of work areas in route section 2 (see Appendix 7 for further details) is anticipated

³⁸ National Grid (2017)

³⁹ TEP (2019)

⁴⁰ National Grid (2017)

to be only intermittent and likely to not cause a significant negative impact on bats. Where lighting is required, it will be employed sensitively (in a downward direction, not pointing at any feature likely to be used by bats and for the shortest duration possible).

Route Section 3

- 4.4.7 Initial baseline surveys to inform the Environmental Statement carried out in 2016/2017 and subsequent surveys undertaken by TEP throughout 2019 **confirmed the presence of a bat roost on tree 233** in route section 3, located adjacent to a proposed access road (Westville Road) and within 20 m of Temporary Construction Compound S5⁴¹. The proximity of the construction works to a known day roost of a common pipistrelle bat – a EPS – requires work to be undertaken as per a Natural England (NE) EPS mitigation licence, if the works cannot be avoided.
- 4.4.8 Initial baseline surveys to inform the Environmental Statement carried out in 2016/2017 and subsequent surveys undertaken by TEP throughout 2019 have determined there are **two** trees of Moderate suitability for roosting bats (yet a full suite of surveys have been completed and no bat roost has been recorded) that are considered likely to be impacted by the proposed construction works located in route section 3. Construction works impacting these trees will be undertaken as per the requirements of a PMW and with a suitably licensed Ecologist present, due to the underlying risk that a bat could be present. As such, this work will be permitted without the need for a specific mitigation licence.
- 4.4.9 A further suite of nocturnal bat activity surveys will be undertaken on the following trees in route section 3 to determine potential bat roost activity, as per BCT guidelines (see Appendix 7): tree #223 (high roost potential) and trees #303, #353, #363 and #369 (moderate roost potential).
- 4.4.10 There will be a total hedgerow loss of **1,100 m** across 19 sub-sections, which will likely cause temporary disturbance to bat foraging and commuting routes⁴². However, this will be mitigated in the short-term by the use of temporary fences to bridge gaps in the lost hedgerow (see Appendix 7 for further details). Replacement hedgerow growth is expected to reach functional maturity within five years, meaning there is likely to be no permanent loss to foraging and commuting habitat for bats.
- 4.4.11 Lighting of work areas in route section 3 (see Appendix 7 for further details), is anticipated to be only intermittent and likely to not cause a significant negative impact on bats. Where lighting is required, such as compounds, (especially Compound S5 close to the confirmed bat roost), lighting will be employed sensitively (in a downward direction, using directional hoods, not pointing at any feature likely to be used by bats and for the shortest duration possible).

Route Section 4

- 4.4.12 Initial baseline surveys to inform the Environmental Statement carried out in 2016/2017 and subsequent surveys undertaken by TEP throughout 2019 have determined there is one tree of High suitability for roosting bats that is considered likely to be impacted by the proposed construction works located in route section 4. Construction works impacting this tree will be undertaken as per the requirements of a PMW and with a suitably qualified Ecologist present. As such, this work will be permitted

⁴¹ TEP (2019)

⁴² National Grid (2017)

without the need for a specific mitigation licence. A further suite of nocturnal bat activity surveys is required for tree #413 (moderate roost potential) in route section 4 to determine potential bat roost activity, as per BCT guidelines (see Appendix 7).

- 4.4.13 There will be a total hedgerow loss of **165 m** across 3 subsections, which will likely cause temporary disturbance to bat foraging and commuting routes⁴³. However, this will be mitigated in the short-term by the use of temporary fences to bridge gaps in the lost hedgerow (see Appendix 7 for further details). Replacement hedgerow growth is expected to reach functional maturity within five years, meaning there is likely to be no permanent loss to foraging and commuting habitat for bats.
- 4.4.14 Lighting of work areas in route section 4 (see Appendix 7 for further details), is anticipated to be only intermittent and likely to not cause a significant negative impact on bats. Where lighting is required, it will be employed sensitively (in a downward direction, using directional hoods, not pointing at any feature likely to be used by bats and for the shortest duration possible).

⁴³ National Grid (2017)

4.5 Badger

- 4.5.1 The risks of all known potentially damaging pre-commencement, site clearance and construction activities on the 54 setts identified along the DC cable route have been assessed and suitable mitigation methods identified within this mitigation strategy. The mitigation measures have been separated into route sections along with the proposed dates and mitigation required.
- 4.5.2 A detailed mitigation strategy for all route sections can be found in the Badger Appendix (**Section 8**).
- 4.5.3 It is not anticipated that works will result in disturbance to the six setts identified during the 2019 surveys which are located over 30 m from the scheme boundary (setts 38, 136, 167, 169, 184 and 185).
- 4.5.4 Following review of the Route Layout drawings, the 48 setts which are located within 30 m of the scheme boundary can be categorised as follows:
- Setts within 30 m of the scheme boundary but located over 30 m from works identified in the Route Layout drawings, of which there are 14 active and one disused setts (seven of which are located within the scheme boundary);
 - Setts where the works identified in the Route Layout drawings as within 30 m are haul roads, of which there are 17 active setts (11 of which are located within the scheme boundary);
 - Setts that are located within 30 m of the 'DC working area', of which there are eight active and two disused setts (all located within or on the scheme boundary); and
 - Setts that are located within the 'DC working area', of which there are five active and one disused setts.
- 4.5.5 The Route Layout drawings indicate that there will be no works or haul roads located within 30 m of 15 setts located within the scheme boundary or within 30 m of it. As such, it is anticipated that appropriate avoidance measures can be implemented at these locations which would prevent disturbance to badgers associated with these setts. However, these setts are all located within 30 m of the scheme boundary, and therefore, should there be works in proximity to these setts that are not detailed on the Route Layout drawings, then further consideration would need to be taken as to whether works are likely to result in disturbance to badgers associated with these setts.
- 4.5.6 The Route Layout drawings indicate that there are 17 setts located within or within 30 m of the scheme boundary which are within 30 m of the 'haul road' only (i.e. are located over 30 m for the 'DC working area' and other work areas detailed on the drawings, such as compounds and access roads). However, following consultation with Balfour Beatty, it is understood that the haul roads will be located within the area marked as 'DC working area' on the Route Layout drawings, rather than within the areas marked as 'haul road'. On this basis, it is understood that there will not be any works within the areas marked as 'haul road' on the Route Layout drawings. As such, it is anticipated that appropriate avoidance measures can be implemented at these locations which would prevent disturbance to badgers associated with these setts. However, should this not be the case, in

many locations where setts are present the 'haul road' (as drawn on the Route Layout drawings) covers a relatively wide area and includes areas on both sides of the 'DC working area'. If this area was to be used as haul roads, it is anticipated that there would be some flexibility for micro-siting the haul road at the majority of these locations, which would allow for appropriate avoidance measures to be implemented, to ensure that the works do not encroach within 30 m of these setts. However, further consideration would need to be taken as to whether works are likely to result in disturbance to badgers at each specific location.

- 4.5.7 **Table 32** below details those setts that are within 30 m of the scheme boundary but over 30 m from the works or have 'haul road' only within 30 m, where it is understood there will be no works impacting the setts.

Table 32: Setts with no works anticipated within 30 m

Route section	Setts with no works or haul roads located within 30 m		Setts with 'Haul road' only within 30 m (assumed to be no works)	
	Within scheme boundary	Within 30 m of scheme boundary	Within scheme boundary	Within 30 m of scheme boundary
Route section 1	None	Setts 183, 186	None	None
Route section 2	Setts 147, 176, 178	Setts 177 [disused], 179, 182	None	Sett 46
Route section 3	Setts 145, 172	Sett 187	Setts 59, 75, 150, 170, 171	Sett 152
Route section 4	Setts 159, 165	Setts 161, 164	Setts 79, 95, 96, 155, 162, 163	Setts 110, 112, 158, 160

- 4.5.8 There are 13 active and three disused setts which are located within 30 m of the working area (as shown on the Route Layout drawings as the 'DC working area', access roads and compounds). It is predicted that the works will impact these setts, either through direct destruction, damage or interference of the sett, or through disturbance of badgers associated with the sett. Further detail of the predicted impacts and licencing requirements is provided below within the relevant route sections for each of these setts.
- 4.5.9 A summary of the mitigation requirements for all these setts is also provided within the Badger Appendix (**Section 8**) in the Timetable of Mitigation Based on Construction Timetable.
- 4.5.10 Setts 59 and 75 (both located in route section 3), which based on the current mapped extent and Route Layout drawings are located over 30 m from the working area, have also be included within the tables below. This is because these two setts have been identified as having the potential to be impacted, should there be

a change to the route design or should the sett extent have changed since the 2019 surveys were undertaken.

Further survey requirements

- 4.5.11 A number of further surveys will be required to provide up to date information to support a licence application. Full details of the survey requirements are provided within the Badger Appendix (**Section 8**). The survey requirements will include:
- Surveys during spring 2020 of all setts that require closure or licence to permit disturbance to support the licence application; and
 - Bait marking surveys of one main sett to inform the licence application (if required).

Route Section 1

- 4.5.12 **Table 33** provides further detail for those setts within route section 1 for which there are predicted impacts.

Table 33: Badger setts within 30 m of the working area in route section 1

Sett ID	Predicted impacts	Licensing, closure and mitigation details ⁴⁴
10	Sett 10 is an active single hole outlier sett. From review of the Route Layout drawings, the sett is located within 20 m of the DC working area.	Closure potentially required. As works will be within 20 m of the sett, a licence will be required to permit the licensable action of 'disturbance of badgers'. It is considered unlikely that the works would result in damage to the sett, based on the distance from the cable route itself. However, an assessment will need to be made when further detail of the works is provided as to whether the works within 30 m have the potential to result in damage to the sett, and if so, temporary closure (under licence) would be required.
146	Sett 146 is a disused single hole outlier sett, located centrally within the 'DC working area'.	Closure required. Sett will require closure due to its location within the working area. Sett closure will not require a licence, provided it is demonstrated that the sett remains disused.

⁴⁴ Potential closure required for badger sett is shown as red. Closure definitely for badger required shown as blue.

Route Section 2

4.5.13 **Table 34** provides further detail for those setts within route section 2 for which there are predicted impacts.

Table 34: Badger setts within 30 m of the working area in route section 2

Sett ID	Predicted impacts	Licensing, closure and mitigation details
175	Sett 175 is a four-hole subsidiary sett. One entrance is located within the scheme boundary, which lies approximately 25m from the 'DC working area'. The cable route is located over 30 m from the closest entrance. The location of one archaeology trench (ID 138) is shown to extend within 20m of the closest entrance. The closest main sett recorded during the 2019 surveys is approximately 380 m south (sett 46). It is assumed that this subsidiary sett is connected with this main sett. This will be confirmed during further surveys.	Closure potentially required. Based on the Route Layout drawings, the sett is unlikely to require closure. However, as the works will be approximately 25m from one entrance, a licence will be required to permit the licensable action of 'disturbance of badgers'. It would be desirable that the location of the archaeology trench is moved to ensure that it does not encroach within 30 m of the closest entrance. However, if this is not possible, it may be that the associated excavation could result in damage to the sett, and therefore temporary closure (under licence) would be required.
180	Sett 180 is an active main sett. The majority of the sett entrances lie outside the scheme boundary, but at least one entrance is located within the scheme boundary. It is not clear from these drawings whether the sett entrance located within the scheme boundary will fall within the 'DC working area'.	Partial sett reduction required. It is assumed, on a precautionary basis, that the entrance is located within the working area. On this basis, partial sett reduction would be required under licence, which would involve live digging and closing the entrances within the working area. This would allow for the retention of the majority of the sett, which lies outside the scheme boundary. However, the Route Layout drawings indicate that there may be potential to straighten the cable route at this location and/or shift the route to the east. This would be desirable as it would allow for the entrances to be retained and a licence would be required to permit the 'disturbance of badgers' only, rather than damage to the sett.

181	Sett 181 is a three-hole annexe sett associated with main sett 180, located within the scheme boundary and within the 'DC working area'. The sett will require closure. Provided that the main sett can be retained, it is anticipated that there would be suitable alternative setts available for this social group.	Closure required. This sett will require closure under licence. No direct mitigation will be required for the closure of this sett, however, should the associated main sett (sett 180) also require closure, then there will be a need to provide a suitable alternative (either a suitable existing sett within the territory or an artificial sett).
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Route Section 3

4.5.14 **Table 35** provides further detail for those setts within route section 3 for which there are predicted impacts.

Table 35: Badger setts within 30 m of the working area in route section 3

Sett ID	Predicted impacts	Licensing, closure and mitigation details
59	Sett 59 is an eight-hole main sett, located centrally within the scheme boundary within the bank of a drainage ditch. The Route Layout drawings indicate that the sett is located over 30 m from the 'DC working area', with the closest entrance approximately 100m west of the 'DC working area'. As such, it is considered that the sett is a sufficient distance from the working area. There will be directional drilling under the ditch at this location.	Sett retained. Based on the information provided, it is not anticipated that the works would result in damage or disturbance to the sett. However, as the sett is within the scheme boundary, it has been included here as a precaution, should there be a change to the route design which would bring the works closer to the sett. If the sett should be within 30 m of the working area, then a licence would be required to permit the licensable action of 'disturbance of badgers'.

64	Sett 64 is an outlier sett comprising three active entrances and four disused entrances. One active entrance is located within the scheme boundary and approximately 20 m from the 'DC working area'. The cable route is located over 30 m from this entrance.	Closure potentially required. As works will be within 20 m of the sett, a licence will be required to permit the licensable action of 'disturbance of badgers'. It is considered unlikely that the works would result in damage to the sett, based on the distance from the cable route itself. However, an assessment will need to be made when further detail of the works is provided as to whether the works within 30 m has the potential to result in damage to the sett, and if so, temporary closure (under licence) would be required.
66	Sett 66 is a subsidiary sett comprising four active entrances and two disused entrances. From review of the Route Layout drawings, the sett appears to be located over 30 m from the area marked 'DC working area'. However, the GIS shapefiles provided indicate that the sett is located within 30 m from the 'DC working area'. The cable route is located over 30 m from this entrance.	Closure potentially required. As works may be within 30 m of the sett, a licence will be required to permit the licensable action of 'disturbance of badgers'. It is considered unlikely that the works would result in damage to the sett, based on the distance from the cable route itself. However, an assessment will need to be made when further detail of the works is provided as to whether the works within 30 m has the potential to result in damage to the sett, and if so, temporary closure (under licence) would be required.
75	Sett 75 is a large main sett comprising approximately 17 holes. The sett is located within the bank of the River Witham and some of the entrances are located within the scheme boundary, approximately 35 m from the 'DC working area'. However, the 2017 surveys recorded a larger number of entrances, with 30 holes.	Sett retained. Based on the current mapped extent of the sett, it is not anticipated that the works would result in any damage or disturbance, and therefore a licence would not be required. However, the sett has been included here to highlight that the closest recorded entrance is located approximately 35 m from the working area and it is possible that entrances may be present within 30 m of the working area, should the sett have been extended since the 2019 surveys were undertaken. This will be confirmed during further surveys.

144	<p>Sett 144 is a four-hole main sett located within a small area of plantation woodland. From review of the Route Layout drawings, the sett is located over 30 m from the area marked 'DC working area'. However, the GIS shapefiles provided indicate that the sett is located approximately 10 m from the DC working area. The sett previously comprised approximately 25 entrances during the 2017 surveys, but it was noted that the majority of entrances were either disused or blocked with chicken wire. The sett has been classified as a main sett on a precautionary basis.</p>	<p>Closure potentially required. As the working area may be approximately 10 m from the sett, it is likely that there would be damage to the sett, depending on the nature of the works within 30 m of the entrances and whether they will involve excavation. Closure (under licence) would be required if this is considered to be a potential risk. As the sett is considered to be a main sett, additional bait marking surveys would be required to determine the territory boundary of the social group and determine if other setts utilised by the same social group. It is likely that an artificial sett would need to be provided, which would need to be constructed at least 6 months prior to sett closure.</p>
173	<p>Sett 173 is a two-hole outlier sett, located within the scheme boundary within the bank of a drainage ditch. Based on the Route Layout drawings, it appears that the western entrance lies within the 'DC working area' and is approximately 20 m from the cable route. There will be directional drilling under the ditch at this location.</p>	<p>Closure required. The sett is within the working area and will therefore require closure under licence to facilitate the works.</p>
174	<p>Sett 174 is a two-hole partially active outlier sett. The sett is within 10 m of the 'DC working area' and is approximately 30 m from the cable route.</p>	<p>Closure potentially required. Depending on the nature of the works within 30 m of the entrances and whether they will involve excavation, there is potential that works will result in damage to the sett. Temporary closure (under licence) would be required if this is considered to be a potential risk. If works are not considered to result in damage to the sett, a licence will be required to permit the licensable action of 'disturbance of badgers', as works will be within 10 m of the sett.</p>

Route Section 4

4.5.15 **Table 36** provides further detail for those setts within route section 4 for which there are predicted impacts.

Table 36: Badger setts within 30 m of the working area in route section 4

Sett ID	Predicted impacts	Licensing, closure and mitigation details
80	Sett 80 is a main sett comprising approximately 15 entrances, of which only one is located within the scheme boundary. The 'DC working area', as shown on the Route Layout drawings, is located relatively close to the western boundary in this area. As such, the sett is within 30 m of the working area, with one entrance located within 'DC working area'.	<p>Partial sett reduction required.</p> <p>On the basis that one of the entrances is located within the working area, partial sett reduction would be required under licence, which would involve live digging and closing the entrances within the working area. This would allow for the retention of the majority of the sett, which lies outside the scheme boundary.</p> <p>The scheme boundary is relatively wide in this area (approximately 200m). There are a number of setts located within the western hedgerow field boundary along a 1.5 km stretch (including setts 89, 90, 92, 166 and 168 included below). The cable route and working area runs along the western boundary. However, the Route Layout drawings indicate that there is potential to shift the route to the east (as shown by the 'DC limits of deviation' line). If this is feasible then there is potential that the sett (along with other setts listed below) could be retained and a licence would only be required for disturbance (or no licence maybe required, depending on the distance from the sett).</p>

89	Sett 89 is a disused single hole outlier sett, located approximately 10 m from the 'DC working area'.	<p>Closure recommended.</p> <p>As the sett is located 10 m from the working area it would not directly require closure to facilitate the works. However, provided there is no change in the status of the sett, it is recommended that the sett is temporarily closed as a precaution, to ensure that the sett does not come back into use during the construction period. Sett closure would not require a licence, provided it is demonstrated that the sett remains disused.</p>
90	Sett 90 is a single hole outlier sett. The sett is located on the scheme boundary and is within 5 m of the 'DC working area'. The sett was noted as being 'very active' in the 2019 badger survey report, and therefore it is possible that more entrances may now be present.	<p>Closure required.</p> <p>Considering the proximity of the sett to the working area, it is likely that works would result in damage to tunnels that may extend into the working area. Therefore, it is likely that temporary closure of the sett is required. An assessment will be undertaken of the sett in the field by an experienced ecologist to determine if closure is required, as depending on the proximity and types of works, the use of bog mats to protect the sett rather than closure may be more appropriate.</p> <p>However, there may be potential to move the route boundary and working area to the east. If this is possible then the sett could be retained and a licence would only be required for disturbance (see sett 80 above for details).</p>
92	Sett 92 is a disused five-hole annexe sett, located on the scheme boundary and within 20 m of the 'DC working area'.	<p>Closure recommended.</p> <p>As the sett is located 20 m from the working area it would not directly require closure to facilitate the works. However, provided there is no change in the status of the sett, it is recommended that the sett is closed as a precaution, to ensure that the sett does not come back into use during the construction period. Sett closure would not require a licence, provided it is demonstrated that the sett remains disused.</p>

166	<p>Sett 166 is a three-hole outlier sett, located on the scheme boundary. The sett is located within 20 m of the 'DC working area'.</p>	<p>Closure required.</p> <p>Considering the proximity of the sett to the working area, it is likely that works would result in damage to tunnels that may extend into the working area. Therefore, it is likely that temporary closure of the sett is required. An assessment will be undertaken of the sett in the field by an experienced ecologist to determine if closure is required, as depending on the proximity and types of works, the use of bog mats to protect the sett rather than closure may be more appropriate.</p> <p>However, there may be potential to move the route boundary and working area to the east. If this is possible the sett could be retained and a licence would only be required for disturbance (see sett 80 above for details).</p>
168	<p>Sett 168 comprises three separate outlier entrances located approximately 35 m apart along the scheme boundary. The southern entrance is located within 10 m of the 'DC working area' and approximately 25 m from the cable route.</p>	<p>Closure potentially required.</p> <p>As works will be within 10 m of the sett, a licence will be required to permit the licensable action of 'disturbance of badgers'. Depending on the nature of the works closest to this entrance, and whether they will involve excavation, temporary closure of this entrance may be necessary if accidental damage to the sett is a risk. However, it is likely that implementation of bog mats will provide sufficient protection to the sett. The notes from the 2019 surveys indicate that the three entrances are separate and unlikely to be connected by tunnels.</p>

4.6 Birds (Including Schedule 1)

4.6.1 For the rest of this section of the report, 'screening' refers to the process of determining the need or otherwise for further targeted surveys for a species, based on a review of a combination of desk study records, results from the breeding bird surveys undertaken in 2016/17, Phase 1 habitat survey results, publicly available imagery of the habitat in the vicinity, an understanding of the species breeding requirements and an understanding of the type of works, the time of year when the works will happen and the distance from works that the breeding species can tolerate with regard to potential disturbance. The entire route will be subject to this screening exercise to identify areas where Schedule 1 birds are reasonably likely to be breeding within the base scheme design area based on their habitat preferences, appropriate zones of influence and the information from distribution maps and desk study records.

4.6.2 The following criteria should be used to identify areas to focus on:

- Presence of Schedule 1 birds identified in the desk study;
- The proximity of designated sites which reference Schedule 1 birds in the citation/site description;
- Presence of suitable habitats likely to support breeding Schedule 1 birds and wintering bird assemblages; and
- Type of construction taking place and the resulting levels of distances required to prevent disturbance (using best-practice guidance or evidence from scientific literature).

Wintering Birds

Route Section 1

4.6.3 Based on the results of the wintering bird surveys, visual and acoustic screening will be installed at the southern edge of the works to the north of Huttoft Bank Pit LWT reserve all year round. The screening would provide a barrier between the works and the nature reserve and the surrounding area. Screening would be a minimum of 2 m high and will consist of Heras fencing with an acoustic quilt attached.

Route Section 2

4.6.4 No mitigation is required as no operational or permanent impacts are anticipated for wintering birds. There is temporary potential displacement to abundant suitable habitat within the nearby area. The habitat present in this section is deemed to be of low value and it is highly unlikely to support significant numbers of wintering bird species of interest.

Route Section 3

4.6.5 Based on the results of the wintering bird surveys, if any works are carried out within 200 m of the River Witham during winter (October to March) then visual and acoustic screening will be installed between the works and the River Witham all year round. It will be installed as close as possible to the works and will be of a sufficient length to screen the works. If the works were to move closer to the river the screening would be moved accordingly to minimise impacts. As in route

section 1 the screening would be a minimum of 2 m high and will consist of Heras fencing with an acoustic quilt attached.

Route Section 4

- 4.6.6 Based on the results of the wintering bird surveys, if any works are carried out within 200 m of South Forty Foot Drain during winter (October to March), then visual and acoustic screening will be installed between the works and the watercourse all year round. It will be installed as close as possible to the works and will be of a sufficient length to screen the works. If the works were to move closer to the river the screening would be moved accordingly to minimise impacts. As in route section 1 the screening would be a minimum of 2 m high and will consist of Heras fencing with an acoustic quilt attached.

Construction Phase Monitoring

- 4.6.7 Monitoring of birds within route section 1 will be undertaken within 500 m of the shoreline during winter (October to March). This will involve supervision of the installation of visual and acoustic screening between the works and Huttoft Bank Pit and then monthly visits during the winter period during construction works to monitor the usage of Huttoft Bank Pit and the surrounding land by wintering birds which are qualifying features of The Wash SPA/Ramsar site and/or the Humber Estuary SPA/Ramsar site. If there were to be a clear reduction in the usage at Huttoft Bank Pit or the surrounding area by wintering birds, then the control measures will be re-evaluated.

Breeding Birds

- 4.6.8 Clearance and construction works must be undertaken with due regard to the potential presence of breeding birds. The core bird nesting season is typically taken to be from 1st March until 31st August, though some species (such as barn owl) can nest earlier or later than this, particularly following a mild winter. Vegetation clearance should be undertaken outside of the nesting bird season wherever possible. When this is not possible, and clearance and construction works need to be carried out during the breeding bird season, standard precautionary measures will be implemented, including a detailed inspection for nesting birds. A nesting bird survey must be carried out by an experienced ecologist no more than 24 hours prior to clearance works. Any located nests must then be identified and left undisturbed until the young have fledged and nesting has been completed.

Marsh Harrier

- 4.6.9 Marsh harriers will use a variety of wet and dry habitats and nest in beds of common reed, crops and rough grassland⁴⁵. They will hunt over dry arable farmland, reed beds, flooded grassland and salt-marshes and they are normally found in freshwater or brackish reed bed. Marsh harriers appear to prefer reedbed nest site locations away from land and water-reedbed edges. This also reduces the risk of human and boat disturbance.

Route Section 1

⁴⁵ Hardey J, Crick H, Wernham C, Riley H, Etheridge B and Thompson D (2013) Raptors: A Field Guide to Survey and Monitoring, 3rd Edition. TSO, Edinburgh.

- 4.6.10 Reedbed habitat is listed in the Lincolnshire Biodiversity Action Plan (LBAP) as a priority habitat. In Lincolnshire, reedbeds are now found to be frequently fringing water-filled pits. Most areas of reedbed in Lincolnshire are small and fragmented with extensive areas occurring along the Humber Bank.
- 4.6.11 The desk study data identified marsh harrier records in route section 1 at Huttoft Bank Pit.
- 4.6.12 A single marsh harrier was recorded over Huttoft Bank Pit in April 2016, during the breeding bird surveys; this is approximately 200 m from the red line boundary.
- 4.6.13 Other than the reedbeds at Huttoft Bank Pit there are no other reedbed habitats within the red line boundary or 215/225 m Zone of Influence (ZoI). Huttoft Bank Pit is approximately 200 m south of the proposed landfall with residential housing and tall trees located to the north of Huttoft Bank Pit, thereby providing a suitable barrier between any marsh harrier present in the reedbeds and the works. As part of the mitigation for wintering birds, visual and acoustic screening will be installed at the southern edge of the works area to the north of Huttoft Bank Pit all year round, and so will be in situ during the summer months too. This will also prevent significant disturbance to any breeding marsh harrier present, providing a barrier between the works and the nature reserve and surrounding land. The screening will be a minimum of 2m in height and will likely consist of Heras fencing with an acoustic quilt attached.
- 4.6.14 For the rest of route section 1 an ECoW will be present. The use of an ECoW will be used to alert the species lead of any potential presence of marsh harrier in the breeding season. If the presence of marsh harrier is likely to be a constraint the following methods will be implemented to ensure no potential disturbance to the species.
- 4.6.15 If a marsh harrier were to be identified to be breeding within the red line boundary or within the Zone of Influence it is suggested that a 215/225 m buffer⁶ is proposed from that nesting location, to minimise disturbance. The buffer depends on a number of factors such as natural screening (reedbed), the type of works and any known responses to current disturbance. Therefore, the risk of disturbance will be reviewed on a site by site basis taking into account these factors.

Route Section 2

- 4.6.16 The desk study data identified a marsh harrier record in route section 2 at East Keal.
- 4.6.17 No marsh harriers were identified during the breeding bird surveys, however there were no survey visits undertaken in route section 2 due to changes in the route following the 2015/2016 winter bird surveys.
- 4.6.18 It is not known if the desk study result for marsh harrier at East Keal relates to East Keal Clay Pit Local Wildlife Site (LWS) which is crossed by the base scheme design. The citation for East Keal Clay Pit does not mention reedbed habitat but marsh harriers can nest in other habitats. Phase 1 habitat data shows the area of East Keal Clay Pit to be comprising of poor semi-improved grassland and dense scrub, however, aerial searches show a waterbody, with possible reedbeds, which could have potential to support breeding marsh harrier.
- 4.6.19 'On the ground' surveys should be undertaken of this area to check for signs of occupancy. This would involve a walkover in 2020 of the Clay Pit to look for signs

of occupancy and presence of breeding pairs between mid-March to late April. Likely nesting would be assumed if positive signs of occupancy over suitable nesting habitat were identified. An appropriate buffer zone would then be placed on the location that has been identified to be suitable for nesting.

- 4.6.20 For the rest of route section 2 an Ecological Clerk of Works will be present. The use of an ECoW will be used to alert the species lead of any potential presence of marsh harrier in the breeding season. If the presence of marsh harrier is likely to be a constraint, the following will be implemented to ensure no potential disturbance to marsh harrier.

- 4.6.21 If a marsh harrier were to be identified to be breeding within the red line boundary or Zone of Influence it is suggested that a 215/225 m buffer⁴⁶ is given from that location, to minimise disturbance. The buffer depends on a number of factors such as natural screening (reedbed), the type of works and any known responses to current disturbance. Therefore, the risk of disturbance will be reviewed on a site by site basis taking into account these factors.

Route Section 3

- 4.6.22 The desk study data identified a marsh harrier record in route section 2 at East Keal.
- 4.6.23 The desk study data identified a marsh harrier at Carrington/Hagnaby Lock/Keal Cotes/Langrick.
- 4.6.24 One marsh harrier was recorded in route section 3 in Transect 10 during the breeding bird survey, and one was noted in Transect 11. It was considered within the Environmental Statement that marsh harrier could nest within arable fields within the red line boundary within the route of Transect 11.
- 4.6.25 As with route section 2, 'on the ground' surveys should be undertaken on these areas, to check for signs of occupancy between mid-March to late April.
- 4.6.26 For the rest of route section 3 an Ecological Clerk of Works will be present. The use of an ECoW will be used to alert the species lead of any potential presence of marsh harrier in the breeding season. If the presence of marsh harrier is likely to be a constraint the following methods will be implemented to ensure no potential disturbance to the species.

If a marsh harrier were to be identified to be breeding within the red line boundary or Zone of Influence it is suggested that a 215/225 m buffer⁴⁷ is given from that location, to minimise disturbance. The buffer depends on a number of factors such as natural screening (reedbed), the type of works and any known responses to current disturbance. Therefore, the risk of disturbance will be reviewed on a site by site basis taking into account these factors.

Route Section 4

- 4.6.27 The desk study data identified a marsh harrier at Amber Hill but there are no details relating to this record.

⁴⁶ Ruddock, M., Whitfield, D.P., 2007. A review of disturbance distances in selected bird species. Report from Natural Research (Projects) Ltd. to Scottish Natural Heritage. Natural Research, Banchory, UK

⁴⁷ Ruddock, M., Whitfield, D.P., 2007. A review of disturbance distances in selected bird species. Report from Natural Research (Projects) Ltd. to Scottish Natural Heritage. Natural Research, Banchory, UK

- 4.6.28 A marsh harrier was recorded in route section 4 during the 2015 wintering bird survey, but none were identified during the breeding bird surveys.
- 4.6.29 South Forty Foot Drain LWS is a 33.3 km ditch consisting of semi-improved grassland, coarse or rank grassland, scattered scrub, semi-improved calcareous grassland and reedbed. The South Forty Foot Drain LWS is crossed by the base scheme design. It is unknown where the reedbed sections are within this LWS although this small area of reedbed is unlikely to support breeding marsh harrier, however, marsh harriers can and will nest in rank grassland next to ditches. Small stands of common reed next to this rank grassland could be enough to provide breeding habitat for marsh harrier.
- 4.6.30 As with the other route sections, an 'on the ground' survey should be undertaken at South Forty Foot Drain LWS, to check for signs of occupancy between mid-March to late April.
- 4.6.31 For the rest of route section 4 an Ecological Clerk of Works will be present. The use of an ECoW will be used to alert the species lead of any potential presence of marsh harrier in the breeding season. If the presence of marsh harrier is likely to be a constraint the following methods will be implemented to ensure no potential disturbance to the species.

If a marsh harrier were to be identified to be breeding within the red line boundary or Zone of Influence it is suggested that a 215/225 m buffer⁴⁸ is given from that location, to minimise disturbance. The buffer depends on a number of factors such as natural screening (reedbed), the type of works and any known responses to current disturbance. Therefore, the risk of disturbance will be reviewed on a site by site basis taking into account these factors.

Bittern

- 4.6.32 Bitterns are confined almost entirely to reedbed habitats. Bitterns require suitably large, high quality reedbeds for breeding and wintering. Bitterns are now found more commonly in Lincolnshire, as extraction of clay, sand and gravel has resulted in a larger network of reedbeds and patches of open water being available to them as breeding habitat. Bitterns feed on fish and small amphibians and eels. The decline in bittern populations from the 1950s to the 1990s was attributed to loss and degradation of reedbed habitat⁴⁹.
- 4.6.33 Reedbed habitat is listed in the Lincolnshire Biodiversity Action Plan (LBAP) as a priority habitat. In Lincolnshire reedbeds are frequently found fringing water-filled pits. Many of Lincolnshire's waterways are lined with linear strands of reeds.

Route Section 1

- 4.6.34 The desk study data identified 31 bittern records entirely within route section 1. All the records were found within a 1 km square from the grid reference TF 53000 78999. All these records were found at Huttoft Bank Pit within the Lincolnshire Wildlife Trust Reserve.
- 4.6.35 Other than the reedbeds at Huttoft Bank Pit there are no other reedbed habitats within the red line boundary. Huttoft Bank Pit is 200 m south of the proposed

⁴⁸ Ruddock, M., Whitfield, D.P., 2007. A review of disturbance distances in selected bird species. Report from Natural Research (Projects) Ltd. to Scottish Natural Heritage. Natural Research, Banchory, UK

⁴⁹ Gilbert, G., Gibbons, D.W. and Evans, J., 1998. Bird Monitoring Methods: a manual of techniques for key UK species. Published by the RSPB in association with British Trust for Ornithology.

landfall. The disturbance zone of bittern is currently unknown, however, as the only reedbed in the locality is over 200 m away from landfall and the area of proposed works, bitterns are unlikely to be affected by the development. Consequently, targeted bittern surveys will not be needed as part of future survey work.

4.6.36 For the rest of route section 1 an Ecological Clerk of Works will be present. The use of an ECoW will be used to alert the species lead of any potential presence of bittern in the breeding season. If the presence of bittern is likely to be a constraint the following methods will be implemented to ensure no potential disturbance to the species.

4.6.37 If a bittern were to be identified to be breeding within the red line boundary or Zone of Influence it is suggested that a buffer is given from that location, to minimise disturbance. The buffer depends on a number of factors such as natural screening (reedbed), the type of works and any known responses to current disturbance. Therefore, the risk of disturbance will be reviewed on a site by site basis taking into account these factors.

Route Section 2

4.6.38 If a bittern were to be identified to be breeding within the red line boundary or Zone of Influence it is suggested that a buffer is given from that location, to minimise disturbance. The buffer depends on a number of factors such as natural screening (reedbed), the type of works and any known responses to current disturbance. Therefore, the risk of disturbance will be reviewed on a site by site basis taking into account these factors.

4.6.39 There are no records of bittern in route section 2 from the desk study data and bittern was not recorded during the breeding bird survey. In addition to this, no suitable habitat for bittern has been identified from aerial imagery.

4.6.40 Therefore, no targeted bittern surveys are required in route section 2.

Route Section 3

4.6.41 There are no records of bittern in route section 3 from the desk study data and bittern was not recorded during the breeding bird survey. In addition to this, no suitable habitat has been identified from aerial imagery.

4.6.42 Therefore, no targeted bittern surveys are required in route section 3.

Route Section 4

4.6.43 There are no records of bittern in route section 4 from the desk study data and bittern was not recorded during the breeding bird survey. In addition to this, no suitable habitat has been identified from aerial imagery.

4.6.44 Therefore, no targeted bittern surveys are required in route section 4

Barn Owl

4.6.45 Barn owls' nest in large cavities in trees, buildings, bale stacks, as well as nest boxes⁵⁰. Barn owls require a level or concave surface to breed upon, most often in the bottom of a cavity and appear to prefer out of the way locations such as hollows in large, mature trees. The minimum size required for barn owls to nest in

⁵⁰ Hardey J, Crick H, Wernham C, Riley H, Etheridge B and Thompson D (2013) Raptors: A Field Guide to Survey and Monitoring, 3rd Edition. TSO, Edinburgh

is a hole of 70 x 70 mm, with an internal width of ~250 mm and a minimum floor area of a nest cavity of 300 mm x 300 mm. They are found in a variety of open farmland and in young conifer plantations.

- 4.6.46 Barn owls prefer to hunt over rough grassland habitats with a sufficient litter layer and structure to support small mammal species, in particular vole species. This reduces the probability they will be found in intensely grazed and managed habitats although they can utilise arable field margins.
- 4.6.47 Arable field margin habitat is listed in the Lincolnshire BAP as a priority habitat. There is a positive trend in the quantity of arable field margins nationally and within Lincolnshire.
- 4.6.48 A survey is required if there is any possibility that barn owls may be breeding at a location where development is under consideration before any site clearance or other works are undertaken. A screening exercise was undertaken to identify specific breeding features within the landscape which are broadly suited to barn owls within 60 m of the red line boundary of the Scheme. This distance was selected due to the likely activity type being general landscape works and medium/high disturbance risk⁵¹. Built structures and mature trees identified from the screening process will then require a nest site verification survey. If evidence of barn owl is identified a protection buffer zone of 60m will be implemented.

Route Section 1

- 4.6.49 Twenty-four records of barn owl were recorded within route section 1, with 16 of these field observations recorded at Huttoft Bank Pit. Huttoft Bank Pit is 200 m south of the proposed landfall and therefore beyond the zone of influence relating to disturbance¹³. Consequently, barn owls recorded in Huttoft Bank Pit will not be directly impacted by the development.
- 4.6.50 The nearest record to the scheme, is a nest box being used in 2014, located approximately 60 m to the north of the Scheme boundary. This would require inspection based on the information below.
- 4.6.51 Aerial imagery was reviewed to determine if there are features, suitable for nesting barn owls, such as buildings and mature trees, within 60 m of the red line boundary, which would require further inspection for nesting barn owls. It was noted that there are areas along route section 1 which construction works should avoid during March to August where possible, with a 60 m buffer. If this is not possible, these features will be targeted for further surveys as there are possible barn owl nesting features that increase the likelihood that barn owls are breeding in the area. These features are detailed in **Table 37** below. Stage 2⁵² and possible Stage 3⁵³ barn owl surveys will be undertaken to determine if these features are actively being used by barn owls for breeding.
- 4.6.52 For the rest of route section 1 an Ecological Clerk of Works will be present. The use of an ECoW will be used to alert the species lead of any potential presence of barn owl in the breeding season. If the presence of barn owl is likely to be a

⁵¹ Shawyer, C. R. 2011. Barn Owl *Tyto alba* Survey Methodology and Techniques for use in Ecological Assessment: Developing Best Practice in Survey and Reporting. IEEM, Winchester.

⁵² Investigative field survey to determine which of the features identified in the screening exercise offer potential nest sites

⁵³ Nest verification survey to confirm which of the potential nest sites identified during the screening exercise are actively being used by barn owls for breeding

constraint the methods below will be implemented to ensure no potential disturbance to the species.

- 4.6.53 If a barn owl were to be identified to be breeding within or from 60 m of the red line boundary, a 60 m buffer will be placed around this location where works could not be undertaken to minimise impacts on disturbance. The buffer takes into account the type of works and the risk to disturbance, following best practice guidelines⁵⁴.

Table 37: Features identified within and up to 60 m of the red line boundary that have the potential to be suitable for nesting barn owls – route section 1

Route Section	Feature Type	Location (easting, northing)	Distance to red line boundary	Historical records
1	Line of trees	551743, 379201	0	Desk study record of nest box 50 m north
1	Agricultural building	551967, 379322	56 m	Desk study record of nest box 165 m west
1	Agricultural building	551832, 378897	21 m	Desk study record of nest box 410 m north
1	Cluster of buildings	550940, 378669	Within (plus a few within 60 m)	No
1	Agricultural building	550840, 378649	25 m	No
1	Agricultural building	550638, 378402	Within	No
1	Cluster of agricultural buildings	550188, 378246	45 m	No

⁵⁴ Shawyer, C. R. 2011. Barn Owl *Tyto alba* Survey Methodology and Techniques for use in Ecological Assessment: Developing Best Practice in Survey and Reporting. IEEM, Winchester.

1	Cluster of agricultural buildings	548104, 377917	55 m	No
1	Agricultural building	547434, 378423	45 m	No
1	Mature tree	544425, 377783	35 m	Barn owl sighting during breeding bird survey 2017, 145 m north west
1	Woodland edge	542699, 376390	15 m	No

Route Section 2

- 4.6.54 Fourteen records of barn owl were recorded within route section 2. Two records of pairs of barn owls were recorded ~300 m (East Keal, TF 38500 64500) and ~180 m (Spilsby, TF 36770 65554) from the Scheme boundary in 1998 and 2002 respectively. The presence of two individuals together indicates that there may be suitable habitat to support breeding barn owls. The most recent record of barn owl is from 2015, at Raithby Village (TF372671), 1.5 km north of Spilsby, suggesting suitable habitat for barn owl is still present.
- 4.6.55 Aerial imagery was reviewed to determine if there are features, suitable for nesting barn owls, such as buildings and mature trees, within 60 m of the red line boundary, which would require further inspection for nesting barn owls. It was noted that there are areas along route section 2 which construction works should avoid during March to August where possible, with a 60 m buffer. If this is not possible, these features will be targeted for further surveys as there are possible barn owl nesting features that increase the likelihood that barn owls are breeding in the area. These features are detailed in **Table 38 below**. Stage 2 and possible Stage 3 barn owl surveys would need to be undertaken to determine if these features are actively being used by barn owls for breeding.
- 4.6.56 For the rest of route section 2 an Ecological Clerk of Works will be present. The use of an ECoW will be used to alert the species lead of any potential presence of barn owl in the breeding season. If the presence of barn owl is likely to be a constraint the details below will be implemented to ensure no potential disturbance to the species.
- 4.6.57 If a barn owl were to be identified to be breeding within or from 60 m of the red line boundary, a 60 m buffer will be placed around this location where works could not be undertaken to minimise impacts on disturbance. The buffer takes into account the type of works and the risk to disturbance, following best practice guidelines.

Table 38: Features identified within and up to 60 m of the red line boundary that have the potential to be suitable for nesting barn owls – route section 2

Route Section	Feature Type	Location (easting, northing)	Distance to red line boundary	Historical records
2	Building	542782, 375863	Within	No
2	Edge of woodland	540632, 373691	5 m	No
2	Cluster of buildings	540673, 373422	30 m	No
2	Mature tree	539894, 371235	Within	No
2	Edge of woodland	540293, 370810	Within	No
2	Matures trees (x2)	540376, 370539	Within	No
2	Building	537170, 367901	Within	No
2	Cluster of buildings	537370, 364776	35 m	No
2	Building	537478, 364573	Within	No
2	Line trees	537054, 365530	30 m	No

Route Section 3

4.6.58 Fifty-seven records of barn owl were identified between 1999 and 2015 in route section 3. The closest is a field observation of a pair of barn owls adjacent to the Scheme boundary at Hagnaby Lock in 2004 and an individual on the southern end

of the route section 3 Scheme boundary in 2009. An additional record of a pair of barn owls at Hagnaby Lock was recorded in 2008.

- 4.6.59 The presence of two individuals together indicates that there may be suitable habitat to support breeding barn owls.
- 4.6.60 Aerial imagery was reviewed to determine if there are features, suitable for nesting barn owls, such as buildings and mature trees, within 60 m of the red line boundary, which would require further inspection for nesting barn owls. It was noted that there are areas along route section 3 which construction works should avoid during March to August where possible, with a 60 m buffer. If this is not possible, these features will be targeted for further surveys as there are possible barn owl nesting features that increase the likelihood that barn owls are breeding in the area. These features are detailed in **Table 39** below. Stage 2 and possible Stage 3 barn owl surveys will be undertaken to determine if these features are actively being used by barn owls for breeding.
- 4.6.61 For the rest of route section 3 an Ecological Clerk of Works will be present. The use of an ECoW will be used to alert the species lead of any potential presence of barn owl in the breeding season. If the presence of barn owl is likely to be a constraint the paragraphs above will be implemented to ensure no potential disturbance to the species.
- 4.6.62 If a barn owl were to be identified to be breeding within or from 60 m of the red line boundary, 60 m buffer will be placed around this location where works could not be undertaken to minimise impacts on disturbance. The buffer takes into account the type of works and the risk to disturbance, following best practice guidelines.

Table 39: Features identified within and up to 60 m of the red line boundary that have the potential to be suitable for nesting barn owls – route section 3

Route Section	Feature Type	Location (easting, northing)	Distance to red line boundary	Historical records
3	Building	537375, 363613	40 m	No
3	Building	536636, 362175	60 m	No
3	Cluster of buildings	535898, 361622	46 m	No
3	Cluster of buildings	534021, 359898	40 m	No

3	Cluster of trees	532520, 357640	Within	BBS sighting 750m south
3	Agricultural building	532251, 356913	Within	BBS sighting 70m east
3	Cluster of trees	532173, 356379	60 m	BBS sighting 550m north
3	Agricultural building	532037, 354510	Within	Desk study record 1km north west (record type not specified)
3	Cluster of trees	532386, 354802	Within	No
3	Building	528161, 351311	Within	No
3	Building	527725, 350971	20 m	Desk study record at same location (record type not specified)
3	Buildings	527591, 351121	Within	Desk study record 175m south east
3	Cluster of buildings	527190, 350680	20 m	No
3	Building	525887, 350053	5 m	No
3	Agricultural buildings	526085, 349426	Within	No

3	Agricultural buildings	525356, 349653	25 m	No
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Route Section 4

- 4.6.63 Five records of barn owl were recorded between 2000 and 2016 in route section 4. One record identified 3 barn owls in the same area in 2000. This could be a possible indication of breeding barn owls and/or the presence of fledglings.
- 4.6.64 Aerial imagery was reviewed to determine if there are features, suitable for nesting barn owls, such as buildings and mature trees, within 60 m of the red line boundary, which would require further inspection for nesting barn owls. It was noted that there are areas along route section 4 which construction works should avoid during March to August where possible, with a 60 m buffer. If this is not possible, these features will be targeted for further surveys as there are possible barn owl nesting features that increase the likelihood that barn owls are breeding in the area. These features are detailed in **Table 40** below. Stage 2 and possible Stage 3 barn owl surveys will be undertaken to determine if these features are actively being used by barn owls for breeding.
- 4.6.65 For the rest of route section 4 an Ecological Clerk of Works will be present. The use of an ECoW will be used to alert the species lead of any potential presence of barn owl in the breeding season. If the presence of barn owl is likely to be a constraint the paragraphs above will be implemented to ensure no potential disturbance to the species.
- 4.6.66 If a barn owl were to be identified to be breeding within or from 60m of the red line boundary, a 60 m buffer will be placed around this location where works could not be undertaken to minimise impacts on disturbance. The buffer takes into account the type of works and the risk to disturbance, following best practice guidelines.

Table 40: Features identified within and up to 60 m of the red line boundary that have the potential to be suitable for nesting barn owls – route section 4

Route Section	Feature Type	Location (easting, northing)	Distance to red line boundary	Historical records
1	Agricultural buildings	524393, 348477	45 m	No
1	Buildings	521669, 346057	55 m	No
1	Agricultural buildings	520902, 343775	Within (plus a few within 60 m)	No
1	Derelict building	519558, 342127	40 m	Desk study record from Greater Lincolnshire Nature

				Partnership in 2016
1	Buildings	517833, 337422	5 m	No
1	Buildings	517833, 337422	15 m	No
1	Buildings	519704, 337209	45 m	No
1	Buildings	519541, 336700	15 m	No
1	Buildings	519169, 336766	5 m	No
1	Buildings	518647, 337112	50 m	No

Peregrine Falcon

- 4.6.67 If a peregrine falcon's nest in a wide range of habitat, typically in high areas such as coastal and inland cliff and quarry sites in addition to urban structures. Breeding peregrines can be relatively tolerant of human disturbance so long as the nest is inaccessible⁵⁵.

Route Section 1

- 4.6.68 Eleven records of peregrine falcon were recorded between 2003 and 2015 in route section 1.
- 4.6.69 A record of a pair of peregrine falcons were recorded at Huttoft Bank Pit in 2012. Huttoft Bank Pit is 222 m south of the proposed landfall (nearest works) so peregrine falcon could be impacted due to the proximity to the works. However, as part of the mitigation for wintering birds, visual and acoustic screening will be installed at the southern edge of the works area to the north of Huttoft Bank Pit. This will also prevent significant disturbance to any breeding peregrine falcon present, providing a barrier between the works and the nature reserve and surrounding land. The screening will be a minimum of 2 m in height and will likely consist of Heras fencing with an acoustic quilt attached. Therefore, no targeted surveys are required in route section 1 for peregrine falcon.
- 4.6.70 For the rest of route section 1 an Ecological Clerk of Works will be present. The use of an ECoW will be used to alert the species lead of any potential presence of

⁵⁵ Ratcliffe, D.A. (1972). The Peregrine population of Great Britain in 1971. Bird Study, 19, 117-156

peregrine falcon in the breeding season. If the presence of peregrine falcon is likely to be a constraint the following methods will be implemented to ensure no potential disturbance to the species.

- 4.6.71 If a peregrine falcon were to be identified to be breeding within the red line boundary or Zone of Influence, a buffer around this location would be implemented and works could not take place during the breeding season within this buffered area. The distance of the buffer would depend on factors such as natural screening so the risk of disturbance will be reviewed on a site by site basis taking into account the screening, the type of works and any known responses to current disturbance.

Route Section 2

- 4.6.72 A single record of peregrine falcon was recorded in 2001 in route section 2. This was located approximately 800 m to the east of the Scheme boundary, therefore, due to the distance of the desk study record to the scheme and the lack of suitable breeding habitat within the route section, no targeted surveys for peregrine falcon will be undertaken within route section 2.
- 4.6.73 For the rest of route section 2 an Ecological Clerk of Works will be present. The use of an ECoW will be used to alert the species lead of any potential presence of peregrine falcon in the breeding season. If the presence of peregrine falcon is likely to be a constraint the following methods will be implemented to ensure no potential disturbance to the species.
- 4.6.74 If a peregrine falcon were to be identified to be breeding within the red line boundary or Zone of Influence, a buffer around this location would be implemented and works could not take place during the breeding season within this buffered area. The distance of the buffer would depend on factors such as natural screening, so the risk of disturbance will be reviewed on a site by site basis taking into account the screening, the type of works and any known responses to current disturbance.

Route Section 3

- 4.6.75 Four records of peregrine falcon were recorded at Hagnaby Lock in route section 3 between 2000 and 2006.
- 4.6.76 These were all recorded in the same location, adjacent to the Scheme boundary. No pairs were recorded; however, the reoccurrence of peregrine falcon at this location indicates regular use. Due to the lack of suitable breeding habitat within this route section, no targeted surveys for peregrine falcon will be undertaken within route section 3.
- 4.6.77 For route section 3 an Ecological Clerk of Works will be present. The use of an ECoW will be used to alert the species lead of any potential presence of peregrine falcon in the breeding season, taking particular caution at Hagnaby Lock. If the presence of peregrine falcon is likely to be a constraint the following methods will be implemented to ensure no potential disturbance to the species.
- 4.6.78 If a peregrine falcon were to be identified to be breeding within the red line boundary or Zone of Influence, a buffer around this location would be implemented and works could not take place during the breeding season within this buffered area. The distance of the buffer would depend on factors such as natural screening, so the risk of disturbance will be reviewed on a site by site basis taking

into account the screening, the type of works and any known responses to current disturbance

Route Section 4

- 4.6.79 There are no desk study records of peregrine falcon in route section 4 and no field survey results. In addition to this, the screening exercise did not identify any suitable habitat for breeding, therefore no surveys for peregrine falcon will be undertaken.
- 4.6.80 For the rest of route section 4 an Ecological Clerk of Works will be present. The use of an ECoW will be used to alert the species lead of any potential presence of peregrine falcon in the breeding season. If the presence of peregrine falcon is likely to be a constraint the following methods will be implemented to ensure no potential disturbance to the species.
- 4.6.81 If a peregrine falcon were to be identified to be breeding within the red line boundary or Zone of Influence, a buffer around this location would be implemented and works could not take place during the breeding season within this buffered area. The distance of the buffer would depend on factors such as natural screening, so the risk of disturbance will be reviewed on a site by site basis taking into account the screening, the type of works and any known responses to current disturbance.

Kingfisher

- 4.6.82 Kingfishers are found along rivers, canals and on still water bodies such as lakes and ponds⁵⁶. Less common sites include ditch banks, reservoir embankments and the sides of canals, lakes and farmland pools. They excavate nest burrows into stone-free sandy soil of low stream banks. Trees or bushes with overhanging branches on the river can provide important fishing perches. Upended roots of fallen trees provide good nest sites.
- 4.6.83 Otter and water vole habitat assessments have been reviewed as part of the screening exercise for kingfisher. The otter and water vole habitat assessments provide a summary of the aquatic features, including information about the aquatic feature type, water levels, bank profile, bankside vegetation. Aquatic feature sections will only be screened out if there is reliable evidence that they would be unsuitable for nesting kingfisher. The criteria that is considered unsuitable for nesting kingfisher includes a combination of:
- Aquatic features that were dry and evidence suggests that the aquatic feature will only hold water for a small proportion of the year;
 - Aquatic features with banks with a flat or shallow profile;
 - Aquatic features with a low bank height (less than 0.5 m);
 - Aquatic features with a bank substrate that is unsuitable for burrowing, such as gravel, stone or reinforced;
 - Aquatic features enclosed within dense hedgerow or scrub; or
 - Aquatic features with banks that are covered in dense vegetation.

⁵⁶ Gilbert, G., Gibbons, D.W. and Evans, J., 1998. Bird Monitoring Methods: a manual of techniques for key UK species. Published by the RSPB in association with British Trust for Ornithology.

- 4.6.84 Kingfishers, along with their nest sites, are a species that can be difficult to detect during general breeding bird surveys due to their secretive behaviour and typically being present at low densities. Therefore, targeted kingfisher surveys will be undertaken to assess the suitability of aquatic features for kingfisher and to identify any nest sites, to avoid causing a legal offence through damage or disturbance of a nest site during the construction phase.

Route Section 1

- 4.6.85 The desk study data provided records of kingfisher within route section 1 at Huttoft Bank Pit/Huttoft Marsh. Kingfisher was not recorded during the breeding bird surveys.
- 4.6.86 Many fields in route section 1 are bounded by brackish or freshwater ditches which frequently support diverse plants and invertebrate communities according to the Lincolnshire Biodiversity Action Plan. The ditches which have the potential to support kingfisher are likely to be those which also support water vole.
- 4.6.87 There is a high level of connectivity of ditches in route section 1 providing plenty of foraging habitat for kingfishers.
- 4.6.88 Aquatic features which are over 100 m from the red line boundary are screened out from requiring further kingfisher survey effort as it is considered that disturbance to breeding kingfisher beyond this distance will be negligible.
- 4.6.89 The surveys undertaken by TEP in 2017 and 2019 for otter and water vole where presence was identified were ditches 4, 107, 123, 141, 143, 144, 146, 157, 179, 184.02 and 191. Following the above methodology, these ditches do have aquatic features suitable for kingfisher and are within 100m from the red line boundary, so kingfisher surveys will be carried out on these ditches.
- 4.6.90 A survey will be undertaken for aquatic features identified from the habitat screening exercise. The survey will be undertaken between June and July 2020. Surveys will consist of walkover surveys to assess if there has been any activity that could indicate breeding has occurred. Any potential nest sites will be recorded, as will any kingfisher observations. If any potential nest sites are identified, then a vantage point survey will be undertaken at the time (if time allows) or up to two further survey visits will be undertaken before the end of July 2020.

Route Section 2

- 4.6.91 The desk study data provided records of kingfisher within route section 2 at Mavis Enderby/East Keal. Kingfisher was not recorded during the breeding bird surveys.
- 4.6.92 The surveys undertaken by TEP in 2017 and 2019 for otter and water vole identified presence of these two species at ditch 249, HD27 and in the River Lymn. HD27 is not labelled as a watercourse in the ES or in the 2019 survey report so has not been surveyed, but on aerial imagery it appears to be a watercourse. Once confirmation as to whether this is a watercourse has been determined, this may require a survey. As with route section 1 there is high level of connectivity throughout route section 2 allowing for kingfisher to forage along large stretches of ditch. Following the above methodology, kingfisher surveys will be carried out on these ditches.
- 4.6.93** A survey will be undertaken for aquatic features identified from the habitat screening exercise. The survey will be undertaken between June and July 2020.

Surveys will consist of walkover surveys to assess if there has been any activity that could indicate breeding has occurred. Any potential nest sites will be recorded spatially, as will any kingfisher observations. If any potential nest sites are identified, then a vantage point survey will be undertaken at the time (if time allows) or up to two further survey visits will be undertaken before the end of July 2020.

Route Section 3

- 4.6.94 The desk study data provided records of kingfisher within route section 3 at Hagnaby Lock. One kingfisher was recorded during the breeding bird survey in transect 10.
- 4.6.95 The surveys undertaken by TEP in 2017 and 2019 for otter and water vole identified presence at 35, 45, 292, 300, 320, 323, 336, 340, 344, 422 (inc. 446), 443, 446, 447, 731. As with route section 1 and 2 there is high level of connectivity throughout route section 3 allowing for kingfisher to forage along large stretches of ditch. Following the above methodology, kingfisher surveys will be carried out on these ditches.
- 4.6.96 A survey will be undertaken for aquatic features identified from the habitat screening exercise using water vole data. The survey will be undertaken between June and July 2020. Surveys will consist of walkover surveys to assess if there has been any activity that could indicate breeding has occurred. Any potential nest sites will be recorded spatially, as will any kingfisher observations. If any potential nest sites are identified, then a vantage point survey will be undertaken at the time (if time allows) or up to two further survey visits will be undertaken before the end of July 2020.

Route Section 4

- 4.6.97 The desk study data provided records of kingfisher within route section 4 at Bicker Fen/Great Hale Eau Drain and Great Hale Fen. Kingfisher was not recorded during the 2017 breeding bird surveys.
- 4.6.98 The surveys undertaken by TEP in 2017 and 2019 for otter and water vole identified presence at 60, 84, 473, 481, 496, 504, 508, 542, 545, 551, 552, 630, 732, 737. As with water vole potential, ditches under HDD102, HDD101, HDD104, HDD100, HDD99, HDD98 are not labelled as ditches in the ES or 2019 survey report and have never been surveyed, however, from reviewing aerial imagery they do appear to be ditches. As with route section 1 and 2 there is high level of connectivity throughout route section 2 allowing for kingfisher to forage along large stretches of ditch. Following the above methodology, targeted kingfisher surveys will be carried out on these ditches.
- 4.6.99 A survey will be undertaken for aquatic features identified from the habitat screening exercise. The survey will be undertaken between June and July 2020. Surveys will consist of walkover surveys to assess if there has been any activity that could indicate breeding has occurred. Any potential nest sites will be recorded spatially, as will any kingfisher observations. If any potential nest sites are identified, then a vantage point survey will be undertaken at the time (if time allows) or up to two further survey visits will be undertaken before the end of July 2020.

Hobby

- 4.6.100 Hobbies are found in a variety of environments, including farmland and open forests⁵⁷. Farmland is its primary breeding habitat. Most breeding occurs as far north as the Humber however it is known to breed further north.
- 4.6.101 Hobbies often nest near wetlands or on chalky or sandy soil and use nests built by other species. The nests are usually in trees but, in recent years, nests on electricity pylons have also been used. Nests used by hobbies are generally in single trees, lines of trees or small open woodlands.

Route Section 1

- 4.6.102 The desk study data identified five hobby records in route section 1, all at Huttoft Bank Pit. As part of the mitigation for wintering birds, visual and acoustic screening will be installed at the southern edge of the works area to the north of Huttoft Bank Pit. This will also prevent significant disturbance to any breeding hobby present, providing a barrier between the works and the nature reserve and surrounding land. The screening will be a minimum of 2 m in height and will likely consist of Heras fencing with an acoustic quilt attached.
- 4.6.103 Due to the lack evidence from breeding bird surveys and lack of suitable breeding habitat within this route section, no targeted surveys for hobby are required in route section 1.
- 4.6.104 However, having an Ecological Clerk of Works on Site during the works will be needed. The use of an ECoW will be used to alert the species lead of any potential presence of hobby in the breeding season. If the presence of hobby is likely to be a constraint the following methods will be implemented to ensure no potential disturbance to the species.
- 4.6.105 If a hobby were to be identified to be breeding within the red line boundary or Zone of Influence, a buffer around this location would be implemented and works could not take place during the breeding season within this buffered area. The distance of the buffer would depend on factors such as natural screening, so the risk of disturbance will be reviewed on a site by site basis taking into account the screening, the type of works and any known responses to current disturbance.

Route Section 2

- 4.6.106 There are two records of hobby passing to the west of the village of East Keal in 2014, approximately 250 m to the east of the proposed route. These records are of hobby passes.
- 4.6.107 Due to the lack evidence from breeding bird surveys and lack of suitable breeding habitat within this route section, no targeted surveys for hobby are required in route section 2.
- 4.6.108 However, having an Ecological Clerk of Works on Site during the works will be needed to make sure there are no signs of disturbance. The use of an ECoW will be used to alert the species lead of any potential presence of hobby in the breeding season. If the presence of hobby is likely to be a constraint the following methods will be implemented to ensure no potential disturbance to the species.

⁵⁷ Hardey J, Crick H, Wernham C, Riley H, Etheridge B and Thompson D (2013) Raptors: A Field Guide to Survey and Monitoring, 3rd Edition. TSO, Edinburgh.

- 4.6.109 If a hobby were to be identified to be breeding within the red line boundary or Zone of Influence, a buffer around this location would be implemented and works could not take place during the breeding season within this buffered area. The distance of the buffer would depend on factors such as natural screening, so the risk of disturbance will be reviewed on a site by site basis taking into account the screening, the type of works and any known responses to current disturbance.

Route Section 3

- 4.6.110 There are three records of hobby in Hagnaby Lock. These are 384 m south east of the proposed route. These records are from 2003, 2005 and 2011. There is also one record of hobby in the village of Carrington. This is 1.2 km to the west of the proposed route.
- 4.6.111 Due to the lack evidence from breeding bird surveys and lack of suitable breeding habitat within this route section, no targeted surveys for hobby are required in route section 3.
- 4.6.112 However, having an Ecological Clerk of Works on Site during the works will be needed. The use of an ECoW will be used to alert the species lead of any potential presence of hobby in the breeding season. If the presence of hobby is likely to be a constraint the following methods will be implemented to ensure no potential disturbance to the species.
- 4.6.113 If a hobby were to be identified to be breeding within the red line boundary or Zone of Influence, a buffer around this location would be implemented and works could not take place during the breeding season within this buffered area. The distance of the buffer would depend on factors such as natural screening, so the risk of disturbance will be reviewed on a site by site basis taking into account the screening, the type of works and any known responses to current disturbance.

Route section 4

- 4.6.114 There are seven records of hobby in Bicker Fen, approximately 1 km to the east of the proposed route. All these records were from 2003 and 2004.
- 4.6.115 Due to the lack evidence from breeding bird surveys and lack of suitable breeding habitat within this route section, no targeted surveys for hobby are required in route section 4.
- 4.6.116 However, having an Ecological Clerk of Works on Site during the works will be needed. The use of an ECoW will be used to alert the species lead of any potential presence of hobby in the breeding season. If the presence of hobby is likely to be a constraint the following methods will be implemented to ensure no potential disturbance to the species.
- 4.6.117 If a hobby were to be identified to be breeding within the red line boundary or Zone of Influence, a buffer around this location would be implemented and works could not take place during the breeding season within this buffered area. The distance of the buffer would depend on factors such as natural screening, so the risk of disturbance will be reviewed on a site by site basis taking into account the screening, the type of works and any known responses to current disturbance.

Bearded Tit

- 4.6.118 Bearded tits tend to be distributed in reedbeds around the coast and build their nests low down among the reeds, often on piles of dead reed stems⁵⁸.

Route Section 1

- 4.6.119 Records of bearded tit have been identified during the desk study and suitable breeding habitats are present within Huttoft Bank Pit near route section 1. There are 206 records of bearded tits in this location which falls 250 m from the proposed route. This species is non-territorial and has been known to forage up to 400 m from their nest site.
- 4.6.120 Other than the reedbeds at Huttoft Bank Pit there are no other reedbed habitats within the red line boundary or Zone of Influence (Zol). As part of the mitigation for wintering birds, visual and acoustic screening will be installed at the southern edge of the works area to the north of Huttoft Bank Pit. This will also prevent significant disturbance to any breeding bearded tit present, providing a barrier between the works and the nature reserve and surrounding land. The screening will be a minimum of 2 m in height and will likely consist of Heras fencing with an acoustic quilt attached.
- 4.6.121 Bearded tit was not observed during the breeding bird surveys and no suitable nesting habitat was identified during the screening exercise outside of Huttoft Bank Pit. No targeted surveys are therefore required in route section 1 for bearded tit.

Route Section 2

- 4.6.122 There are no reedbeds in route section 2. Therefore because of a lack of nesting habitat and lack of records, no targeted surveys need to be undertaken for bearded tit in this section.

Route Section 3

- 4.6.123 There are no reedbeds in route section 3. Therefore because of a lack of nesting habitat and lack of records, no targeted surveys need to be undertaken for bearded tit in this section.

Route Section 4

- 4.6.124 There are no reedbeds in route section 4. Therefore because of a lack of nesting habitat and lack of records, no targeted surveys need to be undertaken for bearded tit in this section.

Little Ringed Plover

- 4.6.125 Little ringed plover nest on bare gravel around flooded gravel pits, sandy riverbanks and reservoirs and opportunistically on sites with similar bare ground, such as brownfield sites⁵⁹.

Route Section 1

- 4.6.126 A single record of little ringed plover was provided in the desk study in August 2013 at Huttoft Bank Pit in route section 1. A single little ringed plover was also recorded on the shoreline (Humber Estuary Ramsar) during winter bird surveys.

⁵⁸ Gilbert, G., Gibbons, D.W. and Evans, J., 1998. Bird Monitoring Methods: a manual of techniques for key UK species. Published by the RSPB in association with British Trust for Ornithology

⁵⁹ Parrinder, E.D., 1989. Little ringed plovers *Charadrius dubius* in Britain in 1984. Bird Study, 36(3), pp.147-153

- 4.6.127 As part of the mitigation for wintering birds, visual and acoustic screening will be installed at the southern edge of the works area to the north of Huttoft Bank Pit. This will also prevent significant disturbance to any breeding little ringed plover present, providing a barrier between the works and the nature reserve and surrounding land. The screening will be a minimum of 2 m in height and will likely consist of Heras fencing with an acoustic quilt attached.

- 4.6.128 No suitable nesting habitat has been identified within route section 1, with the exception of Huttoft Bank Pit. No targeted surveys are therefore required in route section 1 for little ringed plover.

Route Section 2

- 4.6.129 There are no records and no suitable nesting habitat within route section 2 for little ringed plover, so no targeted surveys need to be undertaken for this species in this section.

Route Section 3

- 4.6.130 There are no records and no suitable nesting habitat within route section 3 for little ringed plover, so no targeted surveys need to be undertaken for this species in this section.

Route Section 4

- 4.6.131 There are no records and no suitable nesting habitat within route section 4 for little ringed plover, so no targeted surveys need to be undertaken for this species in this section.

Red Kite

- 4.6.132 Red kites use mature woodland for breeding and roosting and they forage over extensive areas of open ground. They will often occupy well-wooded farmland below 600 m above sea level. The size of the woodland used for nesting can vary from extensive area to small clumps of mature trees to narrow shelterbelts. In large areas of woodland their nests are usually located on the edge or in a clearing or ride to allow for easy aerial access.

Route Section 1

- 4.6.133 Red kite were not recorded in route section 1 during the desk study or during the breeding bird surveys. In addition to this, red kite is a scarce resident in Lincolnshire, with very scarce breeding mainly in the southwest of the county. Therefore, no targeted surveys will be undertaken for this species in this section as they are not reasonably likely to be present.
- 4.6.134 However, due to the suitable nesting habitat present throughout route section 1, having an Ecological Clerk of Works on Site during the works will be needed to alert the species lead of any potential presence of red kite in the breeding season. If the presence of red kite is likely to be a constraint the following methods will be implemented to ensure no potential disturbance to the species.
- 4.6.135 If a red kite were to be identified to be breeding within the red line boundary, a buffer around this location would be implemented and works could not take place during the breeding season within this buffered area. The distance of the buffer would depend on factors such as natural screening, so the risk of disturbance will

be reviewed on a site by site basis taking into account the screening, the type of works and any known responses to current disturbance.

Route Section 2

- 4.6.136 Red kite was recorded in winter in route section 2 in the desk study data at Sutterby, Mavis Enderby, Sausthorpe. Red kite was not recorded during the breeding bird surveys. In addition to this, red kite is a scarce resident in Lincolnshire, with very scarce breeding mainly in the southwest of the county. Therefore, no targeted surveys will be undertaken for this species in this section as they are not reasonably likely to be present.
- 4.6.137 However, due to the suitable nesting habitat present throughout route section 2, having an Ecological Clerk of Works on Site during the works will be needed to alert the species lead of any potential presence of red kite in the breeding season. If the presence of red kite is likely to be a constraint the following methods will be implemented to ensure no potential disturbance to the species.
- 4.6.138 If a red kite were to be identified to be breeding within the red line boundary, a buffer around this location would be implemented and works could not take place during the breeding season within this buffered area. The distance of the buffer would depend on factors such as natural screening, so the risk of disturbance will be reviewed on a site by site basis taking into account the screening, the type of works and any known responses to current disturbance.

Route Section 3

- 4.6.139 Red kite was recorded in route section 3 in the desk study data at Hagnaby Lock during August 2011, which is immediately adjacent to the red line boundary. However, the screening exercise did not identify any suitable nesting habitat at this location and the nearest woodland area is 150 m south of this record and is approximately 0.7-hectare. In addition to this, red kite is a scarce resident in Lincolnshire, with very scarce breeding mainly in the southwest of the county. Therefore, no targeted surveys will be undertaken for this species in this section as they are not reasonably likely to be present.
- 4.6.140 However, due to the suitable nesting habitat present throughout route section 3, having an Ecological Clerk of Works on Site during the works will be needed to alert the species lead of any potential presence of red kite in the breeding season. If the presence of red kite is likely to be a constraint the following methods will be implemented to ensure no potential disturbance to the species.
- 4.6.141 If a red kite were to be identified to be breeding within the red line boundary, a buffer around this location would be implemented and works could not take place during the breeding season within this buffered area. The distance of the buffer would depend on factors such as natural screening, so the risk of disturbance will be reviewed on a site by site basis taking into account the screening, the type of works and any known responses to current disturbance.

Route Section 4

- 4.6.142 Red kite were not recorded in route section 4 during the desk study or during the breeding bird surveys. In addition to this, no suitable nesting habitat was identified within the route section and red kites are a scarce resident in Lincolnshire, with very scarce breeding mainly in the southwest of the county. Therefore, no targeted surveys need to be undertaken for this species in this section.

4.7 Designated Sites and Habitats

4.7.1 This document is the delivery mechanism for all habitat mitigation; it describes measures applicable to all construction activities. Any updates will be provided in a separate document once the further survey data is collected, e.g. for priority habitats and in the area where access was previously unavailable for extended Phase 1 habitat survey.

4.7.2 At the time of writing, no Landscape Restoration Plan has been written. Consequently, this ecological mitigation strategy for habitats will need to inform details of the restoration plan.

Designated Sites (Including Priority Habitats)

4.7.3 In addition to the embedded mitigation set out in the Designated Sites and Habitats Appendix (9), the following mitigation strategy will be adopted for designated sites. Where there are no impacts on designated sites, no mitigation is required, and these sites will not be referred to further in this document.

Route Section 1

4.7.4 Natural England will be consulted in relation to the nationally designated site, Sea Bank Clay Pits Site of Special Scientific Interest (SSSI), 324 m south and 295 m north of the proposed landfall. The potential temporary, indirect impacts, as a result of degradation or pollution of habitats, are considered extremely unlikely but will be avoided by the embedded pollution prevention measures set out in the Designated Sites and Habitats Appendix (9).

4.7.5 Consultation will be undertaken with the relevant regulator to further agree the mitigation strategy for habitats within the following locally designated sites for which impacts have been identified, albeit not significant ones, after taking into account the embedded mitigation set out in the Designated Sites and Habitats in Appendix (9) and summarised below:

- The Rigsby Road Verges Local Wildlife Site (LWS)/ Rigsby Roadside Nature Reserve: Site is adjacent to scheme, with possible accidental encroachment by construction traffic. However, demarcation of working areas and sensitive features and pollution prevention measures will be implemented.
- Rigsby Wood LWS/ Local Wildlife Trust reserve/ Ancient Woodland. This site abuts the western boundary of the scheme. It is possible that accidental encroachment by construction traffic will occur. However, working areas will be demarcated in order to protect retained habitats and features.

4.7.6 No longer term, operational or permanent impacts are predicted for the non-statutory designated sites which fall within 1 km of route section 1, with the exception of Firsby to Louth Dismantled Railway SNCI.

4.7.7 As the proposed DC cable route will cross Firsby to Louth Dismantled Railway SNCI using open cut methods, the works will result in small losses of scrub and grassland within a maximum 30 m wide section which will re-establish, once works are complete. Consultation will be undertaken with the relevant regulator to further agree the mitigation strategy for habitats within this SNCI. This temporary loss of approximately 1 % of the designated site will last 2-5 years until the habitats re-

establish. As the site is designated, reinstatement will comprise natural regeneration rather than re-seeding in order to prevent the introduction of plant species which would not ordinarily be present in the locality. Re-establishment of vegetation will take place within 2-4 years for grassland and up to 5 years for scrub.

- 4.7.8 There are no additional mitigation requirements for temporary impacts on priority habitats (i.e. the field recorded in the desk study as potential coastal floodplain grazing marsh near Wold View Farm), as the embedded mitigation and mitigation in relation to breeding and wintering birds will be implemented.
- 4.7.9 Ecologically important hedge number 55 requires a hedge removal notice. However, it is noted that, through consultation with National Grid, hedgerow removal notices will not be required from the LPA as it is understood this activity is covered under the planning permission granted for the scheme. Hedgerow reinstatement planting will ensure that the species diversity of the hedgerow is maintained including the planting of additional species if required.

Route Section 2

- 4.7.10 Natural England will be consulted in relation to the nationally designated sites within 3.5 km of the scheme: Calceby Marsh SSSI, Keal Carr SSSI, Mavis Enderby Valley SSSI and Swaby Valley SSSI. The potential temporary, indirect impacts to these sites, as a result of water or airborne pollution of habitats or hydrological changes, will be avoided or not significant by the embedded pollution prevention and hydrology measures set out in the Designated Sites and Habitats Appendix (9).
- 4.7.11 Consultation will be undertaken with the relevant regulator to further agree the mitigation strategy for habitats within the following designated sites for which impacts have been identified, albeit not significant ones, after taking into account the embedded mitigation set out in the Designated Sites and Habitats Appendix (9):
- A16 Road Verge, Dalby Bar LWS: Possible encroachment leading to damage to grassland verge, and possible degradation of habitats as a result of pollution and emissions. However, demarcation of working areas and sensitive features and pollution prevention measures will be implemented.
 - East Keal Clay Pit LWS: Site may be crossed by pre-construction drainage works, with possible accidental encroachment onto retained areas. Possible degradation of habitats as a result of pollution and emissions. However, demarcation of working areas and sensitive features and pollution prevention measures will be implemented.
 - Hocker Holt LWS: May be crossed by the scheme for pre-construction land drainage works. The longer-term impacts are discussed in the relevant section below. It is possible that accidental encroachment by construction traffic will occur on the retained parts of the LWS. However, working areas will be demarcated in order to protect retained habitats and features.
 - Wheelabout Wood SNCI: May be crossed by the scheme for pre-construction land drainage works. It is possible that accidental encroachment by construction traffic will occur on the retained parts of the LWS. However, working areas will be demarcated in order to protect retained habitats and features.

- **Bluestone Heath Copse SNCI:** This site is 2 m north of the western boundary of the scheme, but 15 m from the working area at a pinch point on the cable route. It is possible that damage to tree roots due to soil compaction and to tree branches due to construction activities may occur. However, micro siting works away from trees and the tree protection mitigation will ensure that trees and their root protection zones are adequately protected in line with BS:5837. If this is not possible further mitigation and compensation will be required.
- **Callow Carr LWS/ Ancient Woodland:** May be crossed by scheme for pre-construction land drainage works. The longer term impacts are discussed in relevant section below. It is possible that accidental encroachment by construction traffic will occur on the retained parts of the LWS. However, working areas will be demarcated in order to protect retained habitats and features.
- **Manor Farm, Mavis Enderby LWS:** Possible degradation of habitats as a result of pollution and emissions. However, pollution prevention measures will be implemented.
- **Silver Pits Ulceby SNCI:** Abuts scheme, therefore possible encroachment and degradation of habitats as a result of pollution and emissions. However, demarcation of working areas and sensitive features and pollution prevention measures will be implemented.
- **Church Carr SNCI:** Possible degradation of habitats as a result of pollution and emissions. However, pollution prevention measures will be implemented.
- **Dexthorpe Plantation SNCI:** Possible degradation of habitats as a result of pollution and emissions. However, pollution prevention measures will be implemented.
- **Harrington Chalk bank LWS:** Possible degradation of habitats as a result of pollution and emissions. However, pollution prevention measures will be implemented.
- **Harrington Top Road Verge LWS:** Possible degradation of habitats as a result of pollution and emissions. However, pollution prevention measures will be implemented.
- **Keal Carr East LWS:** Possible degradation of habitats as a result of pollution and emissions. However, pollution prevention measures will be implemented.
- **Keal Carr South LWS:** Possible degradation of habitats as a result of pollution and emissions. However, pollution prevention measures will be implemented.
- **Langton Sheepwalks LWS:** Possible degradation of habitats as a result of pollution and emissions. However, pollution prevention measures will be implemented.
- **River Lymn, Skendleby Tributary North SNCI:** Possible hydrological impacts on wetland habitats. However, embedded hydrology mitigation will

ensure consistent run-off rates. Possible degradation of habitats as a result of pollution and emissions. However, pollution prevention measures will be implemented.

- Smith's Wood SNCI: Possible degradation of habitats as a result of pollution and emissions. However, pollution prevention measures will be implemented.
- Southfield Farm Grassland LWS: Possible degradation of habitats as a result of pollution and emissions. However, pollution prevention measures will be implemented.
- Well Vale Estate SNCI: Possible degradation of habitats as a result of pollution and emissions. However, pollution prevention measures will be implemented.
- Winceby Beck (Hagworthingham to Windsor Farm) LWS: Possible degradation of habitats as a result of pollution and emissions. However, pollution prevention measures will be implemented.

4.7.12 Longer term impacts are predicted for three of the following non-statutory designated sites, which fall within 1 km of route section 2.

- East Keal Clay Pit LWS: Possible longer term impact from installation of land drainage. There will be limited disturbance, mitigated by embedded habitat reinstatement using suitable seed mix.
- Hocker Holt LWS: Possible longer term impact from installation of land drainage. Loss of approximately 1.6 % of the woodland. Drainage design will enable replanting of shallow rooted native trees and shrubs.
- Wheelabout Wood SNCI: Possible longer term impact from installation of land drainage. Loss of approximately 2.9 % of the woodland. Drainage design will enable replanting of shallow rooted native trees and shrubs.

4.7.13 Any mitigation requirements for priority habitats, i.e. wet woodland in Holker Holt LWS, will be informed by the further survey. Micro siting works away from trees and adhering to the embedded mitigation set out in the Designated Sites and Habitats in Appendix 9 will minimise any impacts. Any replanting will be informed by the results of the NVC survey.

4.7.14 Ecologically important hedge 46 requires a hedge removal notice. However, it is noted that, through consultation with National Grid, hedgerow removal notices will not be required from the LPA as it is understood this activity is covered under the planning permission granted for the scheme. Hedgerow reinstatement planting will ensure that the species diversity of the hedgerow is maintained including the planting of additional species if required.

Route Section 3

4.7.15 Consultation will be undertaken with the relevant regulator to further agree the mitigation strategy for habitats within the following designated sites for which impacts have been identified, albeit not significant ones, after taking into account the embedded mitigation set out in the Designated Sites and Habitats Appendix (9):

- Braygate Lane SNCI: This site comprises the road verges and drains which abut the scheme. It is possible accidental encroachment by construction traffic and therefore damage to these habitats will occur. However, working areas will be demarcated in order to protect retained habitats and features.
- Hagnaby Lock Nature Reserve: It is possible that indirect impacts arising from changes to the hydrological regime during construction could affect this site which supports wetland habitats and is downstream of the scheme. Embedded hydrology mitigation will ensure run-off rates remain consistent with baseline conditions.
- Langrick Pits SNCI: It is possible that indirect impacts arising from changes to the hydrological regime during construction could affect this site, which supports wetland habitats and is downstream of the scheme. Embedded hydrology mitigation will ensure run-off rates remain consistent with baseline conditions.
- West Fen Catchwater SNCI: It is possible that indirect impacts arising from changes to the hydrological regime during construction could affect this site, which supports wetland habitats and is downstream of the scheme. Embedded hydrology mitigation will ensure run-off rates remain consistent with baseline conditions.

4.7.16 No longer term, operational or permanent impacts are predicted for the non-statutory designated sites which fall within 1 km of route section 3.

4.7.17 Any mitigation requirements for priority habitats, i.e. lowland deciduous woodland by Skirbeck Farm and by the River Witham, will be informed by the further survey. Micro siting works away from trees and adhering to the embedded mitigation set out in the Designated Sites and Habitats in Appendix 9 will minimise any impacts. Any replanting will be informed by the results of the NVC survey. There are no additional mitigation requirements for temporary impacts on the potential coastal floodplain grazing marsh priority habitat near Hagnaby Lock as the embedded mitigation and mitigation in relation to breeding and wintering birds will be implemented.

4.7.18 Ecologically important hedges 7 and 41 require hedge removal notices. However, it is noted that, through consultation with National Grid, hedgerow removal notices will not be required from the LPA as it is understood this activity is covered under the planning permission granted for the scheme. Hedgerow reinstatement planting will ensure that the species diversity of the hedgerow is maintained including the planting of additional species if required.

Route Section 4

4.7.19 Consultation will be undertaken with the relevant regulator to further agree the mitigation strategy for habitats within the following designated sites for which impacts have been identified, albeit not significant ones, after taking into account the embedded mitigation set out in the Designated Sites and Habitats Appendix (9):

- Broadhurst Drain East LWS;
- Great Hale Eau LWS;
- Mill Drain LWS;

- Old Forty Foot Drain LWS;
- Old Forty Foot Drain to South Forty Foot Drain LWS;
- South Forty Foot Drain LWS; and
- Willow Farm Drain LWS.

- 4.7.20 Three LWSs (Great Hale Eau LWS, Old Forty Foot Drain to South Forty Foot Drain LWS and South Forty Foot Drain LWS) are crossed by the scheme. However, all three of these LWSs will be crossed by trenchless techniques. It is possible that accidental encroachment by construction traffic will occur on the retained parts of these LWSs. However, working areas will be demarcated in order to protect retained habitats and features.
- 4.7.21 All seven LWSs within the base scheme design in route section 4 are hydrologically linked. It is possible that indirect impacts arising from changes to the hydrological regime as a result of construction may affect these sites. However, embedded hydrology mitigation will ensure run-off rates remain consistent with baseline conditions.
- 4.7.22 Likewise, it is possible that degradation or pollution of the habitats for which all these sites are designated as a result of water or airborne pollution, dust and debris may occur. This is particularly the case for the Great Eau LWS as a Temporary Works Area is located adjacent to it. However, this will be avoided due to the inclusion of embedded pollution prevention measures.
- 4.7.23 No operational or permanent impacts are predicted for the non-statutory designated sites which fall within 1 km of route section 4.
- 4.7.24 Three LWSs will be directly impacted as they are crossed by the scheme, as follows:
- Great Hale Eau LWS: Will be crossed by the scheme using a trenchless technique. Launch and reception pits will be set back by approximately 50 m from the LWS. Temporary haul road access will be required across the drain which will require a 10 m wide temporary bridge (0.6 % of the length of the LWS) to be placed across it. Embedded reinstatement will comprise natural recolonization (to avoid introduction of non-local species). If bank and soil stabilisation is required, this will be provided by the use of geotextile or coir matting. The bankside and aquatic vegetation will be re-established within 2-4 years.
 - Old Forty Foot Drain to South Forty Foot Drain LWS: Will be crossed by the scheme using a trenchless technique. Launch and reception pits will be set back by approximately 50 m from the LWS. Temporary haul road access will be required across the drain which will require a 10 m wide temporary bridge (1 % of the length of the LWS) to be placed across it. Embedded reinstatement will comprise natural recolonization (to avoid introduction of non-local species). If bank and soil stabilisation is required, this will be provided by the use of geotextile or coir matting. The bankside and aquatic vegetation will be re-established within 2-4 years.
 - South Forty Foot Drain LWS: Will be crossed by the scheme using a trenchless technique. Launch and reception pits will be set back by approximately 50 m from the LWS. Temporary haul road access will be

required across the drain which will require a 10 m wide temporary bridge (<0.1 % of the length of the LWS) to be placed across it. Embedded reinstatement will comprise natural recolonisation (to avoid introduction of non-local species). If bank and soil stabilisation is required, this will be provided by the use of geotextile or coir matting. The bankside and aquatic vegetation will be re-established within 2-4 years.

4.7.25 There are no additional mitigation requirements for temporary impacts on priority habitats (i.e. the bank side habitat recorded in the desk study as potential coastal floodplain grazing marsh by Skerth Drain) as the embedded mitigation and mitigation in relation to breeding and wintering birds will be implemented.

4.7.26 No hedge removal notices are required.

Habitats

4.7.27 In addition to the embedded mitigation set out in the Designated Sites and Habitats Appendix, the following mitigation strategy will be adopted for habitats within and adjacent to the scheme. Where there are no impacts to habitats or habitats are identified to not be of ecological importance, no mitigation is required, and these habitats are not referred to further within this document.

4.7.28 The Landscape Restoration Plan will provide details of the landscape mitigation measures to be implemented along the scheme, to enhance biodiversity where possible through careful selection of replanting species and locations, and translocation of habitats wherever possible

Route Section 1

4.7.29 To avoid, minimise and mitigate temporary impacts to important ecological features the embedded mitigation for hedgerows, woodland, scrub with trees, trees, water courses and drains will be adhered to, as set out in the Designated Sites and Habitats Appendix (9). The embedded mitigation relates to:

- Pollution prevention;
- Demarcation of working areas/ retained habitat;
- Root protection zones;
- Micro siting works away from important features;
- Tool box talks;
- ECoW attendance at the start of all works;
- Timing works to minimise impacts;
- Removal of habitats following prescribed methods;
- Translocation of habitats wherever possible;
- Adherence to biosecurity measures;
- Replanting/ translocation, in line with a landscape restoration plan, using local, and where possible organic, native species; and
- Monitoring and management of replacement habitat in line with the landscape restoration plan.

4.7.30 Aquatic plant surveys noted the presence of Schedule 9 invasive Nuttall's pondweed in several drains in route sections 3 and 4. It is likely the species is also present in drains in route sections 1. All works will aim to avoid the plant, to ensure no spreading occurs. Biosecurity measures set out in the Designated Sites and Habitats Appendix (9), such as checking, cleaning and drying boots and wheels, will be followed carefully in these areas. Where works must proceed in vicinity to the plant, a specialist contractor will be needed to treat and remove Nuttall's pondweed in that area prior to works.

4.7.31 There are no operational or permanent impacts to habitats arising from the scheme.

4.7.32 To avoid, minimise and mitigate longer term impacts to the important habitats, the following embedded mitigation will be implemented, as set out in the Designated Sites and Habitats Appendix (9):

- Hedgerows: Assuming a temporary haul road crossing width of 10 m, approximately 160 m of hedgerow would require removal. The habitat reinstatement plan will deliver in-situ replacement (or translocation) of the hedgerow habitat following construction, using a species mix comprising field maple, dogwood, hazel, hawthorn, spindle, blackthorn, elder and holly. The gap-planting can be expected establish and mature after approximately 5 years and hedgerows will be returned to their pre-construction functionality.
- Woodland and Trees: One area of linear broad-leaved plantation woodland is crossed by the scheme at the Sutton Branch Line Walkway and Conservation Area. Construction will result in the loss of 0.05 ha of this habitat as this will be crossed via open cut methods. Up to 22 trees scattered across the route will be lost, but the majority of these trees will be retained through micro-siting during construction. There may be trees within the scrub habitat and Lidar data will be reviewed so these trees can be identified and protected where possible. The permanent easement means that woodland and tree habitats cannot be replaced in-situ. The reinstatement plan allows for replacement of woodland and tree habitats (with translocation where possible) elsewhere within the application boundary. These areas will be planted up during the reinstatement phase of construction, 10 m from the proposed cable route and they will reach a height of 7–10 m after 15 years.

It is possible that woodland and trees will be affected by the scheme for preconstruction land drainage works. Tree removal will be avoided where possible, however where removal is unavoidable, a tracked vehicle, requiring a 5 m wide working area (reduced from the standard 10m), will install an unperforated drainage pipe within an 8" trench (no soil stripping required) which will then be backfilled. Use of unperforated drainage pipe will enable replanting of shallow rooted native trees and shrubs over the cleared area which would be re-established within 5-10 years.

- Watercourses: Route section 1 crosses 17 watercourses and field drains. The majority of these features will be crossed using trenchless measures which will impact bankside habitats. Two drains will be crossed using open cut measures. These two drains and a further eleven trenchless crossings

will also require a temporary culvert. The rest of the drains and watercourses will be crossed using a temporary bridge. It is probable that only a 10 m working width for watercourse crossings and culverts will be required, therefore it is possible approximately 170 m of bankside habitat will be temporarily lost as a result of construction. However, bankside habitats are abundant within the local area and the temporary loss of approximately 170 m will not undermine the ecological function of the drains with respect to dispersal of flora or movement of fauna. Once construction is completed, watercourse bank habitats will be left to recolonise naturally so as not to introduce non-naturalised or invasive species from the outside area. If bank and soil stabilisation is required, this will be provided by the use of geotextile or coir matting. The bankside and aquatic vegetation can expect to be re-established within 2-4 years. It is probable that permanent outfalls will be installed in association with the scheme design for pre-construction land drainage works. The small area of habitat permanently lost as a result of construction is estimated to be approximately 3m² and bankside habitats are abundant within the local area.

Route Section 2

4.7.33 To avoid, minimise and mitigate temporary impacts to important ecological features embedded mitigation for hedgerows, woodland, scrub with trees, trees, water courses and drains will be adhered to, as set out in the Designated Sites and Habitats Appendix (9). The embedded mitigation relates to:

- Pollution prevention;
- Demarcation of working areas/ retained habitat;
- Root protection zones;
- Micro siting works away from important features,
- Tool box talks;
- ECoW attendance at the start of all works;
- Timing works to minimise impacts;
- Removal of habitats following prescribed methods;
- Translocation of habitats wherever possible;
- Adherence to biosecurity measures;
- Replanting/ translocation, in line with a landscape restoration plan, using local, and where possible organic, native species; and
- Monitoring and management of replacement habitat in line with the landscape restoration plan.

4.7.34 Aquatic plant surveys noted the presence of Schedule 9 invasive Nuttall's pondweed in several drains in route section 3 and 4. It is likely the species is also present in drains in route sections 2. All works will aim to avoid the plant, to ensure it is not caused to spread. Biosecurity measures set out in the Designated Sites and Habitats Appendix (9), such as checking, cleaning and drying boots and wheels, will be followed carefully in these areas. Where works must proceed in

vicinity to the plant a specialist contractor will be needed to treat and remove Nuttall's pondweed in that area prior to works.

4.7.35 There are no operational or permanent Impacts habitats arising from the scheme.

4.7.36 To avoid, minimise and mitigate longer term impacts to the important habitats the following embedded mitigation will be implemented, as set out in the Designated Sites and Habitats Appendix (9):

- Hedgerows Assuming a temporary haul road crossing width of 10 m, it is probable that approximately 190 m of hedgerow would require removal. The habitat reinstatement plan allows for in-situ replacement (or translocation) of the hedgerow habitat following construction, using a species mix comprising 40 % hawthorn and 15 % each of field maple, hazel, blackthorn and dog rose. These can be expected to have established and matured after approximately 5 years and hedgerows will then be returned to their pre-construction functionality.
- Woodland and Trees: One area of broad-leaved plantation woodland is crossed by route section 2. It is not anticipated that this woodland will be impacted by the construction of the DC Cable Route. However, it is possible that construction will result in the loss of 0.11 ha of this habitat. A maximum of 214 trees scattered across the route will be lost as a result of construction of the proposed DC cable route. There may be trees within the scrub habitat and Lidar data will be reviewed so these trees can be identified and protected where possible. It is anticipated that the majority of these trees will be retained through micro-siting during construction. The permanent easement means that woodland and tree habitats cannot be replaced in-situ. The reinstatement plan allows for replacement (or translocation) of woodland and tree habitats elsewhere within the application boundary. These areas will be planted up during the reinstatement phase of construction, 10 m from the proposed cable route and they will reach a height of 7–10 m after 15 years.

It is possible that woodland and trees will be affected by the scheme for preconstruction land drainage. Tree removal will be avoided where possible, however where removal is unavoidable, a tracked vehicle, requiring a 5 m wide working area (reduced from the standard 10m), will install an unperforated drainage pipe within an 8" trench (no soil stripping required) which will then be backfilled. Use of unperforated drainage pipe will enable replanting of shallow rooted native trees and shrubs over the cleared area which would be re-established within 5-10 years.

- Watercourses: According to the crossing schedule route section 2 crosses six watercourses and field drains. One of these drains will be crossed using open cut measures and will also require a temporary culvert. The rest of the drains and watercourses will be crossed using a temporary bridge. It is probable that only a 10 m working width for watercourse crossings and culverts will be required, therefore it is possible approximately 60 m of bankside habitat will be temporarily lost as a result of construction. However, bankside habitats are abundant within the local area and the temporary loss of approximately 60 m will not undermine the ecological function of the drains with respect to dispersal of flora or movement of

fauna. Where culverts are installed for temporary access, disruption to the flow of watercourses during construction will be short-term with flow reinstated once culverts are in place and is extremely unlikely to have a significant effect on the ecological features of these watercourses.

Once construction is completed, watercourse bank habitats will be left to recolonise naturally so as not to introduce non-naturalised or invasive species from the outside area. If bank and soil stabilisation is required, this will be provided by the use of geotextile or coir matting. The bankside and aquatic vegetation can expect to be re-established within 2-4 years. It is probable that permanent outfalls will be installed in association with the base scheme design for pre-construction land drainage. The small area of habitat permanently lost as a result of construction is estimated to be approximately 3m² and bankside habitats are abundant within the local area.

Route Section 3

4.7.37 To avoid, minimise and mitigate temporary impacts to important ecological features embedded mitigation for hedgerows, woodland, scrub with trees, trees, water courses and drains will be adhered to, as set out in the Designated Sites and Habitats Appendix (9). The embedded mitigation relates to:

- Pollution prevention;
- Demarcation of working areas/ retained habitat;
- Root protection zones;
- Micro siting works away from important features,
- Tool box talks;
- ECoW attendance at the start of all works;
- Timing works to minimise impacts;
- Removal of habitats following prescribed methods;
- Translocation of habitats wherever possible;
- Adherence to biosecurity measures;
- Replanting/ translocation, in line with a landscape restoration plan, using local, native species and where possible organic ones; and
- Monitoring and management of replacement habitat in line with the landscape restoration plan.

4.7.38 Aquatic plant surveys noted the presence of Schedule 9 invasive Nuttall's pondweed in one drain in route section 3. It is likely the species is present in many of the unsurveyed drains as well. All works will aim to avoid the plant, to ensure it does not unintentionally spread the plant. . Biosecurity measures set out in the Designated Sites and Habitats Appendix (9), such as checking, cleaning and drying boots and wheels, will be followed carefully in these areas. Where works must proceed in vicinity to the plant a specialist contractor will be needed to treat and remove Nuttall's pondweed in that area prior to works.

4.7.39 There are no permanent impacts on habitats arising from the scheme.

4.7.40 To avoid, minimise and mitigate longer term impacts to the important habitats the following embedded mitigation will be implemented, as set out in the Designated Sites and Habitats Appendix (9):

- **Hedgerows:** Assuming a temporary haul road crossing width of 10 m, it is probable that approximately 190 m of hedgerow would require removal. The habitat reinstatement plan allows for in-situ replacement (or translocation) of the hedgerow habitat following construction, using a species mix comprising 40 % hawthorn and 15 % each of field maple, hazel, blackthorn and dog rose. These can be expected to have established and matured after approximately 5 years and hedgerows will be returned to their pre-construction functionality.
- **Woodland and Trees:** Three blocks of semi-natural broad-leaved woodland occur along route section 3. It is possible that construction will result in the loss of 0.01 ha of this habitat. A maximum of 274 trees scattered across the route will be lost as a result of construction of the proposed DC cable route. There may be trees within the scrub habitat and Lidar data will be reviewed so these trees can be identified and protected where possible. However, it is anticipated that the majority of these trees will be retained through micro-siting during construction. The permanent easement means that woodland and tree habitats cannot be replaced in situ. The reinstatement plan allows for replacement (or translocation) of woodland and tree habitats lost as a result of construction and will enable tree stock to be replaced elsewhere within the application boundary. These areas will be planted up during the reinstatement phase of construction 10 m from the proposed cable route and it is near certain that they will reach a height of 7–10 m after 15 years.

It is possible that woodland and trees will be affected by the scheme for preconstruction land drainage works. Tree removal will be avoided where possible, however where removal is unavoidable, a tracked vehicle, requiring a 5 m wide working area (reduced from the standard 10m), will install an unperforated drainage pipe within an 8" trench (no soil stripping required) which will then be backfilled. Use of unperforated drainage pipe will enable replanting of shallow rooted native trees and shrubs over the cleared area which would be re-established within 5-10 years.

- **Watercourses:** Route section 3 crosses 28 watercourses and field drains. All of these features will be crossed using trenchless measures which will impact bankside habitats. Of these drains nine will also require a temporary culvert. A further 18 drains including one watercourse will also be crossed using a temporary bridge. The River Witham is noted as a Restricted Crossing. It is possible approximately 280m of bankside habitat will be temporarily lost as a result of construction. However, bankside habitats are abundant within the local area and the temporary loss of approximately 280 m will not undermine the ecological function of the drains with respect to dispersal of flora or movement of fauna.

Once construction is completed, watercourse bank habitats will be left to recolonise naturally so as not to introduce non-naturalised or invasive species from the outside area. If bank and soil stabilisation is required, this will be provided by the use of geotextile or coir matting. It is near certain

that bankside and aquatic vegetation can expect to be re-established within 2-4 years.

It is probable that permanent outfalls will be installed in association with the scheme for pre-construction land drainage works. The small area of habitat permanently lost as a result of construction is estimated to be approximately 3m² and bankside habitats are abundant within the local area.

Route Section 4

- 4.7.41 To avoid, minimise and mitigate temporary impacts to important ecological features, embedded mitigation for hedgerows, woodland, scrub with trees, trees, water courses and drains will be adhered to, as set out in the Designated Sites and Habitats Appendix (9). The embedded mitigation relates to:
- Pollution prevention;
 - Demarcation of working areas/ retained habitat;
 - Root protection zones;
 - Micro siting works away from important features;
 - Tool box talks;
 - ECoW attendance at the start of all works;
 - Timing works to minimise impacts;
 - Removal of habitats following prescribed methods;
 - Translocation of habitats wherever possible;
 - Adherence to biosecurity measures;
 - Replanting/ translocation, in line with a landscape restoration plan, using local, native species and where possible organic ones; and
 - Monitoring and management of replacement habitat in line with the landscape restoration plan.
- 4.7.42 Aquatic plant surveys noted the presence of Schedule 9 invasive Nuttall's pondweed in many of the drains in route section 4. It is likely the species is present in some of the unsurveyed drains as well. All works will aim to avoid the plant, to ensure it is not caused to spread. Biosecurity measures set out in the Designated Sites and Habitats Appendix (9), such as checking, cleaning and drying boots and wheels, will be followed carefully in these areas. Where works must proceed in vicinity to the plant a specialist contractor will be needed to treat and remove Nuttall's pondweed in that area prior to works.
- 4.7.43 There are no operational works proposed in this location and no permanent impacts on this habitat will arise from the installation of the cable.
- 4.7.44 To avoid, minimise and mitigate longer term impacts to the important habitats the following embedded mitigation will be implemented, as set out in the Designated Sites and Habitats Appendix (9):
- Hedgerows: Assuming a temporary haul road crossing width of 10 m, it is probable that approximately 30 m of hedgerow would require removal. The habitat reinstatement plan allows for in-situ replacement (or translocation)

of the hedgerow habitat following construction, using a species mix comprising 40 % hawthorn and 15 % each of field maple, hazel, blackthorn and dog rose. These can be expected to have established and matured after approximately 5 years and hedgerows will be returned to their pre-construction functionality.

- Woodland and Trees: A maximum of 98 trees scattered across the route will be lost as a result of construction of the proposed DC cable route. There may be trees within the scrub habitat and Lidar data will be reviewed so these trees can be identified and protected where possible. It is anticipated that the majority of these trees will be retained through micro-siting during construction. The permanent easement means that woodland and tree habitats cannot be replaced in situ. The reinstatement plan allows for replacement (or translocation) of woodland and tree habitats lost as a result of construction and will enable tree stock to be replaced elsewhere within the application boundary. These areas will be planted up during the reinstatement phase of construction 10 m from the proposed cable route and it is near certain that they will reach a height of 7–10 m after 15 years.

It is possible that woodland and trees will be affected by the scheme for preconstruction land drainage works. It is certain that tree removal will be avoided where possible, however where removal is unavoidable, a tracked vehicle, requiring a 5 m wide working area (reduced from the standard 10m), will install an unperforated drainage pipe within an 8" trench (no soil stripping required) which will then be backfilled. Use of unperforated drainage pipe will enable replanting of shallow rooted native trees and shrubs over the cleared area which would be re-established within 5-10 years.

- Watercourses: Where culverts are installed for temporary access, disruption to the flow of watercourses during construction will be short-term with flow reinstated once culverts are in place, consequently, it is extremely unlikely to have a significant effect on the ecological features of these watercourses. Therefore, the effects will be not significant. Route section 4 crosses 20 watercourses and field drains. The majority of these features will be crossed using trenchless measures and will not impact the watercourse/drain habitats. One of these drains will be crossed using open cut measures and will also require a temporary bridge crossing. A further 17 drains including one watercourse will also be crossed using a temporary bridge. Two other drains will require a temporary culvert and South Forty Foot Drain is noted as a Restricted Crossing.

It is probable that only a 10 m working width for watercourse crossings and culverts will be required, therefore it is possible approximately 200 m of bankside habitat will be temporarily lost as a result of construction. However, bankside habitats are abundant within the local area and the temporary loss of approximately 200 m will not undermine the ecological function of the drains, with respect to dispersal of flora or movement of fauna. Once construction is completed, watercourse bank habitats will be left to recolonise naturally so as not to introduce non-naturalised or invasive species from the outside area. If bank and soil stabilisation is required, this will be provided by the use of geotextile or coir matting. It is near certain

that bankside and aquatic vegetation can expect to be re-established within 2-4 years.

It is probable that permanent outfalls will be installed in association with the scheme for pre-construction land drainage works. The small area of habitat permanently lost as a result of construction is estimated to be approximately 3m² and bankside habitats are abundant within the local area.

4.8 Reptiles

4.8.1 As there is the potential for reptiles to be present within some areas of the project, Reasonable Avoidance Measures (RAMs) will be implemented during site clearance works to ensure no killing or injury to individual reptiles. This will be delivered through an on-site PMW that will detail the following mitigation strategy:

- All vegetation removal that is deemed to be suitable for reptiles and over 150 mm to comprise a staged clearance. This will include the same areas identified previously in this document for great crested newts.
- Initial strimming will include vegetation removal to 300 mm (this will not be possible for vegetation between 150mm and 300 mm). This will be followed by a later second cut to 150 mm using hand-tools. All vegetation clearance should be in one direction (allowing reptiles and small mammals to move out of harm's way) under the supervision of an ECoW.
- After the cutting to 150 mm, the ECoW will undertake a hand search to confirm the absence of reptiles (areas where great crested newts are potentially present will be left for a period of 24 hrs after the cut before the ECoW can complete the hand search). During this search the ECoW will ensure any suitable refugia is dismantled and removed from the working area.
- Following the hand search by the ECoW, vegetation will be strimmed to ground level, at which point full site clearance and levelling will then be undertaken.
- Any reptile or small mammals found during hand searching will be removed to alternative suitable habitat by the ECoW. If any great crested newts are found during the search, all works must stop, and the mitigation strategy updated accordingly.
- Site clearance affecting suitable reptile hibernation features (identified by the ECoW) will avoid the hibernation period (November to early March inclusive).
- Smaller excavations within the base scheme design will be covered overnight to prevent entrapment of any animal including reptile. If any open excavations are left uncovered these will be inspected by the ECoW at the start of each working day to ensure no individuals are present, and to remove any that are trapped to a safe location, before works commence.
- In order to prevent reptiles using subsoil and topsoil piles for refuge or hibernation, the surfaces of the piles will be tamped down and consolidated to ensure individuals cannot access them. In addition, stored materials which could be used for refuge or hibernation by reptiles will be either stored on hard standing / bare ground and will remain at least 10m from features that are

likely to be used by reptiles or stored off the ground on pallets to prevent their access.

- 4.8.2 As mentioned above these measures will ensure the works remain legally compliant and will also serve to prevent killing or injury to other fauna, amphibians and small mammals.

4.9 Brown Hare

- 4.9.1 As there is the potential for brown hare leverets to be present within the project, RAMs will be implemented during site clearance works to ensure no killing or injury to individuals. This will be delivered through an on-site PMW that will detail the following mitigation strategy:

- Clearance works must ensure no killing or injury to individuals by a walkover of the working footprint by an ECoW, prior to initial site clearance. This will enable leverets (the young) to be located and flushed out of the area. Any adult hares within the working footprint would also disperse due to the presence of human activity.

4.10 Invasive Non-Native Species (Including Nuttall's Pondweed)

- 4.10.1 Five drains / ditches have been identified to contain the invasive species Nuttall's pondweed, and due to the network of drains being linked a precautionary approach should be taken when working within or in close proximity to water to ensure legal compliance with legislation that prevents the spread of this Schedule 9 species. This will be delivered a through an on-site PMW that will detail the following mitigation strategy:

- Before any works take place within a watercourse, the ECoW must do a thorough pre-commencement search of the area to ensure the plant species is not present.
- Where the plant is known to be located or is identified during the pre-commencement search the advice from a specialist contractor must be sought, before transgression of any machinery or site personnel into the water.
- Where works are proposed within 10m of any watercourse that the plant is known to be present, but no works within the water are proposed, then the ECoW will need to supervise these works and fencing may be necessary to ensure no accidental transgression of personnel or site machinery into the water.

4.11 Pollution Prevention and Emergency Incident Response (PPEIRP)

4.11.1 This EMS is developed for the Viking Link UK Onshore Project, as a requirement of the relevant planning conditions attached to the full planning permissions granted from the relevant local planning authorities.

4.11.2 The EMS has been produced as to also promote and generally be in accordance with the Pollution Prevention and Emergency Incident Response Plan, document reference VKL-BB-ENV-00-PL-EN-20470.

4.11.3 A range of measures are outlined in the PPEIRP to ensure that environmental pollution prevention and emergency response procedures are developed and implemented appropriate to the potential risk of the specific works being undertaken. A set of control measures and responses to prevent environmental pollution incidents from work activities are outlined below:

- All contractor site personnel will be made aware of potential pollution hazards and risks associated with their work activities through the PPEIRP, Risk Assessment & Method Statements (RAMS) and daily risk assessments.
- Appropriate inductions and training will be provided by the Environmental Advisor prior to the commencement of major construction works on site for all site personnel.
- Balfour Beatty will detail pollution incident control measures in the Environmental Incident Control Handbook (EICH) and produce two levels of plans (compound areas and cable route work areas) to identify essential features.
- The Eliminate, Replace, Isolate, Controls, PPE and Discipline (ERIC PD) method will be adopted throughout the Project and seeks to minimise risk and set required control measures. In the event of abnormal conditions i.e. weather, works will stop and only commence if a Safe System of Work is in place.

4.11.4 All works will be in accordance with the Environmental Agency Pollution Prevention Guidance (PPG) as fully detailed within the project's PPEIRP [VKL-BB-ENV-00-PL-EN-20470]. The EMP can be read in conjunction with the above document.

4.12 Fish

4.12.1 Where de-watering is undertaken at watercourse crossings e.g. for the installation of temporary culverts, dams either side of the de-watered working area (sandbags, piling or other material) will be carefully installed under supervision of the ECoW to avoid killing or injury of any fish that might be present. Fish rescue (netting) will be carried out as deemed appropriate by the ECoW, in the latter stages of de-watering during installation/removal of water crossings. The rescue will be undertaken by specialists who are accredited under the 'Performing Section 30 Fish Health Checks Accreditation Scheme' (to meet the requirements of the EA under Section 30 of the Salmon & Freshwater Fisheries Act 1975) (Ref 10-32), and all data collated and submitted to the EA. Fish will be released into the adjacent channel (up or downstream release to be determined by the ECoW on a

case by case basis depending on the connectivity of the watercourse/tributary and the time of year).

- 4.12.2 Migratory species such as the European eel and brown/sea trout are particularly sensitive during the migration seasons of spring and autumn. If open-cut construction across watercourses should fall within these periods, migration may be delayed in the short-term whilst dry working is underway. Although, eels are known to travel overland for moderate distances, it is unlikely that they would cross the construction working width, which being stripped of vegetation would not provide suitable habitat for eels to move across. The drain which will be open cut is described as small and possibly not even present, subject to survey, and therefore is extremely unlikely to support either fish species. Therefore, it is certain that possible fragmentation effects during construction activities on the local European eel and brown/sea trout population are not significant.

5 APPENDIX – WATER VOLE

5.1 General Method Statement for Species Protection and Other Mitigation Measures

5.1.1 Following a risk assessment of all potentially damaging pre-commencement, site clearance and construction activities, a series of measures are proposed to ensure legislative compliance and no significant impact to water vole as a result of the scheme. These include:

- Additional surveys;
- Pre-construction surveys;
- Habitat management;
- Construction ecological support;
- Establishing BPZ and working under PMWs;
- Displacement;
- Mink control; and
- Post development monitoring and maintenance.

Additional water vole surveys

5.1.2 A number of watercourses did not have access in 2017 or 2019 to carry out water vole surveys, and some in 2019 only had access for one of the two required surveys. Where access can be agreed, these watercourses that cross the scheme and have potential to be impacted by HDD and/or haul road crossings will be surveyed for water vole presence/absence in spring 2020 to inform and update the water vole mitigation strategy. This includes the ditches in **Table 41**. Watercourses that do not cross the scheme and that will not be impacted by HDD and/or haul road crossings do not require further survey, and any works adjacent will comply with the PMW and BPZ requirements specified below (this includes Ditch 299 in route section 3 and Ditches 783, 477, 480, 75, 539, 736, 79, 549, 546 and 719 in route section 4).

Table 41: Additional survey requirements for water vole

Route section	Watercourse / Ditch Number
1	Ditch 123 (which crosses the scheme) only had one survey in 2019. Water vole was not recorded but this ditch joins ditch 144 in the centre of the scheme where water voles are present.
2	In route section 2 the watercourse at HD 27 is not labelled as a watercourse in the ES or 2019 survey report and has never been surveyed for water vole but it appears to be a watercourse on aerial imagery and on the phase 1 habitat mapping. A survey of this location is proposed where survey data is missing to ensure robust survey data.

3	<p>Ditch 292 (which crosses the scheme) only had one survey in 2019. Water vole was not recorded but this ditch joins D300 where water voles are present.</p> <p>Ditches 45, 336, 340, 344 (which all cross the scheme) only had one survey in 2019. Water vole was not recorded but a second survey is required.</p> <p>Ditches 447 (which crosses the scheme) only had one survey in 2019. Water vole was not recorded but was found to be present in 2017. Second survey is needed.</p>
4	<p>Ditches 473, 481, 496, 542, 545 and 737 (which crosses the scheme) only had one survey in 2019. Water vole was not recorded but a second survey is required.</p> <p>Ditches 552, 551, 84 and 630 (which all cross the scheme) have never had access for survey and require 2 survey visits.</p> <p>Potential ditches under HDD102, HDD101, HDD104, HDD100, HDD99, HDD98 (not labelled as ditches in the ES, phase 1 map or 2019 survey report and have never been surveyed but look like ditches on aerial imagery). They fall within the area labelled as 'no access' on the 2019 survey maps. A survey of this location is proposed in spring / summer 2020 to ensure robust survey data.</p> <p>HDD104 is not labelled as a ditch in the water vole section of ES or 2019 water vole survey report but is recorded as a wet ditch on the 2019 vegetation surveys technical report and looks like a ditch on aerial imagery. A survey of this location is proposed in spring / summer 2020 to ensure robust survey data.</p>

- 5.1.3 Watercourses where water voles were present in 2019 (or 2020 following additional surveys) that cross the Scheme and will likely require displacement, will be resurveyed including 200 m up and downstream of the works footprint in spring 2020 with the aim of scoping receptor locations for displacement. The survey will look for presence or likely absence of water voles, the habitat suitability as a displacement receptor site and what habitat management may be required to ensure the receptor area remains viable (e.g. scrub removal). This information will be required to inform any conservation licence application to be submitted to Natural England. If the adjacent habitat is not suitable for displaced water voles, vegetation management will be required to create suitable conditions, as stated in the ES. Furthermore, this strategy may require revising to incorporate other methods of providing overall habitat enhancement (e.g. habitat creation within the scheme). Mitigation and enhancement surveys could be combined with pre-construction surveys to reduce the number of site visits.

Habitat Management

- 5.1.4 Within the areas of habitat up or downstream identified in the habitat suitability surveys as suitable to support displaced water voles, habitat management measures will be implemented where opportunities are available and practicable. This will be determined by the ecologist following the pre- construction surveys and may include:
- Scrub removal to stimulate growth of bank-side and aquatic vegetation. This will increase the complexity of vegetation types and offer more reliable and sustained food resources and cover; Ditch maintenance operations e.g. to remove silt to improve the availability of standing water and vegetative growth, and management of the aquatic marginal vegetation; and

- Fencing of the riparian corridor to improve habitat quality, e.g. stop poaching if livestock are present or stop farming practices e.g. veg clearance too close to riparian zone.

- 5.1.5 Habitat management measures will be carried out prior to construction and any water vole displacement to improve the habitat quality in these areas (as required by the licence) and ensure the habitat is suitable to support the displaced water voles. This could be supplemented by pre-established vegetation planting (plug plants or coir rolls) to speed up the process. However, there may be a required amount of time for these plants to establish before displacement can occur.

Pre-construction surveys

- 5.1.6 As water vole populations can vary significantly year on year, a final pre-construction survey will be undertaken on all ditches or watercourses that may be impacted by the HDD or haul road crossings, to update the information on the individual populations which will be affected by the scheme and to inform a licence. Watercourses that do not cross the scheme and that will not be impacted by HDD and/or haul road crossings do not require further survey and any works adjacent will comply with the PMW and BPZ requirements specified below. Pre-construction surveys will be carried out 2 months prior to the construction commencing, starting in route section 1 (between June and September 2020 inclusive). Pre construction surveys are carried out 2 months prior to construction to allow any mitigation or licensing requirements to be implemented.

- 5.1.7 Each pre-construction walkover will cover all watercourses within the footprint of the scheme plus 10 m upstream and downstream of the works where possible, to determine where water vole continue to be present, have colonised or are likely absent. If water vole is found to be present the survey will then be extended to 200 m up and downstream of the works to gather required data to inform the A29 conservation licence application. Any unassessed water bodies in the current baseline survey will be included in the pre-construction surveys where possible and practical.

Vegetation clearance at ditches where water voles are likely absent

- 5.1.8 Where no water vole burrows are identified during the pre-commencement survey, vegetation control will be undertaken to dissuade water voles from colonising the working area prior to commencement. Vegetation within the ditch and on both banks will be strimmed to bare ground (including the removal of the aquatic marginal vegetation, if present), at least to the top of the bank, and where tall vegetation extends beyond this point, up to 5 m from the top of the bank. Within the ditch, strimming will extend 5 m up and downstream from the working area. Arisings will be removed from the cleared area and stored more than 5 m from the top of the ditch banks. The areas will then be maintained (i.e. down to bare earth) on a regular basis to ensure that the habitat remains unsuitable for water voles. Vegetation within the working area will be regularly strimmed to ensure that water voles are dissuaded from colonising the working area.
- 5.1.9 Although the vegetation removal works are not “licensable”, they will be undertaken in accordance with best practice under a PMW and these areas will be monitored regularly for signs of water voles throughout the works.

Identification of Biodiversity Protection Zones (BPZ) and construction ecological support

- 5.1.10 An initial 10 m buffer (which may be reduced to 5m for specific tasks after on-site ecological advice) will be in place at all watercourses where water vole presence has been found in the 2019 surveys and the 2020 pre-construction surveys (until displacement has been carried out successfully where applicable). These areas will be protected from construction activity, vehicle movements and storage of materials through the installation of fencing and signage to prevent encroachment if works are proposed in close proximity.
- 5.1.11 On-site ecological support will be required throughout the period of construction works, whereby an Ecological Clerk of Works will carry out regular checks around watercourses to ensure the BPZ are being adhered to.
- 5.1.12 Where construction works are required within 10 m BPZ (e.g. HDD may encroach to within 9 m of watercourses/ditches) full on-site ecological support and watching brief will be required).

Displacement (under licence)

- 5.1.13 The Water Vole Mitigation Handbook⁶⁰ considers that displacement and vegetation management is appropriate for distances of up to 50 m, and it has been confirmed that the maximum span of these works will be 20 m. This is because water voles show high fidelity to their territories and therefore only small areas sections of habitat are suitable for displacement. In order to be effective, displacement methods must be implemented in Spring (February to mid-April) or Autumn (August to mid-October) to ensure that animals are moved either prior to young being born, or once young are independent for maximum effectiveness.
- 5.1.14 Prior to any displacement being undertaken, an assessment of adjoining habitat will be undertaken by an ecologist (during the pre-construction survey) in order to ensure the suitability of the adjacent habitat to support displaced water vole. This will include consideration of water quality, existing water vole population and presence of predatory species. If adjacent vegetation is not considered to be suitable, vegetation management will be required to create suitable conditions.
- 5.1.15 An ecologist will then mark the presence of all water vole burrows within the working area and 5 m buffer in each direction along the watercourse.
- 5.1.16 The working area and buffer will then be strimmed to bare ground, with vegetation being cut to the top of the bank, or where longer vegetation is present, 5 m from the top of the bank/edge of riparian vegetation to ensure vegetation is removed around all burrow entrances. Arisings will be removed from the strimmed area. Immediately following vegetation strimming the marked burrows will be inspected by an ecologist to ensure that burrows have not been blocked during vegetation cutting. Daily monitoring of the burrows will be undertaken for, a minimum of three days, until such a time that no evidence of water vole presence has been identified.
- 5.1.17 Burrows will then be removed using destructive searching methods. Burrows will be excavated using hand tools, either by an ecologist or under the supervision of an ecologist. Any animals captured will be transferred to adjacent suitable habitats or allowed to disperse. Following burrow destruction, any remaining vegetation will

⁶⁰ Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016). *The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series)*. Eds. Fiona Matherws and Paul Chanin. The Mammal Society, London

be stripped using a machine, under the supervision of an ecologist. Any water voles disturbed during this process will be captured and moved to adjacent habitats. The cleared area will be monitored for 2-4 hours for any further animal movements. Any water voles identified during this period will be captured and transferred to suitable adjacent habitats.

- 5.1.18 Following completion of the destructive search, installation works should be undertaken as soon as possible, or where this is not possible, water voles will continue to be excluded from the area through regular repeat vegetation control, or through installation of water vole proof fencing, where conditions allow.
- 5.1.19 There is potential for water voles to be impacted during removal of culverts and bridges used for haul road crossings and therefore a repeat of the displacement methods will be undertaken for 10 m each side of the crossing, prior to removal.
- 5.1.20 Any excavations adjacent to watercourses that cannot be boarded or fenced overnight will have ramps installed to allow any water vole that may become trapped to escape.
- 5.1.21 These measures will be effective upon commencement of construction.

Mink control strategy

- 5.1.22 The American mink is an invasive, non-native species that are widespread across England. The mink is the main predator of water voles in the UK and is listed in Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) as an invasive species. The Lincolnshire Biodiversity Action Plan⁶¹ promotes humane mink control as an essential tool in water vole conservation. Presence of Mink across the scheme is not mentioned in the 2017 ES or the 2019 survey report. NGVL has been working with the Lincolnshire Wildlife Trust and the Greater Lincolnshire Nature Partnership to identify potential mink control strategies for the project, relevant to the planning conditions that need to be approved. It has been agreed that rather than development of a bespoke scheme for the project, which may ultimately be unsuccessful once the project has completed construction, NGVL has agreed to contribute funding to a wider mink control pilot project that will look at more efficient means of controlling Mink. If successful, this will be rolled out more widely in the County. A letter of comfort has been written by the Wildlife Trust confirming this arrangement and the measures that the funding will be used to implement.
- 5.1.23 Should the funding mechanism, with the above partners, for any reason not be achieved, then the project will seek to develop a bespoke Mink Control Plan (not yet produced) which will incorporate the following methods:
- Mink rafts will be installed to monitor and manage the mink within the locality of the positive water vole watercourses. If mink signs i.e. footprints and/or scat are noted on the rafts a live trap will be installed within the raft (fitted with an otter guard). Traps are checked once every 24 hours, and once captured, mink are dispatched humanely using an air rifle.
 - Mink monitoring and trapping will continue for the duration of water vole monitoring of the displacement receptor areas (i.e. for three years post construction). If mink are repeatedly captured during this period, the

⁶¹ Lincolnshire Biodiversity Action Plan, 2011-2020, 3rd Edition – Lincolnshire Biodiversity Partnership

programme may need to be extended to include a wider area of the river catchment up to a substantial barrier to the migration of mink into the area until mink are eradicated and can no longer colonise the catchment. This mink control will contribute towards the existing mink control programme within Lincolnshire.

Re-instatement and Management

- 5.1.24 Post construction, once the temporary culverts/bridges have been removed the ditches will be re-instated to ensure suitability for water vole inhabitancy. The adjacent up and downstream sections of the ditches will undergo habitat management to improve the overall quality of the habitat for water voles as required in the A29 Conservation Licence. Re-instatement and habitat management may include scrub clearance, bank reprofiling and reseedling to ensure good quality habitat for water voles.
- 5.1.25 Post construction, the displacement receptor areas up and down stream of the works area will be maintained to ensure suitability for water vole inhabitancy and may include the following:
- Scrub removal to stimulate growth of bank-side and aquatic vegetation. This will increase the complexity of vegetation types and offer more reliable and sustained food resources and cover; and
 - Ditch maintenance operations to remove silt to improve the availability of standing water and vegetative growth, and management of the aquatic marginal vegetation.

Post Construction Monitoring

- 5.1.26 Six months after the development is complete, a visit to each area will be undertaken to monitor the establishment and development of vegetation along the banks. In doing so, any further management (such as scrub clearance or reseedling) can be implemented if required to ensure vegetation suitability for food and coverage for water vole.
- 5.1.27 Up to five years post construction monitoring (following removal of temporary haul roads/culverts) will be carried out along all water vole positive watercourses within the scheme and up to 50m from the scheme boundary along all displacement receptor areas. Water vole surveys will be carried out between mid-April to June or July to September. It is proposed that these surveys are completed in year 1, year 3 and year 5 (unless Natural England state otherwise).
- 5.1.28

Timetable of Mitigation Based on Construction Timetable

The water vole works schedule details the timetable of mitigation requirements against the construction timetable see **Table 42**.

Table 42: Timetable of Water Vole Mitigation Based on Construction Timetable

	2020										2021												2022												2023				
	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	
Preparation																																							
Additional Surveys	X	X																																					
Pre-Construction Surveys - Section 1 to 4		X	X	X																																			
Licence Submission				X																																			
Licence Issued					X																																		
Habitat enhancement (for works pre-February 2021)																																							
Habitat Enhancement in Displacement Receptor Areas (under PMW when prior to licence)				X	X	X	X																																
Vegetation Clearance Along Section of Watercourse in Likely Absent Watercourses				X	X	X	X																																
Habitat enhancement (for works post-February 2021)																																							
Habitat Enhancement Displacement Receptor Areas (under PMW when prior to licence)								X	X	X	X	X	X	X	X	X	X																						
Vegetation Clearance Along Section of Watercourse in Likely Absent Watercourses				X	X	X	X	X	X	X	X	X	X	X	X	X	X																						
Displacement (for works pre-February 2021)																																							
Water Vole Displacement (for works pre-February 2021) Mid Feb to Mid-April and Mid Sept to end Oct						X	X																																
Displacement (for works post-February 2021)																																							
Water Vole Displacement (for works post-February 2021) Mid Feb to Mid-April and Mid Sept to end Oct											X	X	X					X	X																				
Construction works (pre-February 2021)																																							
Haul Road Construction Section 1						X	X	X	X	X																													
Haul Road Construction Section 2								X	X	X																													
Haul Road Construction Section 3									X	X	X																												
HDD Section 1								X	X	X																													
Construction works (post-February 2021)																																							
Haul Road Construction Section 1										X																													
Haul Road Construction Section 2										X	X																												
Haul Road Construction Section 3										X	X	X	X	X																									
Haul Road Construction Section 4												X	X	X	X	X	X	X	X	X	X																		
HDD Section 1										X					X	X																							
HDD Section 2										X	X	X	X																										
HDD Section 3												X	X	X	X	X	X	X	X	X																			
HDD Section 4												X	X	X	X	X	X	X	X	X	X	X	X	X	X														
Haul Road/Culvert Removal Section															X	X	X	X	X	X																			
Haul Road/Culvert Removal Section																	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Haul Road/Culvert Removal Section																																							
Haul Road/Culvert Removal Section																																							
Habitat re-instatement and maintenance																																							
Reinstatement/Enhancement Following Culvert Removal Section																X	X	X	X	X	X																		
Reinstatement/Enhancement Following Culvert Removal Section																		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Reinstatement/Enhancement Following Culvert Removal Section																										X	X	X	X	X	X	X	X	X	X	X	X	X	
Reinstatement/Enhancement Following Culvert Removal Section																																							
mitigation monitoring																																							
Water vole post development monitoring to be undertaken on water vole positive ditches/watercourses in years 1 to 3 following construction (after re-instatement of habitat/enhancement)																																							

6 APPENDIX – GREAT CRESTED NEWT

6.1 Background

- 6.1.1 TEP contacted Natural England regarding their proposed approach to great crested newt mitigation on this project. In principal⁶², Natural England agreed that if work was carried out using Reasonable Avoidance Measures (RAMs) and consideration was given to any risk of habitat connectivity disruptions, then further surveys would not be needed. This approach has been adopted within this document. The one addition is that TEP assumed that all waterbodies that had not been surveyed were absent of great crested newts. Atkins has not adopted this approach and have instead assumed presence in all of these waterbodies until proved otherwise. It is felt that this approach will allow for suitable RAMs to be utilised and ensure no breach in wildlife legislation. Prior to commencement of this mitigation strategy, Natural England will be consulted again with the full information and proposed approach in regard to the scope and contents of this document.
- 6.1.2 Traditional great crested newt and eDNA surveys during 2017 identified two waterbodies within the base scheme design and surrounding land with confirmed great crested newt presence. This comprised D3 in route section 1, where a positive eDNA result was obtained but no great crested newt was recorded during traditional surveys and D83 in route section 4 where one great crested newt was recorded during torch surveys. Further to this, there are a number of waterbodies where access had not been granted where great crested newt presence must be assumed until proven otherwise.
- 6.1.3 Habitat Suitability Index (HSI) assessments and e-DNA presence/absence surveys of these waterbodies will be carried out; please note that conversations are currently on-going with the Balfour Beatty design / construction team to ensure that any impacts to suitable newt habitat within 250 m of these waterbodies is avoided where possible. In the scenario that no impacts are perceived on these 'newt corridors' i.e. RAMs, then further surveys of these specific waterbodies will not be necessary. The surveys taking place in spring 2020 will be used to inform the great crested newt mitigation strategy. The waterbodies with access restrictions during the 2017 surveys are outlined within **Table 10**, **Table 11** and **Table 12**.
- 6.1.4 The two waterbodies (D3 and D84) with confirmed great crested newt populations are not crossed by the proposed DC cable route but are part of a wider ditch network which connects to surrounding ditches which the route crosses. This includes D4 which is directly connected with D3, and D737 which is directly connected with D83. Furthermore, there are seven ditches (D4, D29, D41, D45, D46, D84) which are crossed by the DC cable route which have not been surveyed due to access issues during the 2017 surveys (and great crested newt presence is assumed). If waterbodies with confirmed or assumed great crested newt presence will be crossed by the DC cable route, then directional drilling will be utilised to avoid any impacts.
- 6.1.5 Overall, the terrestrial habitat within the base scheme design is considered to be sub-optimal, comprising predominantly of arable farmland and improved grassland. It is not considered that the temporary loss of these habitats is

⁶² Natural England clearly state that a definitive answer could not be given until seeing further documents / plans.

significant due to the habitats being sub-optimal, however, there is a risk of killing low numbers of individuals and potentially causing habitat fragmentation during the great crested newt active period (generally considered to be March-September/October).

6.1.6 There are potential impacts with regards to habitat fragmentation within 250 m of ponds with confirmed/assumed great crested newt presence during the proposed works, which may prevent the distribution of individuals to their breeding ponds during the breeding season as well as foraging areas and hibernation spaces outside of this period. Key commuting corridors have been identified, which include areas of semi-improved grassland, ditches, ditch edges, and hedgerows which will be avoided through directional drilling to ensure that commuting corridors are retained. This will ensure that any potential fragmentation impacts can be mitigated.

6.1.7 The strategy has been divided into the following sections:

- Pre-construction presence / likely absence surveys;
- Works within 250 m of a waterbody with confirmed or assumed presence of great crested newt;
- Works crossing a ditch with confirmed or assumed presence of great crested newt;
- Biodiversity Protection Zones (BPZ);
- Monitoring; and
- Re-instatement and management methodology.

6.2 Pre-construction Presence / Likely Absence Surveys

6.2.1 Fourteen ponds and 17 ditches did not have access granted for the 2017 surveys to undertake initial HSI/DSI assessments or further presence / likely absence surveys. **Table 43** provides an outline of the ponds within each route section where access was not granted, and for which great crested newt presence will be assumed unless likely absence can be established. Where access can be agreed, these waterbodies will be surveyed in spring 2020 using e-DNA presence/absence surveys to inform and update the great crested newt mitigation strategy. This will only include waterbodies within the designated survey area (the base scheme design and a 250 m buffer), as beyond this distance, any significant impacts from the proposed development has been scoped out.

6.2.2 Certain areas of suitable habitat which have been identified as key commuter corridors will be avoided with use of directional drilling. These include ditches, hedgerows, and areas of semi-improved grassland suitable for commuting or foraging great crested newt. As this method can be utilised, it will be possible to avoid any impacts upon any potentially present great crested newts through maintaining connectivity and foraging areas. It is proposed that if access can be granted, HSI/DSI assessments and e-DNA presence/absence surveys are undertaken to allow unsuitable waterbodies to be scoped out of the PMW. If waterbodies are found to have great crested newt present through a positive e-DNA result, the PMW must apply. The waterbodies requiring HSI/DSI assessments and e-DNA surveys are outlined within **Table 43**.

Table 43: Waterbodies requiring further survey during spring 2020

Route Section	Ditch / Pond Reference	Distance from Scheme (m)	Survey Type Required
Ponds			
1	P7	51-250	HSI & e-DNA
1	P9	51-250	HSI & e-DNA
1	P11	51-250	HSI & e-DNA
1	P27	51-250	HSI & e-DNA
1	P32	51-250	HSI & e-DNA
1	P198	51-250	HSI & e-DNA
1	P200	51-250	HSI & e-DNA
2	P71	51-250	HSI & e-DNA
3	P154	51-250	HSI & e-DNA
3	P155	51-250	HSI & e-DNA
3	P164	51-250	HSI & e-DNA
3	P165	51-250	HSI & e-DNA
Ditches			
1	D8	0-50	DSI & e-DNA
1	D15	51-250	DSI & e-DNA
1	D108	0-50	DSI & e-DNA
1	D109	0-50	DSI & e-DNA
3	D29	0-50	DSI & e-DNA
3	D31	51-250	DSI & e-DNA
3	D32	51-250	DSI & e-DNA
3	D35	51-250	DSI & e-DNA
3	D40	51-250	DSI & e-DNA
3	D41	0-50	DSI & e-DNA
3	D45	0-50	DSI & e-DNA
3	D46	0-50	DSI & e-DNA
3	D49	51-250	DSI & e-DNA

6.3 Works Within 250 m of a Confirmed / Assumed Great Crested Newt Population

Background

- 6.3.1 In total, 32 waterbodies are located within 250 m from the base scheme design in which great crested newt have been confirmed or assumed present. These are outlined within **Table 44**. It is proposed that HSI/DSI assessments and e-DNA presence/absence surveys are arranged on the waterbodies with access restrictions to enable any waterbodies unsuitable for great crested newt to be scoped out. If any waterbody is deemed to be unsuitable, then the following mitigation measures do not apply for that respective waterbody. It is proposed that any works within 250 m of these ponds proceeds under the following PMW.
- 6.3.2 Due to the temporary nature of the potential impacts on great crested newt and the predominance of sub-optimal habitats (i.e. arable farmland and improved grassland) along the proposed DC cable route, and current survey findings of only a single adult great crested newt, it is probable that the risks of killing or injury of great crested newt are very low. A PMW will be implemented during site clearance

works within 250 m of all ponds with confirmed or assumed great crested newt populations to ensure no killing, injury or disturbance to individuals. This will include a buffer zone of 250 m from each individual pond and will only apply within this area.

- 6.3.3 Due to the temporary nature of the works, and that no breeding ponds will be lost through the proposed development, it is not considered that the works will require the submission of a European Protected Species Mitigation (EPSM) licence, if the works are undertaken under the strict PMW outlined within this document. However, if the proposed working methodology were to change, the need for an EPSM will be re-assessed.

Table 44: Ponds with Assumed Great Crested Newt Populations 0-250 m from the Base Scheme Design

Route Section	Waterbody ID	Current Status
1	P7	No access granted – assumed present
1	P9	No access granted – assumed present
1	P11	No access granted – assumed present
1	P27	No access granted – assumed present
1	P32	No access granted – assumed present
1	P198	No access granted – assumed present
1	P200	No access granted – assumed present
1	D3	Confirmed great crested newt population
1	D4	No access granted – assumed present
1	D8	No access granted – assumed present
1	D15	No access granted – assumed present
1	D101	No access granted – assumed present
1	D108	No access granted – assumed present
1	D109	No access granted – assumed present
1	D110	No access granted – assumed present
2	P71	No access granted – assumed present
2	P183	No access granted – assumed present
3	P154	No access granted – assumed present
3	P155	No access granted – assumed present
3	P164	No access granted – assumed present
3	P165	No access granted – assumed present
3	D29	No access granted – assumed present
3	D31	No access granted – assumed present
3	D32	No access granted – assumed present
3	D35	No access granted – assumed present
3	D40	No access granted – assumed present
3	D41	No access granted – assumed present
3	D45	No access granted – assumed present
3	D46	No access granted – assumed present
3	D49	No access granted – assumed present
4	D83	Confirmed great crested newt population
4	D84	No access granted – assumed present

Vegetation Removal

- 6.3.4 Key commuter corridors have been identified within 250 m of all confirmed or assumed populations of great crested newts. These areas will be avoided and protected during construction to ensure that connectivity is retained. No vegetation clearance works will be permitted within these areas.
- 6.3.5 Vegetation removal within any areas that have a sward height greater than 150 mm and are also within 250 m of a confirmed or assumed population of great crested newt will comprise a staged clearance. Initial strimming will include vegetation removal to 300 mm (this will not be possible for vegetation between 150mm and 300 mm). This will be followed by a later second cut to 150 mm and a final cut to ground level, both using hand-tools. All clearance should proceed in one direction (allowing reptiles and small mammals to move out of harm's way) under the supervision of an ECoW.
- 6.3.6 The areas will be left for a period of 24 hrs after the cut to 150 mm, where deemed necessary by the ECoW, after which the ECoW will undertake a walkover to confirm the likely absence of great crested newts and ensuring that any suitable refuge is dismantled and removed from the working area. Following the walkover, vegetation will be strimmed to ground level, at which point full site clearance and levelling will then be undertaken. If any great crested newts are found during the walkover, all works must stop, and the mitigation strategy updated accordingly.
- 6.3.7 It is not anticipated that exclusion fencing will be necessary due to the predominance of sub-optimal habitat (i.e. arable farmland) that will be impacted and the proposed vegetation removal strategy which will deter any great crested newts entering the working area. However, ECoW supervision will be required within 250 m of all waterbodies (and those with access restrictions) with confirmed or assumed great crested newt presence.

Hibernation

- 6.3.8 As the working area contains predominantly arable farmland and improved grassland with limited refuge area available, it is not considered to contain suitable areas or structures suitable for hibernation (for example woodland, deadwood piles, and rubble piles). However, there are a number of hedgerows throughout the survey area which may contain suitable areas. These areas are located within the identified key commuter corridors and will be directional drilled to avoid any impacts to these areas. Any rubble/log piles which are found within 250 m of any waterbody with confirmed/assumed population of great crested newt will either be avoided, or carefully dismantled by hand by the ECoW. If any great crested newts are discovered, all works will stop, a new approach to the work determined, and the PMW and the mitigation strategy updated accordingly.
- 6.3.9 In order to prevent great crested newt using subsoil and topsoil piles for refuge or hibernation, the surfaces of the piles will be tamped down and consolidated to ensure individuals cannot access them (within 250 m of a confirmed or assumed great crested newt waterbody).

Connectivity

- 6.3.10 Whilst the proposed works are temporary, mitigation will be implemented to ensure that connectivity is retained during construction. If works must be undertaken

during the active period, key commuting routes must be maintained. These include areas of suitable habitats, or corridors likely to be used by great crested newts during the active period, including areas of semi-improved grassland, ditches, ditch sides and rough field boundaries. Mitigation includes avoidance of these habitats altogether through directional drilling; this will ensure that these corridors are kept disturbance free and connectivity is maintained. Suitable fencing and signage will be used where necessary to ensure that all workers are aware that no works or machinery are allowed entry into these areas.

- 6.3.11 Smaller excavations within the base scheme design will be covered overnight to prevent entrapment of any great crested newt. If any open excavations are left uncovered these will be inspected by the ECoW at the start of each working day to ensure no individuals are present, and to remove any that are trapped to a safe location, before works commence.
- 6.3.12 These measures will be effective upon commencement of construction within all areas within 250m of the identified ponds.

6.4 Works crossing a ditch with confirmed/assumed great crested newts

Background

- 6.4.1 In total, six ditches will be crossed by the DC route in which great crested newt has been assumed present (due to access restrictions). These are outlined within **Table 45**. It is proposed that further surveys are undertaken upon these waterbodies as previously mentioned within **Section 3.3** to enable any unsuitable waterbodies to be scoped out. Once this data is available, the mitigation strategy will be updated accordingly.

Table 45: Ditches crossed by the DC cable route

Route Section	Pond/Ditch Reference	Status
1	D4	No access granted – assumed present
3	D29	No access granted – assumed present
3	D41	No access granted – assumed present
3	D45	No access granted – assumed present
3	D46	No access granted – assumed present
4	D84	No access granted – assumed present

- 6.4.2 All mitigation measures previously outlined within Section 4.3 apply to these ditches.

De-watering

- 6.4.3 No de-watering will be permitted on any waterbody with confirmed or assumed great crested newt populations during the breeding season (March-June) as this is when great crested newts are most likely to be within the waterbodies. Any de-watering works must be undertaken outside of this period to ensure there will be no impacts on any potential great crested newt breeding pond and must be supervised by an ECoW. If any great crested newts are found during any de-watering works carried outside of the great crested newt breeding season, all works must stop, and the mitigation strategy updated accordingly. If de-watering

is carried out, the pond must be restored to its previous state, prior to the great crested newt active period.

Crossings

- 6.4.4 The majority of watercourse crossings will be undertaken using a trenchless installation method such as Horizontal Directional Drilling (HDD) or pipe-jacking. The use of trenchless methods to cross the ditches will ensure that any impacts upon the ditches that require crossing can be avoided.
- 6.4.5 Temporary haul roads will be required to facilitate construction of the scheme. Where haul roads cross ditches, existing bridges/crossing points will be assessed for viability of use to minimise impacts to GCN and maintain habitat connectivity throughout.
- 6.4.6 If this approach is not feasible, a temporary culvert or bridge will result in a very small temporary loss of bank side habitat and is considered to have minimal impacts upon any potentially present great crested newts. Connectivity will be retained beneath the temporary bridges and culverts. An ECoW will be present during the installation of these temporary features and any vegetation removal required to facilitate the development must follow the procedures outlined within this PMW. This will only be required on ditches with confirmed or assumed populations of great crested newts and where potential modification to the watercourse is needed.

6.5 Monitoring

Construction Phase

- 6.5.1 Prior to construction, an ECoW will be appointed. The key role of the ECoW during construction activities will be to monitor the implementation of the PMW for great crested newts. This monitoring will be required for terrestrial habitats only.

Operational Phase

- 6.5.2 Due to the small populations recorded and temporary nature of the works, no monitoring is deemed necessary upon completion of the proposed works. However, this will be reviewed following the further required surveys during spring 2020.

Re-instatement and Management Methodology

- 6.5.3 Post construction, and once the temporary culverts/bridges have been removed, the ditches will be re-instated to improve the suitability for great crested newt. Re-instatement may include scrub clearance, bank reprofiling and re-seeding and will be outlined within the habitats **Appendix 9**.

7 APPENDIX – BATS

7.1 Risk Assessment for All Potentially Damaging Construction Activities - Roosts

General Method Statement for Bat Protection

- 7.1.1 For the assessment of impacts on bats, impacts within a distance of 20 m of a bat roost have been assessed as having significant potential risk. Therefore, this mitigation strategy adopts a Biodiversity Protection Zone (BPZ) of 20 m encircling any tree with a bat roost, or tree containing bat roosting features.
- 7.1.2 Between 20 m and 100 m of a bat roost has been assessed as having only minimal potential risk, therefore requiring consideration but unlikely to cause desertion or alteration in roost use. Therefore, these situations will be covered by a PMW. An Ecologist or ECoW will remain on site throughout the construction works to deliver a toolbox talk to all site workers and ensure the measures set out are undertaken in accordance with the PMW.
- 7.1.3 This mitigation strategy has further divided the Biodiversity Protection Zone into trees where there will be direct impacts (including pruning, felling or works within the Root Protection Zone (RPZ)) and indirect impacts (works outside of the RPZ but within 20 m). Works around retained trees must as a minimum adhere to BS:5837: 2012 Trees in Relation to Design Demolition and Development. This Appendix also considers effects on foraging and commuting bats (section 7.2).

Impacts on a Tree with a Confirmed Bat Roost (Tree #233, route section 3)

- 7.1.4 A single common pipistrelle day roost was confirmed during July 2019 bat nocturnal activity surveys, on the eastern elevation, approximately 8 m high on tree #233, an ash tree adjacent to an existing access road (Westville Road) and within 20 m of the proposed Temporary Construction Compound S5 (within route section 3). The roost access point is likely located within one of the woodpecker holes noted at this elevation based on the emergence location noted by surveyors.
- 7.1.5 Based on the current proposals and proximity of the construction works to this tree's BPZ, it is anticipated it will be significantly and directly impacted by this scheme. The following mitigation will need to be adhered to, to assure disturbance of any bats using this tree is avoided:
- A pre-commencement aerial tree climbing survey will take place to show if bats are currently using the roost features. If bats are recorded, then works may need to be stopped until an EPS licence from Natural England has been issued to exclude the bat(s) from the tree;
 - Construction works should be timed for when bat(s) are least likely to be present. The tree has been identified as a day roost; however, it is possible that the woodpecker holes could be used for hibernating (as hibernation surveys were not conducted). Therefore, it is recommended that all works within 20 m of this tree avoid the hibernation and summer breeding period, generally taken to be October – March and May – September, respectively. Works in this location should therefore be timed for spring or autumn where possible, specifically the months of April – May and September – October. Temporary Construction Compound S5 is proposed to be constructed throughout **May 2021**, with work activity slated to continue until November

2021. There will then be a second phase of work activity lasting between July and November 2022, at which time Temporary Construction Compound S5 will be removed. Potential disturbance to both bat roosting and bat foraging activity during the active season is anticipated during these periods.

- An Ecologist or ECoW will remain on site to ensure all works undertaken within 20 m of Tree #233 are done so in accordance with the PMW.
- No night-time working will be permitted within 20 m of the tree. Any lighting that is further than 20 m from the tree must be directional and point away from the tree; and
- These details will be included within a site PMW.

7.1.6 An EPS development licence application to NE can take up to 6 weeks to be returned after submission and this should be taken into consideration in line with the proposed construction programme.

7.1.7 Based on the current construction timetable, no baseline re-surveys would be required. The surveys for tree #233 were completed in July 2019: providing works within the vicinity of this tree take place before the end of April 2023 (within three bat activity periods, generally considered to be May to September), then the baseline survey data for this tree is considered to remain sufficiently in date.

Impacts on Trees with Bat Roosting Features (Low to High) route wide

7.1.8 Fourteen trees that have been categorised as having Moderate to High bat roosting features have all been subject to a suite of nocturnal surveys, with no bat roosts having been recorded. However, as the possibility remains of bats utilising the roosting features on these trees and being directly impacted (exact works on trees are not currently known) by the proposed construction activities, then a precautionary approach must be adopted for these works.

Table 46: Trees with moderate / high bat roosting potential across the route that will be impacted by construction activities

Route Section	Tree ID and species	Location	Approximate chainage	Tree bat roost status	Likely construction impact (exact works are not currently known - impacts are proposed to be mitigated as much as possible within the current design phase)
Section 2	#30, Common Ash	X539626, Y372610 South of RDX10	16850	Moderate	Yes - within 20 m of DC working area
Section 2	#65, Common Ash	X540364, Y370103, East of	20000	High	Yes – inside DC working area

Route Section	Tree ID and species	Location	Approximate chainage	Tree bat roost status	Likely construction impact (exact works are not currently known - impacts are proposed to be mitigated as much as possible within the current design phase)
		Langton, West of A16			
Section 2	#406, Common Ash	Y370078, East of Langton, West of A16	20030	Moderate	Yes – inside DC working area
Section 2	#330, Alder	X539494, Y369243, North West of East Farm	21330	Moderate	Yes - within 20 m of DC working area
Section 2	#331, Alder	X539507, Y369236, North West of East Farm	21330	Moderate	Yes – inside DC working area
Section 2	#333, Alder	X539559, Y369224, North West of East Farm	21300	High	Yes - within 20 m of DC working area
Section 2	#336, Common Ash	X537586, Y368419	23580	Moderate	Yes - within 20 m of DC working area
Section 2	#315, Common Ash	X537387, Y368128	23975	Moderate	No - >20 m away from DC working area

Route Section	Tree ID and species	Location	Approximate chainage	Tree bat roost status	Likely construction impact (exact works are not currently known - impacts are proposed to be mitigated as much as possible within the current design phase)
Section 2	#368, Common Ash	X537014, Y366588, East of Raithby Road / B1195 junction	25805	Moderate	No - >20 m away from DC working area
Section 2	#148, Common Ash	X537117, Y366582, East of Raithby Road / B1195 junction	25810	Moderate	Yes – within 20 m of T8 working area
Section 2	#145, Common Ash	X537238, 3East of Raithby Road / B1195 junction	25810	Moderate	Yes – within 20 m of T8 working area
Section 3	#193, Common Ash	X537377, Y363202, East of West Keal and A16, South West of East Keal	29340	Moderate	Yes - within 20 m of DC working area
Section 3	#359, Sycamore	X533330, Y360066, South of Fen Bank and West	35030	Moderate	Yes - within 20 m of DC working area

Route Section	Tree ID and species	Location	Approximate chainage	Tree bat roost status	Likely construction impact (exact works are not currently known - impacts are proposed to be mitigated as much as possible within the current design phase)
		of Drain Road			
Section 4	#414, Sycamore	X519059, Y341024, West of South Forty Foot Drain, East of Old Sixteen Foot Drain	61840	High	No - >20 m away from DC working area

7.1.9 Trees with Low potential to support roosting bats have not been included within the **Table 46** above. With each of these trees where possible all impacts on have been discussed with the design / construction team and avoided where possible. Where avoidance is not possible, direct impacts from proposed construction works affecting Low potential trees will be mitigated through adherence to the PMW responsibilities outlined previously.

Where a Tree is Likely to be Directly Affected by Construction Activities (i.e. Felling or Pruning)

7.1.10 Some trees with moderate or high bat roosting opportunities will be subject to direct impacts (i.e. felling or pruning to facilitate the works). In these scenarios then the following mitigation and compensation measures will need to be adhered to (see **Table 47**, below):

7.1.11 Works should be timed for when bats are least likely to be present. Although the trees have not been identified as a roost, works should be timed to avoid the hibernating and maternity periods. Therefore, it is recommended that all works within 20 m of these trees avoid the winter and summer period. Works in these locations should be timed for spring or autumn, where spring includes April to May inclusive and autumn includes September to October inclusive.

7.1.12 If working at these times (spring and autumn) is unfeasible then there is the potential for works to be carried out in these locations, only if the tree(s) within 20

m were fully inspected with a pre-commencement aerial inspection survey (i.e. all features could be fully assessed). In this situation, works would only be able to proceed if no bat(s) were recorded and construction activities would need to start within 24 hours of the aerial inspection.

- 7.1.12 If a bat(s) were recorded, ALL works would need to cease within 20 m of the tree until an EPS mitigation licence to exclude the bat(s) from the tree was granted by Natural England (which could take up to six weeks). This may cause timetable problems with regards to the construction programme.
- 7.1.13 If works to these trees are required, including removal or pruning, a PMW will be produced and implemented. All works within 20 m of the tree will be under the supervision of a suitably licenced Ecologist or ECoW.
- 7.1.14 A toolbox talk will be given by the Ecologist or ECoW to all construction site operatives prior to any proposed works commencing within 20 m of each tree.
- 7.1.15 Once there is confidence no bat roosts are present, the tree would then be felled in sections within 24 hrs of the pre-commencement survey, with the roost/feature section cut wherever possible and with individual limbs lowered to the ground for inspection by the Ecologist or ECoW. This will be undertaken under direct advisement of the Ecologist or ECoW. All felled timber will be inspected for the presence of bats and any felled timber that could not be fully inspected with an endoscope will be left in-situ overnight to enable any undiscovered bats to disperse.
- 7.1.16 Fencing may need to be erected to protect the tree(s), details of which will be advised by the Ecologist or ECoW. Fencing will ensure that when works are near trees, there is no accidental transgression of site personnel or machinery into this area
- 7.1.17 Compensation for the removal of tree roost habitat along the DC cable route will need to ensure no net loss of roost habitat for bats. Due to the loss of potential bat roost feature(s) from these tree removals, then compensation features will be required. Replacement roost boxes will be incorporated onto trees adjacent to areas where tree loss will occur, (or as close as possible if no suitable trees are located within the local vicinity), prior to any works to allow bats within the locality to find these replacement features. This will be undertaken regardless of whether bats are recorded as absent, and they will be in place before any tree removal occurs.
- 7.1.18 Bat boxes should be positioned in areas where conditions such as temperature and humidity will be maintained by surrounding vegetation structure e.g. on trees sheltered by surrounding tree or scrub cover. Replacement roost boxes should include a variety of designs that will support a variety of species and roost types.
- 7.1.19 Replacement roosts should act to replicate the size, height and aspects of tree roosts lost. Boxes should be sited in a variety of locations, ideally with multiple boxes on trees to provide a range of roost conditions. Boxes should be situated near features to provide similar flight-lines such as woodland edge habitat or linear scrub and hedgerow features and should have an entrance close to appropriate foraging habitat.

Table 47: Trees with Moderate to High Bat Roosting Features to be Directly Impacted by the Construction Activities – Work Timings

Route Section	Tree ID	When works proposed to begin in the vicinity of the tree	Suggested work timings
Section 2	#30	W/c 3 rd November 2020	Move to within Sep-Oct 2020 or April-May 2021. Otherwise aerial survey required here
Section 2	#65	W/c 1 st December 2020	Move to within Sep-Oct 2020 or April-May 2021. Otherwise aerial survey required here
Section 2	#406	W/c 1 st December 2020	Move to within Sep-Oct 2020 or April-May 2021. Otherwise aerial survey required here
Section 2	#329	Wc 8 th December 2020	Subsequent to 3x Nocturnal bat activity surveys required (Apr- Oct)
Section 2	#330	Wc 8 th December 2020	Move to within Sep-Oct 2020 or April-May 2021. Otherwise aerial survey required here
Section 2	#331	Wc 8 th December 2020	Move to within Sep-Oct 2020 or April-May 2021. Otherwise aerial survey required here
Section 2	#333	Wc 8 th December 2020	Move to within Sep-Oct 2020 or April-May 2021. Otherwise aerial survey required here
Section 2	#334	Wc 15 th December 2020	Subsequent to 2x Nocturnal bat activity

Route Section	Tree ID	When works proposed to begin in the vicinity of the tree	Suggested work timings
			surveys required (Apr- Oct)
Section 2	#336	Wc 15 th December 2020	Move to within Sep-Oct 2020 or April-May 2021. Otherwise aerial survey required here
Section 2	#315	Wc 22 nd December 2020	Move to within Sep-Oct 2020 or April-May 2021. Otherwise aerial survey required here
Section 2	#368	Wc 12 th January 2021	Move to within Sep-Oct 2020 or April-May 2021. Otherwise aerial survey required here
Section 2	#148	Wc 12 th January 2021	Move to within Sep-Oct 2020 or April-May 2021. Otherwise aerial survey required here
Section 2	#145	Wc 12 th January 2021	Move to within Sep-Oct 2020 or April-May 2021. Otherwise aerial survey required here
Section 3	#193	Wc 16 th February 2021	Move to within April-May 2021. Otherwise aerial survey required here
Section 3	#223	Wc 30 th March 2021	Subsequent to 3x Nocturnal bat activity surveys required (Apr- Oct)

Route Section	Tree ID	When works proposed to begin in the vicinity of the tree	Suggested work timings
Section 3	#303	Wc 30 th March 2021	Subsequent to 2x Nocturnal bat activity surveys required (Apr- Oct)
Section 3	#353	Wc 18 th March 2021	Subsequent to 2x Nocturnal bat activity surveys required (Apr- Oct)
Section 3	#359	Wc 30 th March 2021	Works already proposed March to April which will be appropriate
Section 3	#363	Wc 30 th March 2021	Subsequent to 2x Nocturnal bat activity surveys required (Apr- Oct)
Section 3	#369	Wc 25 th Feb 2021	Subsequent to 2x Nocturnal bat activity surveys required (Apr- Oct)
Section 4	#413	Wc 25 th Nov 2021	Subsequent to 2x Nocturnal bat activity surveys required (Apr- Oct)

- 7.1.20 Based on when the surveys were completed, the baseline survey data for these trees may become out of date by the time that the works begin at each location, based on the current construction timetable. All baseline surveys were completed by July 2019, and therefore the baseline survey data for these tree(s) will only be considered out of date if the construction activities do not occur before winter 2022 (end of the bat activity survey season). Based on the current construction timetable then no re-surveys of the baseline data are considered necessary (this excludes trees where no nocturnal data has yet been gathered).

7.2 Risk Assessment for All Potentially Damaging Construction Activities – Foraging

General

- 7.2.1 The proposed works will lead to the temporary loss of sections of foraging habitat along the route. On this basis the following mitigation will need to be adhered to:

- Loss of trees along the DC cable route will result in a minor loss of foraging and commuting habitat. Once works are completed, land will be restored to its previous state. Where linear features are removed such as hedgerows and tree lines, these features must be restored following works (see **Appendix 9** for further details). Where tree lines cannot be re-established hedgerow planting will be undertaken, with *Acer campestre* (10%), *Cornus sanguinea* (10%), *Corylus avellane* (10%), *Crataegus monogyna* (35%), *Euonymus europaeus* (10%), *Prunus spinosa* (10%), *Sambucus nigra* (10%) and *Ilex aquifolium* (5%) (as detailed in Section 9.1).
- Temporary fencing will be placed across vegetation gaps such as hedgerow (where gaps exceed 10 m) to ensure that these linear features remain functional for the local bat population (these fences can be removed during the day and put back at night if necessary). These fences must remain in place until the reinstatement of the hedgerow has been completed. Fencing could include Heras fencing, with hessian attached, which will temporarily guide bats along the route gap in the hedgerow, thereby acting as a temporary bat commuting route.
- An Artificial Light Emissions Plan (ALEP VKL-BB-ENV-00-PL-X-20488) has been produced⁶³ which specifically details referring to this Ecological Mitigation Strategy. A summary of the general principals are as follows:
 - To locate, as far as practical, significant sources of lighting away from sensitive receptors (such as green corridors, trees and water bodies);
 - Light shall be directed downwards and away from sensitive receptors, if necessary, using shields, baffles and cowls.
 - Lighting will not directly illuminate bat roosts or important areas for nesting birds (it is suggested that this should relate to all vegetation within the nesting bird season of March to September);
 - Winter working may require task specific lighting due to the short day lengths. Effects will be limited in locations (and limited in duration at any one location) and will only be experienced at the beginning and end of the bat active season when day lengths are starting to decrease but bats are yet to hibernate; and
 - The installation of the compounds will have the potential for a longer-term impact upon the bat foraging and commuting routes. On this basis lighting will be directed away from the surrounding hedge lines and tree canopies.
- In addition to the details within the ALEP VKL-BB-ENV-00-PL-X-20488, the lighting should adopt the following principals:
 - Contractors should avoid night-time working within 30 m of any green corridors (taken to mean 30 minutes prior to sunset to 30 minutes after sunrise) during key bat active hours particularly during post-dusk and pre-dawn hours (May to September only); Where lighting is required (for the entire route), dark buffer zones between

⁶³ Viking Link UK Onshore Civil works: Artificial Light Emissions Plan (Document number VKL-BB-ENV-00-PL-X-20488)

habitats and lighting should be used with illuminance limits and zonation;

- Narrow spectrum bulbs should be used, that do not emit UV light (peaking higher than 550 nm) e.g. warm white spectrum lights (<2700 Kelvin) or LED luminaires; and
- Downward directional luminaires should be used to retain darkness above and using only luminaires with an upward light ratio of 0% and with good optical control.
- Any external security lighting should be set on motion-sensors and short (1 min) timers where possible.
- Maintenance of dark corridors during construction works along woodland edge habitats, retained treelines, drains, ditches and hedgerows will minimise impacts on foraging and commuting bats.

7.2.2 Lighting of work areas during construction is only anticipated for specific activities which will be of short duration and intermittent throughout the construction period. It is unlikely that this will cause any significant effects on the foraging and commuting activities of the local bat population. However, as bats are using these areas for foraging and commuting, there is the potential that bats could be affected by construction lighting. Therefore, mitigation will be required if night time working is required between March and October (as detailed above). Works in the winter period will be when bats are hibernating and therefore no lighting impacts are predicted on bats during this period.

7.2.3 If night time works are required within 20 m of a known / potential roost, in addition to an Ecologist being present for the duration of the proposed works, sensitive directional downward lighting will be employed, ensuring it is pointing away from the known / potential roost and any vegetation which may be being utilised as a bat flight path.

7.2.4 It is not considered that baseline bat transect re-surveys would need to be carried out again based on the proposed construction timetable and the previous results and mitigation proposed.

Construction Post Monitoring

7.2.5 Due to the low number of bats recorded and only a single tree with a bat roost determined to be of low conservation status, as per Natural England's Bat Mitigation Guidelines⁶⁴, no post-monitoring of the construction works is considered necessary, unless specified under the terms of a Natural England mitigation licence.

7.2.6 As all of the impacts on the foraging and commuting route are temporary, as hedgerows will be re-instated as soon as possible, no significant impact on bats is predicted.

⁶⁴ Bat Mitigation Guidelines (2004)

8 APPENDIX – BADGER

8.1 General Method Statement for Species Protection and Other Mitigation Measures

8.1.1 The badger mitigation strategy draws on a combination of measures to ensure legislative compliance. These include:

- Implementation of avoidance and protective measures where appropriate to prevent disturbance to badgers (under licence when within 30 m of a sett);
- Badger exclusion and sett closures under licence; and
- Partial sett reduction (under licence) of certain setts with only a small number of entrances with potential to be impacted.

8.2 Gap Analysis

8.2.1 The limitations included within the 2019 DC Cable Route Badger Survey Report do not indicate that there were any specific land access limitations. As such, the assumption is that the whole DC cable route was robustly surveyed during the 2019 surveys.

8.2.2 Neither the 2017 nor 2019 badger surveys incorporated bait marking surveys. As such, the data does not provide evidence that certain setts may be connected and utilised by the same badger social groups or provide evidence of approximate territory boundaries. Similarly, without bait marking data to conclusively connect subsidiary and outlier setts to social groups and main setts, it is possible that some of the setts categorised as subsidiary (or even outliers) may in fact be small main setts associated with separate social groups.

8.3 Further survey requirements

8.3.1 The 2019 badger survey report provides robust data for the locations of badger setts along the cable route. However, considering that badgers are highly mobile and can construct new setts at any time of year, update surveys will be required to provide up to date information to support a licence application. These include:

- Update surveys of all setts that require closure or licence to permit disturbance;
- Bait marking surveys of one main sett; and
- Scheme-wide pre-commencement checks undertaken by the ECoW.

8.3.1 For all setts that have been identified within the scheme boundary and within 30 m of the working area that will require closure under licence or will require a licence application to permit disturbance, an up to date survey to assess any change in status will be required to support the licence application (see **Table 33** to **Table 36** for relevant setts). Re-survey will be undertaken in spring 2020 to allow sufficient time for a licence application prior to sett closures between July and November 2020.

8.3.2 It is not anticipated that there will be any impacts on 32 setts that are located within 30 m of the scheme boundary, but over 30 m from any proposed works, as detailed within the mitigation strategy above (**Section 4.5**). However, as a precaution, it is

proposed that these retained setts are included within the licence application to permit the licensable action of 'disturbance of badgers', to allow for flexibility in the route design. As such, these setts will also be re-surveyed in spring 2020, to provide up to date information to support the licence application. This should include detailed survey of main setts 59 and 75 (both located within route section 3), which are not predicted to be impacted at present based on their current mapped extent (i.e. the closest entrance is located over 30 m from the working area), but are located relatively close to the works, and therefore sett extension since the 2019 survey may bring the setts within 30 m of the works.

8.3.3 Based on the proposed DC Working Area GIS shapefiles provided, it is anticipated that the works may require closure of one main sett (sett 144) located within route section 3. Every attempt to retain this sett will be considered, however, if retention is not possible it will be necessary to undertake bait marking surveys to identify the territory of the social group associated with this main sett and to identify an alternative existing sett or a suitable location for an artificial sett, should there not be a suitable alternative. This information will be required to support the licence application. Bait marking surveys are most reliable when undertaken between February and April, as latrines are easiest to locate during this time (and are least accurate when undertaken during summer when vegetation conceals latrines). If an artificial sett is required, this would need to be constructed at least six months prior to sett closure, and therefore the sett closure will not be possible until the second closure period (between July and November 2021). Bait marking surveys would therefore ideally need to be undertaken in spring 2020. However, if this is not possible, they would need to be undertaken in autumn or early winter 2020 to allow sufficient time for construction of an artificial sett. Bait marking surveys involve searching all areas within at least 500 m of the main sett for latrines to try and provide a connection, and therefore full access to adjacent land is required for robust surveys.

8.3.4 Badgers are highly mobile and therefore pre-commencement checks will be undertaken by the ECoW of all areas within 30m of the scheme boundary approximately two months prior to works commencing at that location (or by April 2021 in areas where works are programmed to commence following July 2021). This is to allow sufficient time for a licence application for closures during the 2021 closure period (July to November, inclusive) should any new setts be identified that have been excavated since the 2019 surveys.

8.3.5 Pre-commencement checks of all areas will also be undertaken by the ECoW immediately prior to site clearance (within 24 hours), which will be detailed within a PMW.

8.3.6 A timetable of update surveys is provided within the Badger Work Schedule.

8.4 Risk assessment of potentially damaging activities

8.4.1 It is generally considered that works within 30 m of an active badger sett have the potential to cause disturbance. The risk and level of disturbance varies depending on the type of activity. As general guidelines, work activities using heavy machinery are considered to have the potential to cause disturbance at a distance of 30 m from the nearest active entrance, work activities using light machinery are considered to have the potential to cause disturbance at a distance of 20m, and

work activities using hand tools are considered to have the potential to cause disturbance at a distance of 10m.

8.4.2 However, there are a number of factors that can influence disturbance levels, and therefore the distance over which disturbance can occur. Natural England guidance does not provide specific distances over which they consider certain activities will cause disturbance. Instead, it is up to the discretion of the consultant ecologist as to what constitutes disturbance, and over what distance it is likely to result in disturbance levels greater than that which badgers commonly tolerate.

8.4.3 The working area associated with the cable route is relatively narrow (15 m to 30 m along the majority of the route) and a number of potentially disturbing activities will be concentrated within this area, including a number of activities requiring heavy machinery, such as excavations and directional drilling. It is therefore considered appropriate that any setts that are located within 30 m of the working area (as shown as the 'DC working area' on the Route Layout drawings) are at risk of disturbance and will therefore require a licence to permit the licensable action of 'disturbance of badgers'.

8.4.4 There is also potential that works within 30 m of an active entrance that involves excavations or drilling may also result in damage to part of a sett. It is generally accepted that most setts rarely extend beyond 20 m from the sett entrances. However, there is evidence that setts can extend further than this, particularly in areas where the soil type allows for easy excavation. An assessment will be undertaken at each location where there are works within 30 m of an entrance to assess the nature of the works involved and the structure of the sett, to evaluate whether there is potential for damage to the sett. The assessment of the structure of the sett will take into account factors such as the sett size and classification, the direction of the tunnels from the entrances, the location of the sett (such as whether it's associated with a field boundary feature or built into an embankment), soil structure, and surrounding habitat, to evaluate the likelihood of the sett tunnels extending into the working area. If it is considered possible that works may result in damage to a sett, temporary closure (under licence) may be required.

8.5 Licencing and sett closure requirements and timescales

8.5.1 Licences are granted for sett closures to be undertaken between 1 July and 30 November, as this avoids the badger breeding period (which runs from December to June), during which badgers are most susceptible to disruptive activities.

8.5.2 The Time Chainage Diagram⁶⁵ shows that works are programmed to begin in August 2020, with all works completed by July 2023.

8.5.3 Based on the information provided within the Time Chainage Diagram, there are two time periods within the current programme in which sett closures would be feasible, these being:

- 1 July to 30 November 2020; and
- 1 July to 30 November 2021.

⁶⁵ Balfour Beatty (2020). Time Chainage Diagram

- 8.5.4 In general, each element of the construction works are programmed to commence in the east (route section 1) and work west along the cable route (to route section 4).
- 8.5.5 To reduce the number of new setts appearing prior to construction work starting, the setts will be left in situ as long as possible (i.e. closed during the season immediately before works are due to start). However, based on current information provided, it appears that works along the majority of the route are scheduled to begin before the second closure period (July to November 2021). It is therefore anticipated that the majority of sett closures will need to be undertaken during the first closure period (July to November 2020).
- 8.5.6 Works will commence with the construction of compounds, installation of pre-construction drainage and installation of haul roads. This will be followed by horizontal directional drilling and excavation of cable trenches along the cable route.
- 8.5.7 Based on the information provided, works within route section 4 in proximity to the setts identified as requiring closure are programmed to commence in May 2021 (installation of pre-construction drainage), but with trenching in this area not commencing until June 2022. Depending on the nature of the works associated with the installation of pre-construction drainage and haul roads, it may be preferable to close setts within route section 4 during the second closure period (July to November 2021) to minimise the time between closure and construction works commencing.
- 8.5.8 A Timetable of Mitigation Based on Construction Timetable is provided below, which provides more detail of the closure requirements for each sett where impacts are anticipated.
- 8.5.9 As a precaution, all 44 active setts located within or within 30 m of the scheme boundary will be included within the badger licence application. However, the licence will outline that disturbance or interference is not anticipated for the 34 setts located over 30 m from works identified in the Route Layout drawings (including the 18 setts which have 'haul roads' identified within 30 m on Route Layout drawings, for which the assumption is that no works will occur within this area). This is to allow for flexibility for the route design within the scheme boundary.
- 8.5.10 The closure of setts that are deemed to be disused is not a licensable act and therefore, can be undertaken at any time of year (provided there is no change to the status of the sett).
- 8.5.11 Should the closure of a main sett be required, the artificial sett would need to be constructed at least six months prior to closure (ideally longer if possible), to provide sufficient time for badgers to locate and become familiar with the artificial sett within their territory. Based on the current route design information, it is anticipated that one main sett will require closure and therefore one main sett will be required.
- 8.6 Identification of Biodiversity Protection Zones (BPZ) and construction ecological support**
- 8.6.1 A 30 m exclusion zone will be in place at all badger setts (unless a smaller exclusion zone is appropriate, depending on the type of works to be carried out, or until closure has been carried out successfully where applicable). The exclusion

zones will be identified as Biodiversity Protection Zones (BPZ) and will not be specifically identified as exclusion zones for badger. These areas will be protected from construction activity, vehicle movements and storage of materials through the installation of fencing and signage to prevent encroachment, if works are proposed in close proximity.

- 8.6.2 On-site ecological support will be required throughout the period of construction works. Works within 30 m of the badger setts will be undertaken under licence and measures to control the disturbance of badgers will be implemented (see below).
- 8.6.3 Where works are within 30 m of badger setts the ECoW will remain on site for the duration of the works within the BPZ (or until closure has been carried out successfully where applicable) to ensure that the works are undertaken in accordance with the measures set out in the Natural England Development licence.
- 8.6.4 The ECoW will also carry out regular checks around badger setts to ensure the BPZ are being adhered to.

8.7 Measures to control the disturbance of badgers in setts within 30 m of the scheme boundary

- 8.7.1 Measures to control the disturbance of badgers in setts within 30 m of the scheme boundary will be implemented. This will include regular monitoring by ecologists and remote cameras on active setts located near to construction activities, and appropriate exclusion zones around setts.
- 8.7.2 Measures to maintain badger welfare will be followed during construction, including maintaining fencing to exclude badgers from working areas, capping of any open pipes to prevent badgers entering, covering of open excavations at the end of a shift (or providing sloped sides/exit ramps from excavations) and regular checks for trapped badgers at the start of a shift.
- 8.7.3 It will be ensured that exclusion fencing will not fully restrict badger movement across the scheme and that badgers will be able to cross the scheme in places, maintaining connectivity for badger territories that extend across the scheme boundary, both during and post-construction.
- 8.7.4 Where full exclusion zones cannot be avoided for access reasons, bog mats or steel plates will be laid down to dissipate the weight of any vehicle moving along the ground, over the top of potential sett tunnels, to that of a person of average weight standing on the ground.
- 8.7.5 As badgers can excavate setts at any time of the year, regular checks will be made prior to and during construction works, to record any new setts and to determine the most appropriate course of action with regards potential impacts, such as retention or licensing works to disturb or close the sett. If new setts are discovered within the scheme boundary, an exclusion zone will be maintained until appropriate measures are in place, such as amendments to licences.
- 8.7.6 It is anticipated that night time working will be required at the HDD locations during the drilling phase and during the installation of the Joint Bays. Night time working will not be undertaken within 30 m of badger setts that have not been closed under licence. To reduce disturbance, night time working or traffic movements (other than light vehicles) will be restricted as far as possible in areas where badger setts are near to works. As badgers are nocturnal, disturbance will be reduced by

restricting the amount of night time working. Night time working, in terms of badger nocturnal activity, will be classed as beginning one hour before sunset and lasting until one hour after sunrise.

- 8.7.7 The use of plant and machinery in the vicinity of the biodiversity protection zones will cease one hour before sunset until one hour after sunrise, where possible.
- 8.7.8 All construction excavations will either be covered or have an escape ramp put in them overnight to prevent badgers, or other wildlife, from falling into them and becoming trapped.
- 8.7.9 Any spoil heaps will not be sited on badger paths.
- 8.7.10 An ECoW will be present on the Scheme. During this time, they will ensure contractors are complying with the method statement, provide 'toolbox talks', and will be available to provide advice on aspects of the project which could affect badgers.

8.8 Settle exclusion method

- 8.8.1 The sett closures will begin by hard-stopping all the disused setts (i.e. non-licensable works) ahead of the start of the exclusions (following confirmation setts are disused). These should be undertaken as soon as possible, to ensure that the setts do not come back into use prior to construction works commencing.
- 8.8.2 The exclusion and closure of setts that are in current use will be carried out under a Natural England Development licence and will take place between 1 July to 30 November (i.e. outside the badger breeding season). The exclusions will be completed using one-way gates fitted directly to sett entrances in current use.
- 8.8.3 Each gate will be surrounded by an apron of heavy-duty weld mesh fencing (medium or heavy gauge stock netting) to deter badgers from digging back into the sett. The fencing will be attached with pegs firmly to the ground and extend a minimum of 5 m radius around each entrance.
- 8.8.4 Monitoring for badger movement into/out the sett will take place throughout the exclusion period and will continue until there has been no evidence of badgers entering the sett for at least 21 days after the gates have been installed, at which point the sett will be hard stopped and/or destroyed, as described below. Monitoring will be achieved by using either small sticks wrapped in sticky tape (to collect hairs of any animals moving past) inside the sett entrances or by sand smoothed out over the entrances (inside and outside the gates) to reveal badger footprints. Motion sensor cameras will also be used to check for signs of badgers leaving the sett entrances. These will be stationed around each sett to monitor activity at the entrances. An experienced ecologist will check the sett every two-three days over the 21-day period or greater if required. During each visit, the ecologist will check each entrance, ensuring the one-way gate mechanism is working effectively, check the sticky sticks and sand for hairs and prints, and checking the camera trap footage. The ecologist will also do a thorough check of the mesh ensuring the closure is secure and no breaches have occurred.
- 8.8.5 The setts will then be closed once it has been ascertained that all animals have been successfully excluded (after at least 21 days of monitoring).
- 8.8.6 Those setts with sett entrances located outside of the working area that will not require direct destruction, to facilitate the construction works, will have temporary

closure. For these setts, the one-way gates will be removed and the entrances will be securely closed using heavy-duty weld mesh fencing to prevent the badgers from digging back into the sett during the construction period. The sett will be left in situ and will not be destroyed. If any tunnels are breached during works the exposed ends of tunnels will be closed to prevent badgers re-entering (either using chain-link netting or by fitting one-way gates, if considered necessary) and the area around the entrance will be secured against re-entry by badgers using chain-link netting.

- 8.8.7 The setts that are located within the working area, or with entrances in very close proximity to the working area, will require permanent closure. These setts will be destroyed under the direction of the licence holder or an accredited agent once it has been ascertained that all animals have been successfully excluded (after at least 21 days of monitoring). Destruction will be undertaken with a JCB or similar, commencing at approximately 30 m from the outer sett entrances and working towards the centre of the setts, cutting 0.5 m slices in a trench to a depth of 2 m. This will be carried out in such a manner to ensure that top soil and sub soil are not mixed. Exposed tunnels will be checked for recent badger activity. The sett will be destroyed from several directions, in the above manner, until only the central core of the sett remains. Once it is ensured that no badgers remain, the core will also be destroyed and the entire area back-filled and made safe. Sett excavations should be concluded within one working day, as badgers may re-enter exposed tunnels and entrances.

8.9 Partial sett reduction method

- 8.9.1 There are two main setts (setts 80 and 180) for which the majority of the sett entrances lie outside of the scheme boundary, with only one or two entrances located within the working area. In these cases, full closure of the main setts and provision of suitable alternative setts is considered inappropriate. It is therefore proposed that there is partial reduction of these setts. This will be achieved by 'live digging' the entrances and tunnels located within the working area and closing the exposed ends of tunnels. Based on the current mapped extent of these setts, this is anticipated to impact a small proportion of each sett, retaining enough of the setts to support the social groups. Furthermore, both setts are located on boundary features that extend away from the scheme boundary, therefore allowing for the setts to be naturally extended away from the works.
- 8.9.2 Update surveys will be undertaken prior to closure to ensure that the mapped extent of the sett is correct, that there has been no significant changes to the sett, and that the method is still appropriate. If this is not the case, other mitigation options will be required, which may involve full closure and provision of alternative setts.
- 8.9.3 The sett reductions will be carried out under a Natural England Development licence between 1 July and 30 November. The works will be overseen by an experienced ecologist with prior experience of live digging at badger setts. The process will involve the careful excavation of substrate to expose the tunnels, which will be regularly checked by the ecologist for presence of badgers. All tunnels encountered within the works area will be carefully excavated back to their conclusion, to confirm that no part of the sett remains within the work area. The exposed ends of tunnels will have one-way gates fitted and the area around the

gate secured against re-entry by badgers using chain-link netting. The gate will be left in place for 21 days and monitored, and then the tunnels will be hard stopped or filled in.

8.10 Monitoring

- 8.10.1 Artificial setts will be monitored regularly following their installation up to the time of closure of the main sett, to ensure badgers have found the new artificial sett. Closure of the main setts will not be undertaken until it has been demonstrated that the artificial sett is in use by the badgers. Following closure of the existing main setts the artificial setts will be monitored quarterly throughout construction. If badgers, try to dig back into the Scheme during construction, the monitoring data will show whether the mitigation is used as intended, or whether further measures are required.
- 8.10.2 All setts that have been closed under licence from Natural England will be monitored weekly as part of the duties of the onsite ECoW/licence holder until the sett is destroyed or reopened if temporarily closed. Attempts by badgers to re-excavate setts and to re-enter exclusion areas before setts are destroyed will be closely monitored. Exclusion barriers will be maintained to ensure they remain viable. If badgers have re-entered setts, works that are likely to cause damage or disturbance to it will cease until the sett has been successfully excluded again; Natural England will be consulted throughout in the event of this happening and a revised licence would be sought, where necessary.
- 8.10.3 Monitoring will be undertaken of those setts where partial sett reduction is undertaken by the onsite ECoW/licence holder for up to two months following the partial closure. This will be undertaken to demonstrate continued use of the sett following the partial closure and to ensure that badgers do not try to re-excavate the closed section of the sett.

8.11 Sett re-instatement method

- 8.11.1 All setts that are temporarily closed during the construction works will be re-opened following completion of the scheme or following completion of works within that location where deemed appropriate. This will be detailed within Natural England Development licence.

Table 48: Timetable of Mitigation Based on Construction Timetable - Details of badger setts that will require closure

Sett ID	Dates of commencement of construction activities proposed within 30 m of sett ⁶⁶		Closure required	Required closure period	Comments
	First construction activities	Activities requiring excavation or drilling			
Route Section 1					
146 [dis]	Sep-20	Dec-20	Yes (permanent)	Before works commence (non-licensable)	Closure recommended as soon as possible.
Route section 2					
175	Jan-21	Sep-21	Potentially required (temporary)	Jul-20 to Nov-20	Anticipated that sett can be retained.
180	Nov-20	May-21	Yes (partial sett reduction)	Jul-20 to Nov-20	Closure may not be required if changes in route design could be implemented.
181	Nov-20	May-21	Yes (permanent)	Jul-20 to Nov-20	
Route section 3					
59	Feb-21	Aug-21	No		No impacts anticipated, but clarification required.
64	Mar-21	Jan-22	Potentially required (temporary)	Jul-20 to Nov-20	Closure may be required depending on the nature of the works within 30 m.
173	Apr-21	Nov-21	Yes (permanent)	Jul-20 to Nov-20	Potentially only temporary closure, depending on the works. May be preferable to close during second closure period (Jul-21 to Nov-21).

⁶⁶ Approximate dates of commencement of construction activities are based on the Time Chainage Diagram. The first activities to commence are the construction of compounds (in certain locations) or installation of pre-construction drainage. The activities that are anticipated to require significant excavation or drilling (and are therefore considered to be of greater impact to any badger setts present) that commence first will be direction drilling (HDD) and the excavation of trenches.

174	Mar-21	Nov-21	Potentially required (temporary)	Jul-20 to Nov-20	Closure may be required depending on the nature of the works within 30 m. May be preferable to close during second closure period (Jul-21 to Nov-21).
Route section 4					
75	Mar-21	Jun-21	No	Jul-20 to Nov-20	No impacts anticipated, but further survey required.
80	May-21	Jun-22	Yes (partial sett reduction)	Jul-21 to Nov-21	Trenching not scheduled until Jun-22 so closure proposed in 2021 but may require closure during 2020 depending on nature of early works.
89 [dis]	May-21	Jul-22	Yes (recommended, temporary)	Before works commence (non-licensable)	Closure recommended as soon as possible.
90	May-21	Jul-22	Yes (temporary)	Jul-21 to Nov-21	Trenching not scheduled until Jun-22 so closure proposed in 2021 but may require closure during 2020 depending on nature of early works.
92 [dis]	May-21	Jul-22	Yes (recommended, temporary)	Before works commence (non-licensable)	Closure recommended as soon as possible.
166	May-21	Jul-22	Yes (temporary)	Jul-21 to Nov-21	Trenching not scheduled until Jun-22 so closure proposed in 2021 but may require closure during 2020 depending on nature of early works.
168	May-21	Jun-22	Potentially required (temporary)	Jul-21 to Nov-21	Closure may be required depending on the nature of the works within 30 m.

9 APPENDIX – DESIGNATED SITES AND HABITATS

9.1 General Method Statement for Species Protection and Other Mitigation Measures

Timing of works

- 9.1.1 Much of the mitigation set out below will apply for the duration of the construction phase. The habitat monitoring and management will continue for 5 years into the operational phase of the scheme. Any changes in habitat quality after five years will not be recorded and there will be no opportunity for further habitat management, which could either reduce the value of the habitat in the long-term, or mean that additional, unpredicted benefits are not recorded. The time between habitat loss and reinstatement will be minimised. Construction is due to begin in August 2020 at the northern end of the scheme and will start along the length of the scheme to the south sequentially, so works in the southern end will start in September 2021. Most works will be completed within the northern end by October 2021 and May 2023 in the southern end. The timetable in section 9.2 below sets out broad timings of works near designated sites and important habitats. On average there will be a year of habitat loss in any one location before it gets reinstated. Where possible trees and hedges that are removed will be moved nearby in the scheme and replanted immediately, to minimise the temporary loss of woody habitat during the works, and to maximise the woody cover and localness of the planting. Where new stock is brought in it will be locally sourced, native and where possible organic. Some detail on the planting plans is given in the paragraph below, more detail such as the habitat reinstatement and management requirements will be set out in the Landscape Restoration Strategy (LRS). The LRS will also set out the approach to post-construction monitoring including triggers for and details of appropriate remedial action.

Ecological Clerk of Works (ECoW)

- 9.1.2 The ECoW in relation to habitats will be suitably experienced and be a member of the Chartered Institute of Ecology and Environmental Management and signed off as capable of extended Phase 1 habitat survey, with at least a FISC level 3 or be closely supervised by such an individual.
- 9.1.3 The key role of the ECoW during construction activities will be to assist with micro siting works away from important habitats as well as monitoring the implementation of habitat Method Statements, to ensure their legal compliance.
- 9.1.4 The ECoW will be present at the start of clearance of the important habitats (trees, woodland, hedges and works near designated site or drains) to confirm works proceed in accordance with this CEMP VKL-BB-ENV-00-PL-EN-20528. The clearance of the important habitats will then take place under supervision of the ECoW or another responsible person briefed by the ECoW.
- 9.1.5 All employees are to be made aware of ecologically important habitats and designated sites and the embedded mitigation at each work location through site specific briefings and tool box talks (TBT's).
- 9.1.6 All employees will be vigilant on site reporting any breaches to the bunds and/or mitigation controls. Works in or near to the important ecological habitats, will not be undertaken without the relevant consents in place from NGVL and under the

instruction of the ecological advisor/ECoW. All hedge removal notices will be in place before ecologically important hedges are removed.

General embedded mitigation

Pollution prevention

- 9.1.7 Site run-off and potential pollution events will be prevented from entering the surrounding drainage network in line with Environment Agency pollution prevention guidance notes and a range of good practice working methods. This will be achieved using bunds to catch and divert runoff, drip trays to prevent any oil and fuel spillages spreading and the avoidance of storage of any materials in close proximity. Windblown dust will be minimised by using wheel washing and damping down, while net fencing will catch windblown rubbish. To address the risk of singular accidental events, mitigation measures include provision of spill kits and emergency response procedures. These measures will be effective upon commencement of construction.

Demarcation of working Areas

- 9.1.8 There will be a demarcation of the working areas (including storage areas and accesses), using appropriate fencing (e.g. stock proof where relevant), to protect retained habitats including woodland, scattered trees, hedges, water courses, drains, designated sites and priority habitat and will take place under supervision and at the appropriate time of year, as appropriate to the site in question; and there will be prompt reinstatement of habitats to their former condition, including any measures to enhance species diversity.

Tree Protection

- 9.1.9 Woodland, hedgerow, scrub and tree loss will be minimised by marking out and micro-siting construction activities with the ECoW prior to works commencing. Where possible, trees will be preserved in situ to minimise the impact on those within the route through design such as utilising natural breaks in tree lines. Wherever mature trees are identified on a work scheme the Local Authority will be contacted to identify if a tree preservation order is in place. Currently Lincolnshire County Council's online mapping identifies six trees on or near to the line that may be subject to a TPO.
- 9.1.10 Tree protection measures will be implemented where required when works are within 15 m (i.e. maximum tree root zone) of woodland, hedgerows, scrub with trees and scattered trees. These measures will accord with current standards (BS:5837:2012 Trees in relation to design, demolition and construction – Recommendations). All tree and hedgerow works will comply with BS3998:2010 'Tree Work – Recommendations'. No trees will be pruned, cut back or removed without full consultation with the Ecological Clerk of Work (ECoW). Trees that are to be retained within the working area will be subject to appropriate tree protection measures using BS 5837:2012 (in relation to design, demolition and construction – Recommendations) to calculate the minimum distances for protective fencing where required. These measures will minimise incidental damage and disturbance to the habitats and the species they support⁶⁷.

⁶⁷ For further details of measures please see the Construction Environmental Management Plan (doc reference VKL-BB-ENV-00-PL-EN-20528) Section 5.6.7

Removal of Habitats

- 9.1.11 A method statement will be prepared for the removal or translocation of important habitats, including priority habitats, important hedges and bluebells.
- 9.1.12 Tree/hedgerow removal will be a seasonally staged process. Should hedgerow coppicing or vegetation management works within the bird nesting season be unavoidable, the risk of active nests being present will increase significantly. In this instance hedgerows and vegetation would be checked by an experienced ecologist for nesting birds immediately prior to works commencing and removed under supervision of an ecologist. Tree removal activities will be fully documented.
- 9.1.13 Where possible existing gaps in hedgerows will be utilised, where hedgerow is to be removed this will be minimal and the gaps replanted post construction. Where hedgerow removal is required to establish a working area/access, the extent of hedge removal will be kept to the minimum required. Where works are near, or parallel to a hedgerow, a 15 m buffer zone (where possible) will be left between the hedgerow and the work area to minimise disruption.

Landscape Planting Plans

- 9.1.14 Broad plans for the Landscape Restoration Plan that is yet to be written are as follows:
- 9.1.15 Grassland replacement would generally match the use of land prior to construction. Appropriate seed mixes will be determined in consultation with the landowners, in order to seek to replicate current conditions.
- 9.1.16 Where non-statutory designated sites are affected, reinstatement will also be discussed and agreed with the Local Wildlife Trust.
- 9.1.17 Hedgerows and trees removed to facilitate the construction of the DC cable route will be reinstated with native mix. Replacement hedgerow planting will follow the existing landscape pattern. Hedgerow planting would include locally appropriate native species (*Acer campestre* (10%), *Cornus sanguinea* (10%), *Corylus avellane* (10%), *Crataegus monogyna* (35%), *Euonymus europaeus* (10%), *Prunus spinosa* (10%), *Sambucus nigra* (10%) and *Ilex aquifolium* (5%)). The planting specifications for hedgerows are outlined in the reinstatement plans. Livestock fencing would be provided to safeguard planted specimens as appropriate. Where 'Important' hedgerows are crossed, reinstatement planting will ensure that the species diversity of the hedgerow is maintained including the planting of additional species if required.
- 9.1.18 All vegetation disturbed by construction will be reinstated, with most areas expected to be returned to arable farming during the first available planting season. In addition, road verges and other areas affected temporarily will be seeded with species rich wildflower or grass seed mix. These mixes will be designed to reflect local species mix to provide landscape, biodiversity and habitat enhancement. Planting of woodland edge mix will consist of shallower rooting species where technical constraints allow woodland reinstatement.
- 9.1.19 Where open-cut crossings of watercourses/drains are undertaken, they will be backfilled and the natural channel form reinstated. As only short sections of watercourses/drains are affected, it is intended that the banks will be allowed to re-colonise naturally, in agreement with stakeholders. If bank and soil stabilisation is required, this will be provided using geotextile or coir matting.
- 9.1.20 Replacement planting would take time to establish. This assessment is based on 1-3 years for grassland, 2-4 years for new aquatic vegetation, 3-5 years for hedgerows and 15 years for trees, depending on the species and age-class planted. It is recognised that this describes the time for the sward, whips or standards to establish but longer periods would be required to allow semimature trees or hedgerows (e.g. those over 3 m high) to develop i.e. over 5 years for tall hedgerows. These timeframes broadly correspond to the timescales and feasibility for creation/restoration as set out in the national biodiversity net gain guidance⁶⁸. Hedgerows are listed as of 'Low' technical difficulty to recreate or restore. Vegetation growth at 15 years (against which residual effects are determined) assumes hedgerow planting has reached a height of 1.5 m, understory shrub planting at 4-6 m and native tree planting 7-10 m (depending on maintenance). Management will be provided over a 5 year period to ensure reinstatement planting takes place and habitats establish as intended.
- 9.1.21 Monitoring during the operational phase will relate to the establishment of habitat

⁶⁸ Natural England Biodiversity Metric 2.0 <http://publications.naturalengland.org.uk/publication/5850908674228224>

reinstatement works and landscape planting, in addition to any post-completion mitigation monitoring requirements such as that required by protected species licences. Detailed monitoring of habitat recovery will be undertaken in non-statutory sites which have been directly affected, with the implementation of remedial measures if required.

Hydrology

- 9.1.22 Embedded hydrology mitigation will ensure run-off rates remain consistent with baseline conditions and therefore any effects will be not significant to habitats and designated sites. Potential impacts to the water environment will be avoided where practicable, through careful consideration of the construction drainage design, construction techniques and operational best practices of the DC cable route. The Environment Agency, Lead Local Flood Authority and IDB will be consulted through the construction works planning process to ensure all appropriate permits and consents are in place.
- 9.1.23 All construction work will be undertaken in accordance with good practice guidance including, but not limited to:
- EA, Pollution Prevention Guidance Note 6 (PPG6): Pollution Prevention Guidelines – Working at Construction and Demolition Sites (EA, 2012);
 - EA, Pollution Prevention Guidance Note 5 (PPG5):– Working in, near or liable to affect watercourses (EA, 2007);
 - EA guidance for discharges to surface water and groundwater: environmental permits;
 - EA guidance for oil storage regulations for businesses;
 - Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors CIRIA (C532);
 - CIRIA – SuDS Manual (CIRIA, 2015);
 - EA guidance for work on a river, flood defense or sea defense;
 - Prevent surface water being affected during earthwork operations;
 - No discharge to surface watercourses will occur without permission from the EA (SuDS Manual);
 - Wheel washers and dust suppression measures to be used as appropriate to prevent the migration of pollutants (SuDS Manual); and
 - Regular cleaning of the permanent access road and temporary accesses of any construction waste and dirt to be carried out (SuDS Manual).
- 9.1.24 Where culverts are installed into wet drains for temporary access, disruption to the flow of watercourses during construction will be short-term with the flow reinstated once the culverts are in place. Given the current management regimes ongoing for these drains, involving regular dredging and cutting, the installation of the culverts is extremely unlikely to have a significant effect on the ecological features of these watercourses.

Biosecurity

- 9.1.25 The aquatic vegetation and habitat surveys identified one invasive plant species, Nuttall's pond weed, as being present along the route. The plant species will be avoided, wherever possible, with works keeping a distance (over 10 m) from any known Nuttall's pond weed location, and all boots and wheels checked, cleaned and dried before and after works to prevent the invasive plants spread. In this way the hazard will be managed throughout works. Areas identified will be marked and recorded and 10 m exclusion zones erected.
- 9.1.26 If avoidance is not possible, a specialist contractor will be brought in to treat and remove Nuttall's pond weed in that area, prior to works. Removal will be considered as a last resort, and any removal will be subject to all waste management controls and identified in the Site Waste Management Plan.
- 9.1.27 All site personnel will be briefed on actual and potential invasive species and the associated mitigation, through toolbox talks and the project environmental induction.
- 9.1.28 The route predominantly runs through agricultural land, as such it is anticipated that land owners will have their own bespoke biosecurity requirements. Following engagement with the local landowners, requirements will be arranged and the location of any biosecurity points where disinfectants and/or sprays will be used will be agreed.
- 9.1.29 To restrict spread of tree pathogens, all equipment and machinery and vehicles used for tree, hedge and shrub removal will be cleaned, disinfected and used in accordance with current Forestry Commission biosecurity guidance⁶⁹. The ECoW will advise on whether each working area requires 'red' or 'amber' level biosecurity precautions. These measures will be effective upon commencement of construction.

Seeding of Stockpiles

- 9.1.30 Where stockpiles of soil are created and stored for durations longer than three months, management of the stockpiles will follow the Soil Handling and Storage Protocol⁷⁰ (SHSP VKL-BB-ENV-00-PL-EN-20471). As currently detailed in the SHSP VKL-BB-ENV-00-PL-EN-20471 the short duration of stockpiles associated with the cable trenches would not allow for successful seeding. As such, these stockpiles will only be seeded on reinstatement, in agreement with the landowner, if during the germination period of March to October, a maximum of 4 weeks after backfilling. If the soil is backfilled outside of the germination period, it will be seeded at the beginning of the next germination period. The soil will be seeded as per pre-construction condition in agreement with the landowner.
- 9.1.31 All spoil piles associated with the construction compounds will be seeded with a native (where possible organic) seed mix, in agreement with the landowner, to stabilise stockpiles and prevent erosion.

⁶⁹ The Forestry Commission biosecurity guidance can be found here: <https://www.gov.uk/guidance/prevent-the-introduction-and-spread-of-tree-pests-and-diseases#industry-professionals>

⁷⁰ Document number VKL-BB-ENV-00-PL-EN-20471, submitted with the CEMP

Table 49: Timetable of mitigation in the vicinity of designated sites and important habitats

Designated site or habitat feature	Approximate dates of construction activities within the vicinity of designated site or habitat (including start and end chainage of area effected)		Action required
	Start	End	
Route Section 1			
The Rigsby Road Verges Local Wildlife Site (LWS)/ Rigsby Roadside Nature Reserve	Oct 2020 (12240)	Feb 2022 (12300)	Embedded mitigation, pollution prevention and demarcation of working areas, micro siting works, toolbox talks, biosecurity measures, sensitive timing, ECoW presence at start of works, root protection zones
Rigsby Wood LWS/ Local Wildlife Trust reserve/ Ancient Woodland	Oct 2020 (11310)	Feb 2022 (11870)	Embedded mitigation, pollution prevention and demarcation of working areas, micro siting works, toolbox talks, biosecurity measures, sensitive timing, ECoW presence at start of works, root protection zones
Sandilands Golf Course and Dunes LWS	Unknown ⁷¹ – likely Aug 2020 (<0)	Unknown (<0)	Embedded mitigation, pollution prevention and demarcation of working areas, micro siting works, toolbox talks, biosecurity measures, sensitive timing, ECoW presence at start of works, root protection zones

⁷¹ Sandilands Golf Course and Dunes LWS is located in an area that is before chainage '0'. Works timetabling starts at chainage '0'. Works look to be underground until this point.

Firsby to Louth Dismantled Railway SNCI	Jan 2021 (10780)	Dec 2021 (10830)	Embedded mitigation, pollution prevention and demarcation of working areas, micro siting works, toolbox talks, biosecurity measures, sensitive timing, ECoW presence at start of works, root protection zones, natural regeneration of habitat lost
Potential coastal floodplain grazing marsh near Wold View Farm	Sep 2020 (2780)	Sep 2021 (3110)	Embedded mitigation, pollution prevention and demarcation of working areas, micro siting works, toolbox talks, biosecurity measures, sensitive timing, ECoW presence at start of works
Important hedge 55, with bluebell	Oct 2020 (7810)	Nov 2021 (7910)	Bluebell translocation, method statement for removal adhered to, root protection zones, hedgerow reinstatement planting to maintain species diversity and additional species if required
Area of bluebells near Target Note 62	Oct 2020 (11600)	Feb 2022 (11780)	Bluebell translocation
All hedges, woodland, scattered trees, scrub with trees, watercourses and drains, as well as any Nuttall's pond weed that is found	Various	Various	Implement method statements as required, e.g. translocation, protect retained habitat, removal of habitat. Embedded mitigation, pollution prevention and demarcation of working areas, micro siting works, toolbox talks, biosecurity measures, sensitive timing, ECoW presence at start of works, hydrology mitigation. Implement planting in line with landscape restoration plan, including monitoring and management
Route section 2			
A16 Road Verge, Dalby Bar LWS	Nov 2020 (18200)	Jul 2022 (18820)	Embedded mitigation, pollution prevention and demarcation of working areas, micro siting works, toolbox talks, biosecurity measures, sensitive timing, ECoW presence at start of works, root protection zones

East Keal Clay Pit LWS	Nov 2020 (27540)	Aug 2022 (28070)	Embedded mitigation, pollution prevention and demarcation of working areas, micro siting works, toolbox talks, biosecurity measures, sensitive timing, ECoW presence at start of works, root protection zones
Hocker Holt LWS	Feb 2021 (24370)	Jun 2022 (24460)	Embedded mitigation, pollution prevention and demarcation of working areas, micro siting works, toolbox talks, biosecurity measures, sensitive timing, ECoW presence at start of works, root protection zones. Adhere to any planting recommendations.
Wheelabout Wood SNCI	Feb 2021 (26550)	Nov 2021 (26660)	Embedded mitigation, pollution prevention and demarcation of working areas, micro siting works, toolbox talks, biosecurity measures, sensitive timing, ECoW presence at start of works, root protection zones
Bluestone Heath Copse SNCI	Nov 2020 (14610)	Jun 2022 (14660)	Embedded mitigation, pollution prevention and demarcation of working areas, micro siting works, toolbox talks, biosecurity measures, sensitive timing, ECoW presence at start of works, root protection zones
Callow Carr LWS/ Ancient Woodland	Nov 2020 (18780)	Jul 2020 (19330)	Embedded mitigation, pollution prevention and demarcation of working areas, micro siting works, toolbox talks, biosecurity measures, sensitive timing, ECoW presence at start of works, root protection zones
Manor Farm, Mavis Enderby LWS	Feb 2021 (24180)	Jun 2022 (24500)	Embedded mitigation, pollution prevention and demarcation of working areas, micro siting works, toolbox talks, biosecurity measures, sensitive timing, ECoW presence at start of works, root protection zones
Silver Pits Ulceby SNCI	Feb 2021 (15010)	Jun 2022 (15190)	Embedded mitigation, pollution prevention and demarcation of working areas, micro siting works, toolbox talks, biosecurity measures, sensitive timing, ECoW presence at start of works, root protection zones

Important hedge 46	Jan 2021 (20000)	Jan 2022 (20270)	Method statement for removal adhered to, root protection zones, hedgerow reinstatement planting to maintain species diversity and additional species if required
All hedges, woodland, scattered trees, scrub with trees, watercourses and drains, as well as any Nuttall's pond weed that is found	Various	Various	Implement method statements as required, e.g. translocation, protect retained habitat, removal of habitat. Embedded mitigation, pollution prevention and demarcation of working areas, micro siting works, toolbox talks, biosecurity measures, sensitive timing, ECoW presence at start of works, hydrology mitigation. Implement planting in line with landscape restoration plan, including monitoring and management
Route section 3			
Braygate Lane SNCI	Sep 2020 (30030)	Jul 2023 (30170)	Embedded mitigation, pollution prevention and demarcation of working areas, micro siting works, toolbox talks, biosecurity measures, sensitive timing, ECoW presence at start of works, root protection zones
Lowland deciduous woodland by Skirbeck Farm	Feb 2021 (40840)	Oct 2022 (40950)	Embedded mitigation, pollution prevention and demarcation of working areas, micro siting works, toolbox talks, biosecurity measures, sensitive timing, ECoW presence at start of works, root protection zones. Adhere to any planting recommendations.
Lowland deciduous woodland by the River Witham,	Mar 2021 (50370)	Oct 2022 (50440)	Embedded mitigation, pollution prevention and demarcation of working areas, micro siting works, toolbox talks, biosecurity measures, sensitive timing, ECoW presence at start of works, root protection zones. Adhere to any planting recommendations.
Potential coastal floodplain grazing marsh priority habitat near Hagnaby Lock	Mar 2021 (34210)	Nov 2022 (34620)	Embedded mitigation, pollution prevention and demarcation of working areas, micro siting works, toolbox talks, biosecurity measures, sensitive timing, ECoW presence at start of works.

Important hedges 7	Feb 2021 (40850)	Oct 2022 (40910)	Method statement for removal adhered to, root protection zones, hedgerow reinstatement planting to maintain species diversity and additional species if required
Important hedges 41	Feb 2021 (29060)	Jun 2022 (29120)	Method statement for removal adhered to, root protection zones, hedgerow reinstatement planting to maintain species diversity and additional species if required
Nuttall's pond weed in drain 447	Apr 2021 (50410)	Oct 2022 (50510)	Avoid the plant, check, clean and dry boots and wheels. Where works must proceed in vicinity to the plant, a specialist contractor will be needed to treat and remove Nuttall's pondweed in that area prior to works.
All hedges, woodland, scattered trees, scrub with trees, watercourses and drains, as well as any Nuttall's pond weed that is found	Various	Various	Implement method statements as required, e.g. translocation, protect retained habitat, removal of habitat. Embedded mitigation, pollution prevention and demarcation of working areas, micro siting works, toolbox talks, biosecurity measures, sensitive timing, ECoW presence at start of works, hydrology mitigation. Implement planting in line with landscape restoration plan, including monitoring and management
Route section 4			
Great Hale Eau LWS	Jul 2021 (59740)	Jun 2023 (60470)	Embedded mitigation, pollution prevention and demarcation of working areas, micro siting works, toolbox talks, biosecurity measures, sensitive timing, ECoW presence at start of works, root protection zones
Old Forty Foot Drain to South Forty Foot Drain LWS	Nov 2021 (63040)	Apr 2023 (63080)	Embedded mitigation, pollution prevention and demarcation of working areas, micro siting works, toolbox talks, biosecurity measures, sensitive timing, ECoW presence at start of works, root protection zones

South Forty Foot Drain LWS	July 2021 (58960)	Jun 2023 (64770)	Embedded mitigation, pollution prevention and demarcation of working areas, micro siting works, toolbox talks, biosecurity measures, sensitive timing, ECoW presence at start of works, root protection zones
Potential coastal floodplain grazing marsh by Skerth Drain	Jul 2021 (55520)	Dec 2022 (55620)	Embedded mitigation, pollution prevention and demarcation of working areas, micro siting works, toolbox talks, biosecurity measures, sensitive timing, ECoW presence at start of works.
Nuttall's pond weed in drains 747, 481, 509 and 737 ⁷²	May 2021 (51640)	Mar 2023 (59270)	Avoid the plant, check, clean and dry boots and wheels. Where works must proceed in vicinity to the plant, a specialist contractor will be needed to treat and remove Nuttall's pondweed in that area prior to works.
All hedges, woodland, scattered trees, scrub with trees, watercourses and drains, as well as any Nuttall's pond weed that is found	Various	Various	Implement method statements as required, e.g. translocation, protect retained habitat, removal of habitat. Embedded mitigation, pollution prevention and demarcation of working areas, micro siting works, toolbox talks, biosecurity measures, sensitive timing, ECoW presence at start of works, hydrology mitigation. Implement planting in line with landscape restoration plan, including monitoring and management

⁷² These 4 drains intersect the Scheme at discrete locations between the chainage brackets given