The Great Grid Upgrade

North Humber to High Marnham

NHHM-NG-CNS-REP-0010

North Humber to High Marnham

Volume 5: Reports and Statements

Document 5.9 Design Development Report

Final Issue A

October 2026

Planning Inspectorate Reference: EN020034

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

nationalgrid

Contents

Executive summary 1

1. Introduction 3

1.1 Purpose of This Report 3

1.2 Overview 3

1.3 The Need for the Project 4
Project Description 5

1.4 Associated Substations 5
Project Timeline 6

1.5 Structure of This Report 6

1.6 Relationship to Other Documents 7

2. Legislation and National Policy Context 8

2.1 Introduction 8

2.2 Planning Act 2008 8

2.3 Planning and Infrastructure Act 2025 8

2.4 Electricity Act 1989 9

2.5 National Planning Policy 9
Overarching National Policy Statement for Energy (EN-1) (2025) 10
National Policy Statement for Renewable Energy Infrastructure (EN-3) (2025) 11
National Policy Statement for Electricity Networks Infrastructure (EN-5) (2025) 11

2.6 Planning Inspectorate Guidance 14
Nationally Significant Infrastructure Projects: Advice on Preparing Applications for Linear Projects 14
Nationally Significant Infrastructure Projects: Advice on Good Design (2024) 15

3. Statutory Consultation Feedback 18

3.1 Statutory Consultation 2025 18
Context 18
Consultation Corridor 19
Changes to the Statutory Consultation Design Covered by the DDR 20
Consideration of Statutory Consultation Feedback 21
Further Persons with Interest in Land Consultation 2025–2026 21
Changes to Statutory Consultation design not covered by the DDR 22

4. Review of Project Evolution 23

4.1 Project Evolution 23

4.2 Strategic Proposal 23

4.3 Options Identification and Selection 24

4.4 Defined Proposal and Statutory Consultation 25

4.5 Assessment and Land Rights 26

5. Design Evolution 27

5.1 Overview 27

5.2 Design Principles and Technical Considerations 27
Close Parallel Opportunities 27
Line Swap Overs 28

5.3 Pylon Type Considerations 28

5.4 Conductor Type Considerations 28

5.5 Environmental, Socio-economic and Planning Considerations 29

5.6 Approach to Mitigation 30
Environmental Statement 30

6. Design Development 31

6.1 Introduction 31

6.2 Whole Route 31
Distribution Network 31
Mitigation Planting 32
Species Mitigation 32
Landowner Requests 32

6.3 Route Section A – between the proposed Birkhill Wood Substation and the River Ouse 33
Overview 33
Summary of Design Development 36

6.4 Route Section B – between the River Ouse and Crowle 49
Overview 49
Summary of Design Development 51

6.5 Route Section C – between Crowle and North Moor (M180) 62
Overview 62
Summary of Design Development 64

6.6 Route Section D – between North Moor (M180) and the River Idle 71
Overview 71
Summary of Design Development 73

6.7 Route Section E – between the River Idle and Darlton 83
Overview 83
Summary of Design Development 85

6.8 Route Section F – between Darlton and the proposed High Marnham Substation 94
Overview 94
Summary of Design Development 96

7. Temporary Works 99

7.1 Overview 99

7.2 Transport Assessment 99

7.3 Construction Strategy 99
Construction Haul Road 99
Crossing Protection Scaffolding 100
Conductor Stringing Positions 100
Temporary Public Right of Way Management 101

Temporary Management of the Road Network 101
7.4 Temporary Works Compounds 102
7.5 Work by Third Parties 102
8. Next Steps 103
8.1 Introduction 103
8.2 Mitigation Measures 103
8.3 The DCO Process and Timeline 103

Table 3.1 – Project Route Sections 19
Table 3.2 – Extensive Design Changes 20

Image 1.1 – Project timeline 6
Image 4.1 – National Grid's approach to project development and delivery 23
Image 6.1 – Route Section A – Design Change Overview 35
Image 6.2 – Temporary compound relocation near Birkhill Wood Substation 37
Image 6.3 – Changes to construction accesses and working areas in Route Section A 39
Image 6.4 – Repositioning of Pylon 4AF6 40
Image 6.5 – Repositioning of a bellmouth from Dunflat Road 41
Image 6.6 – Realignment near Skidby 42
Image 6.7 – Mitigation planting and operational and maintenance access along Rowley Road 43
Image 6.8 – Pylon repositioning near Riplingham 44
Image 6.9 – Ings Lane construction haul road 45
Image 6.10 – Repositioning of Pylon 4AF51 46
Image 6.11 – Accesses near Broomfleet 47
Image 6.12 – Temporary works compound near Ellerker 48
Image 6.13 – Route Section B – Design Change Overview 50
Image 6.14 – Working areas near the River Ouse 51
Image 6.15 – River Ouse crossing realignment 53
Image 6.16 – Ousefleet bellmouth and construction haul road relocation 55
Image 6.17 – Church Lane Construction Vehicles 56
Image 6.18 – Undergrounding of a Distribution Network Operator asset near Pylon 4AF80 57
Image 6.19 – Carr Lane construction haul road 59
Image 6.20 – Pylon realignment south of Luddington 61
Image 6.21 – Route Section C – Design Change Overview 63
Image 6.22 – Washinghall Lane and Keadby Wind Farm 65
Image 6.23 – Fibre optic diversion 66
Image 6.24 – Temporary access track for Pylon ZDA115 67
Image 6.25 – Widening of Bonnyhale Road 68
Image 6.26 – Ealand Viaduct construction access 70
Image 6.27 – Route Section D – Design Change Overview 72
Image 6.28 – Realignment east towards Beltoft 74
Image 6.29 – Pylon movements by Melwood Hill 76
Image 6.30 – Pylon movements by East Lound 78
Image 6.31 – Pylon movements east of Graizelound 80
Image 6.32 – Repositioning of Pylon 4AF166 81
Image 6.33 – Pylon movements before the River Idle 82
Image 6.34 – Route Section E – Design Change Overview 84
Image 6.35 – Construction access between pylon 4AF171 and 4AF174 85
Image 6.36 – Realignment between pylons 4AF175 and 4AF185 87
Image 6.37 – Realignment to the west of Beckingham 89
Image 6.38 – Pylon positions and construction accesses near Sturton-le-Steeple 91
Image 6.39 – Pylon 4AF230 repositioning to the west of Treswell 92
Image 6.40 – Construction access by Retford Road 93
Image 6.41 – Route Section F – Design Change Overview 95
Image 6.42 – Pylon positions near East Drayton 96
Image 6.43 – Pylon rationalisation towards High Marnham Substation 98

Bibliography 104

Appendix A Aviation Assessment

Executive summary

National Grid Electricity Transmission plc (National Grid), owns, builds and maintains the high voltage electricity transmission network in England and Wales. National Grid is responsible for making sure electricity is transported safely and efficiently from where it's produced to where it's needed. National Grid has developed plans for the North Humber to High Marnham Project (the Project). The Project would support the UK government's net zero target through the connection of new low carbon energy generation and by reinforcing the transmission network.

The Design Development Report (DDR) presents the main changes that have been made to the Project since the completion of statutory consultation that ran from February to April 2025. The Project design has previously been informed by feedback received during the non-statutory consultation in 2023 and localised non-statutory consultation in 2024. This feedback has been reviewed and considered with the results of environmental, socio-economic, transport and engineering studies alongside the findings from the Environmental Impact Assessment (EIA).

Chapter 6 of this DDR describes the main changes to the Project design following the 2025 statutory consultation process which are listed below. Other changes to the design have also been made, although these are not covered by this DDR due to their scale and nature. All changes to the design requested through statutory consultation feedback are explained within **Application Document 5.1 Consultation Report**.

All implemented changes build on the preferred alignment derived for the 2025 statutory consultation (the 2025 design). Further information on the background of how the route has evolved can be found in **Application Document 7.18 Corridor and Preliminary Routeing and Siting Study** which identified an emerging preferred corridor for the Project and **Application Document 7.20 Design Development Report - 2025** which identified the alignment and design consulted on during 2025 non-statutory consultation.

In summary, the main changes to the design that are covered by this report are as follows:

Location	Project Design Change	Design Change Explanation
Route Section A	Temporary compound relocation near Birkhill Wood Substation	Engagement with other projects in the area required temporary compound to be moved further from a Local Wildlife Site and for other infrastructure projects to be deliverable.
Route Section B	Realignment of River Ouse crossing	Feedback from residents informed the movements of pylons 4AF76 and 4AF78 to 4AF84, moving the alignment further from Hall Garth Moated Site Scheduled Monument.
Route Section B	Realignment south of Luddington	A variety of feedback informed the movement of the alignment further from Luddington which enabled a reduction in both the heights of seven pylons and the number of bellmouths required.

Location	Project Design Change	Design Change Explanation
Route Section D	Realignment east towards Beltoft	Landowner feedback informed a realignment between pylons 4AF132 and 4AF142 to increase the extent of triple paralleling and enable a reduction in pylon heights decrease in the area.
Route Section D	Pylon rationalisation east of Graizeland	Landowner feedback informed the repositioning of pylons for more efficient agricultural practices to take place and subsequent removal of a pylon which reduces the Project's local impact.
Route Section E	Realignment between pylons 4AF175 and 4AF185	The Project's surveys identified buried archaeology which required a realignment to reduce potential impacts.
Route Section E	Realignment to the west of Beckingham	The realignment was informed by feedback received from local landowners and iGas. This enabled a reduction in pylon heights and moved the alignment further from residential properties.
Route Section F	Pylon rationalisation towards High Marnham Substation	The Project team identified the opportunity to remove a pylon and reduce disruption on landowners in the area.

1. Introduction

1.1 Purpose of This Report

1.1.1 The purpose of this report is to describe how the design of the North Humber to High Marnham Project (the Project) has evolved since statutory consultation in 2025. The Project has evolved in response to feedback collected during consultation and through further environmental and engineering studies. A review of the design presented at statutory consultation in 2025 and previous design decisions has been undertaken in the light of feedback received and findings from additional surveys and assessments.

1.2 Overview

1.2.1 National Grid Electricity Transmission plc (National Grid) owns and maintains the national high voltage electricity transmission network throughout England and Wales.

1.2.2 The transmission network connects the power from where it is generated to the regional distribution network operators who then supply businesses and homes.

1.2.3 National Grid holds the Transmission Licence for England and Wales, and its statutory duty is to develop and maintain an efficient, coordinated and economical system of electricity transmission and to facilitate competition in the generation and supply of electricity, as set out in the Electricity Act 1989.

1.2.4 National Grid has developed plans for the North Humber to High Marnham Project. The Project would support the UK government's net zero target through the connection of new low carbon energy generation and by reinforcing the transmission network.

1.2.5 The Project would establish a new 400 kilovolt (kV) transmission connection approximately 90 kilometres (km) in length between a new substation to be built in the vicinity of Birkhill Wood, located to the north of Hull near Creyke Beck in the East Riding of Yorkshire, and a new substation at High Marnham in Nottinghamshire.

1.2.6 The reinforcement is needed because the existing transmission network, even with current upgrading, will not have sufficient capacity for the new renewable energy (a substantial proportion of which would be generated by offshore wind) that is expected to connect to the network over the next 10 years and beyond. Completion of the Project, together with other new reinforcements across the country, will meet this future energy transmission demand across the UK.

1.2.7 The Project is a Nationally Significant Infrastructure Project (NSIP), and National Grid is seeking development consent under the Planning Act 2008. NSIPs require a type of planning permission known as a Development Consent Order (DCO). Instead of applying to the local authority for planning permission, the developer must apply to the Secretary of State via the Planning Inspectorate for a DCO.

1.2.8 National Grid has submitted an application for development consent to the Planning Inspectorate for the Project. The Examining Authority (consisting of one or more examining inspectors), after a period of public examination, will make its

recommendation to the Secretary of State for Energy Security and Net Zero, who in turn will decide on whether development consent should be granted.

1.2.9 The Project has been identified as being critical to delivering a network which supports the clean power pathways for 2030 delivery.

1.3 The Need for the Project

1.3.1 With growing renewables integration into the National Electricity Transmission System, such as offshore wind and interconnectors[1], an anticipated tripling of wind generation connected across the Scottish networks by 2030 and the government's increased ambition to connect 50 GW of offshore wind by 2030, north–south power flows are set to increase.

1.3.2 The existing electricity transmission network in the Yorkshire and Humber region was initially developed in the 1960s and has historically been able to meet demand. It was designed to connect the in-land large coal fired power stations in the region, with changes occurring in the later parts of the century in order to connect gas fired power stations and offshore wind.

1.3.3 However, due to the changes noted above in terms of delivering net zero emissions, the existing network in this area does not have the capability to reliably and securely transport all the energy that will be connected by 2030, whilst operating to the standards it is required to.

1.3.4 The existing transmission infrastructure in this area requires reinforcement for the following main reasons:

- The existing transmission network was not designed to transport electricity from where it is increasingly being generated (largely offshore).
- The growth in offshore wind, interconnectors and onshore generation such as battery and solar means that more electricity will be generated in the years ahead than the current network is able to securely and reliably transport.
- In the UK, electricity demand is forecasted to at least double by 2050, increasing the amount of energy needed to be transported to homes and businesses.
- Upgrading the existing network as it is today (such as through replacing cables to carry more power) will not be enough to carry the amount of future power whilst operating to required standards.
- To increase boundary transfer capability in order to reduce wider network generator constraint costs.

1.3.5 The Project would support the UK's net zero target by reinforcing the electricity transmission network between the North of England and the Midlands and facilitate the connection of planned renewable energy projects such as offshore wind generation and interconnectors and increase boundary transfer capability. The Project would help meet future energy requirements.

[1] Interconnectors are high voltage cables that are often used to connect the electricity systems of neighbouring countries.

1.3.6 For further information please refer to the 'Need Case' section contained within **Application Document 7.17 Strategic Options Report Including Needs Case**.

Project Description

1.3.7 The Project is a new 400 kilovolt (kV) electricity transmission connection of approximately 90 kilometres (km) in overall length between two proposed new substations: the 400 kV Birkhill Wood Substation and 400 kV High Marnham Substation.

1.3.8 The proposed new substations are subject to separate planning applications. For more information, see **Application Document 5.4 Consents and Licences Required Under Other Legislation**.

1.3.9 The Project comprises:

- Approximately 90 km of new overhead line (Route Code 4AF) between the proposed new 400 kV Birkhill Wood Substation and 400 kV High Marnham Substation;
- Replacement and re-alignment of a section of the existing 400 kV overhead line (Route Code 4ZQ) between Brantingham and east of Broomfleet;
- Replacement and re-alignment of a section of the existing 400 kV overhead line (Route Code ZDA) between Ealand and west of Keadby;
- Line entry connections to a proposed new 400 kV Birkhill Wood Substation;
- Line entry connections to a proposed new 400 kV High Marnham Substation; and
- The Project would include other required works, for example, temporary diversions for works on existing overhead line routes, temporary access roads, highway works, temporary works compounds, work sites and ancillary works. The Project would also include utility diversions and drainage works. There would also be land required for environmental mitigation, offsetting, compensation and Biodiversity Net Gain (BNG).

1.3.10 A full description of the Project is provided in **Application Document 6.4 Environmental Statement Chapter 4 Description of the Project**.

1.4 Associated Substations

1.4.1 Following statutory consultation on the Project in 2025, a decision was taken to remove both the proposed 400 kV Birkhill Wood Substation and 400 kV High Marnham Substation and associated works from the Project.

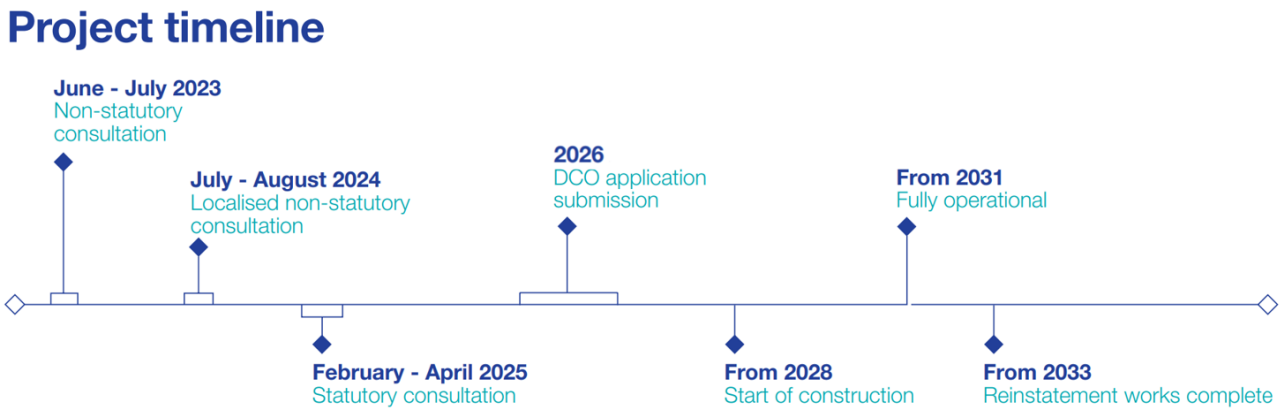
1.4.2 Separate planning applications for the 400 kV Birkhill Wood Substation (25/01898/STPLF), and 400 kV High Marnham Substation (25/01302/FUL) were submitted by National Grid in July and November 2025 to the local planning authorities of East Riding of Yorkshire Council and Bassetlaw District Council, respectively. The planning applications have subsequently been approved in 2026. Alongside these planning applications, National Grid published a Compulsory Purchase Order for acquisition of the land, to enable the delivery of each of the substations. Negotiations with land owners to acquire by agreement are still ongoing, and the Compulsory Purchase Order is forecast to be confirmed in late 2026.

1.4.3 A full description of the design evolution of the Project is provided in this document.

Project Timeline

1.4.4 Non-statutory consultation took place between June and July 2023 to provide early information on the proposals and gather feedback. A further localised non-statutory consultation was undertaken between July and August 2024 which provided an opportunity to gather feedback on an additional option under consideration between South Wheatley and High Marnham. As required under the Planning Act 2008, a statutory consultation was held between February and April 2025, presenting the refined proposals and inviting further consultation feedback. Following changes to the Project after statutory consultation, targeted Person with Interest in Land (PIL) consultations were held between June 2025 and September 2026 to gather feedback on these changes which would impact some PILs. For further information on all consultations undertaken for the Project, please refer to **Application Document 5.1 Consultation Report**. Image 1.1 sets out the Project timeline through to operation.

Image 1.1 – Project timeline



1.5 Structure of This Report

1.5.1 The report is structured as follows:

- Chapter 1 – Introduction;
- Chapter 2 – Legislation and National Policy Context;
- Chapter 3 – Statutory Consultation Feedback;
- Chapter 4 – Review of Project Evolution;
- Chapter 5 – Design Evolution;
- Chapter 6 – Design Development;
- Chapter 7 – Temporary Works; and
- Chapter 8 – Next Steps.

1.5.2 The report includes an appendix:

- Appendix A – Aviation Assessment

1.6 Relationship to Other Documents

1.6.1 The report is informed by other application documents, including:

- **Application Document 5.1 Consultation Report**;
- **Application Document 5.10 Design Approach Document**;
- **Application Document 6.3 Environmental Statement Chapter 3 - Main Alternatives Considered**;
- **Application Document 7.2 Outline Code of Construction Practice**; and
- **Application Document 7.17 Strategic Options Report Including Needs Case**.

2. Legislation and National Policy Context

2.1 Introduction

2.1.1 The Project's development has been informed by consideration of consultation feedback with balanced decision making within the framework of the guidance of the Holford Rules. This sits within the context of the relevant National Policy Statements (Overarching National Policy Statement for Energy (EN-1) (Department for Energy Security and Net Zero (DESNZ), 2025), National Policy Statement for Electricity Networks Infrastructure (EN-5) (DESNZ, 2025) and National Policy Statement for Renewable Energy Infrastructure (EN-3) (DESNZ, 2025)) and other material considerations, e.g. the National Planning Policy Framework (Ministry of Housing. Communities & Local Government, 2024), that apply and National Grid's interpretation of the various duties, requirements and compliance under various legislation including the Electricity Act 1989 (HM Government, 1989).

2.1.2 This chapter sets out a summary of legislation and national policy relevant to the design development of the Project. **Application Document 5.6 Policy Compliance Document and Application Document 5.5 Planning Statement** provides an assessment of the Project's strategic alignment and conformity with the policy documents referenced in this chapter.

2.2 Planning Act 2008

2.2.1 The Project is defined as a Nationally Significant Infrastructure Project (NSIP) under s14(1)(b) and s16 of the Planning Act 2008 (HM Government, 2008) and the Planning Act 2008 (Nationally Significant Infrastructure Projects) (Electric Lines) Order 2013, as it involves the installation of an electric line above ground of more than 2 km, which will operate at 400 kV in England.

2.2.2 Pursuant to the Planning Act 2008, an applicant is required to secure a Development Consent Order (DCO) to construct, maintain and operate the Project, and it may include a range of consents and powers.

2.2.3 Other development, such as underground cables, may be granted development consent as associated development within the meaning of s115 of the Planning Act 2008.

2.3 Planning and Infrastructure Act 2025

2.3.1 The Planning and Infrastructure Act 2025 (HM Government, 2025) makes a number of changes to legislation relating to the DCO process, including key amendments to the Planning Act 2008 (HM Government, 2008) and wider legislative framework for electricity transmission.

2.3.2 Many of the provisions set out in the Planning and Infrastructure Act 2025 require the making of secondary legislation before they take effect. The Applicant has continued to monitor the publication of these and any subsequent amendments to existing regulations throughout the pre-application stage. **Application Document 5.5**

Planning Statement sets out the current position of the changing regulatory framework, and establishes the Applicant's position on amendments to regulations and legislation relating to the application.

2.4 Electricity Act 1989

2.4.1 National Grid Electricity Transmission plc (National Grid) holds the Transmission Licence for England and Wales under the Electricity Act 1989 (as amended) (HM Government, 1989); and under s9(2), this requires National Grid '*to develop and maintain an efficient, co-ordinated and economical system of electricity transmission*'.

2.4.2 Section 38 and Schedule 9 of the Electricity Act 1989 require National Grid, when formulating proposals for new lines and other works, to '*have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest*' and to '*do what it reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects*'.

2.4.3 The consideration of National Grid's statutory duties is embedded in the options appraisal process. The options appraisal process that has been used to compare options and to assess their positive and negative effects includes cost (capital and lifetime) as an appraisal topic. One of the principles underpinning the Project's options appraisal is that financially less-expensive options, both in terms of capital and lifetime costs, will generally be of benefit, as these support National Grid's statutory duty under Section 9(2) of the Electricity Act 1989 to develop and maintain '*an efficient, co-ordinated and economical system of electricity transmission*'.

2.4.4 Another principle underpinning the appraisal process is that options that avoid or reduce and mitigate impacts on environmental or socio-economic constraints will generally be of benefit compared with those which have likely significant residual effects, as less environmentally - or socially-damaging - options support National Grid's statutory duty under Schedule 9 of the Electricity Act '*to have regard to the desirability of preserving amenity*'.

2.5 National Planning Policy

2.5.1 In deciding an application for development consent, s104 of the Planning Act 2008 requires the Secretary of State to determine the application in accordance with any relevant National Policy Statement (NPS). The NPSs relevant to the Project are the Overarching National Policy Statement for Energy (EN-1) (Department for Energy Security and Net Zero, 2025) and the National Policy Statement for Electricity Networks Infrastructure (EN-5) (Department for Energy Security and Net Zero, 2025) which came into force in January 2026.

2.5.2 The National Policy Statement for Renewable Energy Infrastructure (EN-3) (Department for Energy Security and Net Zero, 2025) also includes support for the onshore infrastructure required to deliver new offshore wind developments. This NPS is considered relevant to the Project as a key driver for the transmission infrastructure proposed is new offshore wind customer connections in the North East.

2.5.3 A more detailed review of the policies contained within the NPSs is set out in **Application Document 6.2 Environmental Statement Chapter 2 Legislation and Policy Context**, **Application Document 5.5 Planning Statement** and **Application Document 5.6 Policy Compliance Document**.

Overarching National Policy Statement for Energy (EN-1) (2025)

2.5.4 NPS EN-1 sets out the Government's overarching policy with regards to the development of NSIPs in the energy sector.

2.5.5 Section 4.7 of EN-1 sets out detail on the criteria for good design for energy infrastructure projects.

2.5.6 Paragraph 4.7.1 sets out:

'The visual appearance of a building, structure, or piece of infrastructure, and how it relates to the landscape it sits within, is sometimes considered to be the most important factor in good design. But high quality and inclusive design goes far beyond aesthetic considerations. The functionality of an object – be it a building or other type of infrastructure – including fitness for purpose and sustainability, is equally important.'

2.5.7 Paragraphs 4.7.2 to 4.7.4 acknowledge the role of good design in energy projects to produce sustainable infrastructure sensitive to place, and a means by which many policy objectives of the NPSs can be met, such as how good design, in terms of siting and use of appropriate technologies, can help mitigate adverse impacts.

2.5.8 Paragraph 4.7.7 identifies the need for the Applicant to demonstrate how the design process has been conducted and evolved over time:

'Applicants must demonstrate in their application documents how the design process was conducted and how the proposed design evolved. Where a number of different designs were considered, applicants should set out the reasons why the favoured choice has been selected.'

2.5.9 Paragraph 4.7.10 states:

'In light of the above and given the importance which the Planning Act 2008 places on good design and sustainability, the Secretary of State needs to be satisfied that energy infrastructure developments are sustainable and, having regard to regulatory and other constraints, are as attractive, durable, and adaptable (including taking into account of natural hazards such as flooding) as they can be'.

2.5.10 Paragraph 4.7.11 states:

'In doing so, the Secretary of State should be satisfied that the applicant has considered both functionality (including fitness for purpose and sustainability) and aesthetics (including its contribution to the quality of the area in which it would be located, any potential amenity benefits, and visual impacts on the landscape or seascape) as far as possible.'

2.5.11 Furthermore, Paragraph 4.7.12 states:

'In considering applications, the Secretary of State should take into account the ultimate purpose of the infrastructure and bear in mind the operational safety and security requirements which the design has to satisfy. Many of the wider impacts of a

development, such as landscape and environmental impacts, will be important factors in the design process.'

2.5.12 Section 4.6 of EN-1 provides details of how environmental and biodiversity net gain should be considered and confirms that this approach to development aims to leave the natural environment in a measurably better state than beforehand. Projects should therefore not only avoid, mitigate and compensate harms, following the mitigation hierarchy, but also consider whether there are opportunities for enhancements. Applications for development consent should be accompanied by a statement demonstrating how opportunities for delivering wider environmental net gains have been considered, and where appropriate, incorporated into proposals as part of good design of the project.

2.5.13 Section 4.10 of EN-1 details how the effects of climate change should be taken into account during the design stage to ensure new energy infrastructure is sufficiently resilient against the possible impacts of climate change. Specifically, as new energy infrastructure is typically likely to remain operational over many decades, the direct and indirect impacts of climate change when considering the Project location, design, build, operation and where appropriate decommissioning will need consideration.

National Policy Statement for Renewable Energy Infrastructure (EN-3) (2025)

2.5.14 NPS EN-3 also includes support for the onshore infrastructure required to deliver new offshore wind developments. This NPS contains relevant policies in relation to design including opportunities for co-location and coordination of onshore-offshore transmission.

2.5.15 Paragraphs 2.8.34 to 2.8.43 (inclusive) reiterate the position set out in EN-1 and EN-5 that a co-ordinated approach to onshore-offshore transmission is required. Paragraph 2.8.35 states that '*The previous standard approach to offshore-onshore connection involved a radial connection between single wind farm projects and the shore. A coordinated approach will involve the connection of multiple, spatially close, offshore wind farms and other offshore infrastructure, wherever possible, as relevant to onshore networks*'. EN-3 is of relevance to the Project as increasing the transmission capability of the network will support delivery of power from a range of renewable energy sources.

2.5.16 NPS EN-3 also includes references to critical national priority infrastructure stating in Paragraph 2.1.8 that '*the assessment principles outlined in Section 4 of EN-1 continue to apply to critical national priority infrastructure. Applicants must show how any likely significant negative effects would be avoided, reduced, mitigated, or compensated for, following the mitigation hierarchy. Early application of the mitigation hierarchy is strongly encouraged, as is engagement with key stakeholders including Statutory Nature Conservation Bodies (SNCB), both before and at the formal pre-application stage'*.

National Policy Statement for Electricity Networks Infrastructure (EN-5) (2025)

2.5.17 NPS EN-5 specifically relates to electricity networks. Section 2 of EN-5 sets out general assessment principles and technology-specific policies relating to matters including site selection and design, climate change adaptation, consideration of good

design, biodiversity and geological conservation, landscape and visual, and noise and vibration.

2.5.18 Section 2.2 sets out considerations in relation to site selection and sets out that the Secretary of State should take into account that the development zone of new electricity network infrastructure is not substantially within the control of the applicant. Furthermore, Paragraph 2.2.2 sets out that:

'Siting is determined by:

- *The location of new generating stations or other infrastructure requiring connection to the network, and/or*
- *System capacity and resilience requirements determined by the NESO* [National Energy System Operator].'

2.5.19 However, Paragraphs 2.2.5 to 2.2.8 acknowledge that applicants retain control in managing the identification of routeing and site selection within the development zone, and that this does not exempt applicants from their duty to consider and balance the site selection considerations and policies on design set out in Section 2.4 of EN-5.

2.5.20 Paragraph 2.2.9 states:

'In particular, the applicant should consider such characteristics as the local topography, the possibilities for screening of the infrastructure and/or other options to mitigate any impacts…'

2.5.21 Paragraph 2.2.10 supports the duties set out in s9 of the Electricity Act 1989, both in relation developing and maintaining an economical and efficient network. Details of the duties set out in s9 of the Electricity Act 1989 are set out in section 2.4 of this DDR.

2.5.22 Section 2.3 of EN-5 sets out how applicants should consider climate change adaptation and resilience in the design of new schemes. Paragraph 2.3.2 states that:

'… applicants should in particular set out to what extent the proposed development is expected to be vulnerable, and, as appropriate, how it has been designed to be resilient to:

- *Flooding, particularly for substations that are vital to the network; and especially in light of changes to groundwater levels resulting from climate change;*
- *The effects of wind and storms on overhead lines;*
- *Higher average temperatures leading to increased transmission losses;*
- *Earth movement or subsidence caused by flooding or drought (for underground cables); and*
- *Coastal erosion – for the landfall of offshore transmission cables and their associated substations in the inshore and coast locations respectively*.'

2.5.23 Section 2.4 of EN-5 sets out the consideration of good design for energy infrastructure, with reference to the criteria for good design set out in EN-1 Section 4.7.

2.5.24 Paragraph 2.4.1 notes that '*The Planning Act 2008 requires the Secretary of State to have regard, in designating an NPS, and in determining applications for development consent, to the desirability of good design*.'

2.5.25 Paragraph 2.4.3 sets out:

'… the Secretary of State should bear in mind that electricity networks infrastructure must in the first instance be safe and secure, and that the functional design constraints of safety and security may limit an applicant's ability to influence the aesthetic appearance of that infrastructure.'

2.5.26 Furthermore, Paragraph 2.4.4 sets out:

'While the above principles should govern the design of an electricity networks infrastructure application to the fullest possible extent – including in its avoidance and/or mitigation of potential adverse impacts… – the functional performance of the infrastructure in respect of security of supply and public occupational safety must not thereby be threatened.'

2.5.27 Section 2.5 makes consideration for environmental and biodiversity net gain, making specific reference in Paragraph 2.5.1 to opportunities to:

- '*Reconnect important habitats via green corridors, biodiversity stepping zones, and reestablishment of appropriate hedgerows; and/or*
- *Connect people to the environment, for instance via footpaths and cycleways constructed in tandem with environmental enhancements*.'

2.5.28 Section 2.9 sets out guidelines on applicant assessment, detailing how applicants must provide information on relevant impacts as directed by EN-5 and the Secretary of State. In relation to design, Section 2.9 sets out expectations of compliance with the Holford Rules. Details of the Holford Rules are set out at the end of this section of the DDR.

2.5.29 Specifically, Paragraph 2.9.7 sets out that '*While the government does not believe that the development of overhead lines is incompatible with applicants' statutory duty under Schedule 9 to the Electricity Act 1989, to have regard to visual and landscape amenity and to reasonably mitigate possible impacts thereon, in practice new overhead lines can give rise to adverse landscape and visual impacts*.'

2.5.30 Paragraph 2.9.21 also provides policies on the undergrounding of cables:

'Although it is the government's position that overhead lines should be the strong starting presumption for electricity networks developments in general, this presumption is reversed when proposed developments will cross part of a nationally designated landscape (i.e. National Park, The Broads, or National Landscapes).'

2.5.31 Paragraph 2.9.23 goes on to state:

'However, undergrounding will not be required where it is infeasible in engineering terms, or where the harm that it causes … is not outweighed by the corresponding landscape, visual amenity and natural beauty benefits. Regardless of the option, the scheme through its design, delivery, and operation, should seek to further the statutory purposes of the designated landscape. These enhancements may go beyond the mitigation measures needed to minimise the adverse effects of the scheme.'

2.5.32 Section 2.11 provides detail on Secretary of State decision making. Paragraph 2.11.15 states:

'Where a statutory consultee on the safeguarding of technical facilities identifies a risk that the EMF [electric and magnetic field] effect of electricity network infrastructure would compromise the effective and safe operating of such facilities, the potential impact and siting and design alternatives will need to have been fully considered as part of the application.'

Holford Rules

2.5.33 The Holford Rules are guidelines for the routeing of new overhead lines. In brief, the Holford Rules state that applicants should:

- Avoid altogether, if possible, the major areas of highest amenity value, by so planning the general route of the line in the first place, even if total mileage is somewhat increased in consequence;
- Avoid smaller areas of high amenity value or scientific interest by deviation, provided this can be done without using too many angle towers, i.e. the bigger structures which are used when lines change direction;
- Other things being equal, choose the most direct line, with no sharp changes of direction and thus with fewer angle towers;
- Choose tree and hill backgrounds in preference to sky backgrounds wherever possible. When a line has to cross a ridge, secure this opaque background as long as possible, cross obliquely when a dip in the ridge provides an opportunity. Where it does not, cross directly, preferably between belts of trees;
- Prefer moderately open valleys with medium or moderate levels of tree cover where the apparent height of towers will be reduced, and views of the line will be broken by trees;
- Where country is flat and sparsely planted, and unless specifically preferred otherwise by relevant stakeholders, keep the high voltage lines as far as possible independent of smaller lines, converging routes, distribution poles and other masts, wires and cables, so as to avoid a concentration of lines or 'wirescape'; and
- Approach urban areas through industrial zones, where they exist; and when pleasant residential and recreational land intervenes between the approach line and the substation, carefully assess the comparative costs of undergrounding.

2.5.34 Further detail of how the Holford Rules have been applied in the Project's design evolution process is set out in Section 2.7 of **Application Document 5.10 Design Approach Document**.

2.6 Planning Inspectorate Guidance

Nationally Significant Infrastructure Projects: Advice on Preparing Applications for Linear Projects

2.6.1 In February 2025 the Planning Inspectorate published non-statutory advice that supplements the Planning Act 2008 titled Nationally Significant Infrastructure Projects: Advice on Preparing Applications for Linear Projects (Planning

Inspectorate, 2025). The advice note focuses on electric lines and other linear assets, offering guidance drawn from good practice that should be followed by applicants. National Grid has considered this guidance for the Project and it has informed various aspects of the Project's design development. Further detail of how this advice has been applied to the Project's design evolution is set out in Section 2.8.10 of **Application Document 5.10 Design Approach Document**.

Nationally Significant Infrastructure Projects: Advice on Good Design (2024)

2.6.2 The Planning Inspectorate (2024) published the guidance Advice on Good Design in October 2024, which sets out how good design might be successfully delivered in applications for NSIPs.

2.6.3 The advice note states:

'Achieving good design requires a holistic approach to deliver high quality, sustainable infrastructure that responds to place and takes account of often complex environments. Good design is not primarily about how infrastructure looks, although these considerations (the aesthetics) are important.'

2.6.4 The guidance references the National Infrastructure Commission (NIC) Design Group, which recommends that considering design properly in NSIPs supports the government's ambition to speed up delivery and maximise value by addressing: a structured design process, design principles, and multiple beneficial outcomes. The NIC has published Design Principles for National Infrastructure and applicants are advised to explain how their design responds to the NIC principles.

2.6.5 The guidance states that a good design process includes the following components:

- '*An effective, intentional, transparent and deliverable process.*
- *A collaborative, multi-disciplinary approach including positive community and land rights engagement.*
- *A succinct and ambitious vision for the project, underpinned by a clear analysis of the context for the place, its environment and the opportunities for creating social value, including for the local and wider economy.*
- *A clear statement of design principles that will drive the project and deliver wider value and benefits beyond the core purpose of the scheme.*
- *A narrative that explains how the approach to design has evolved, the reasons for the choices that have been, or will be, made, an explanation of the multiple beneficial outcomes the project will achieve and how they will be secured.*
- *Design leadership supported by an engaged design champion to ensure design governance is secured and the design principles drive a structured design process and hierarchy of design control.*'

2.6.6 The guidance sets out four key elements that applicants should consider during the pre-application process and should be addressed within an NSIP application. The extent to which these elements need to be covered will depend on the nature of the infrastructure proposed and the site. The four elements are set out below:

- '***Assemble***

This stage requires a brief setting out the project's purpose, a budget, a proposed timeline, a multi-disciplinary team with design skills and gathering of baseline information which can inform consideration of alternatives and eventual site selection.

The multi-disciplinary project team must use the information that it has assembled to develop a vision. The vision should have a compelling narrative, which goes beyond solving technical problems and policy compliance and considers construction as well as operation. It should define an ambition which goes beyond the Order limits in line with outcomes that are wider than the project limits. It must include the development of design principles.

- ***Research***

This stage needs to be iterative. It should analyse the constraints and opportunities of technology and location with a narrative of how the design evolved from the brief. It will need to mitigate adverse effects assessed as part of the EIA process and show how the proposed development will deliver positive outcomes and create a new and distinctive place. During this stage, engagement and consultation with statutory parties, affected persons, local communities and independent design panels should inform the project's design evolution. This should be explained.

- ***Co-ordinate***

Further iteration must be undertaken to refine choices for details and parameters. This should incorporate consultation responses, independent design input and ensure that design principles are being met. There may be choices to be made. Decisions need to be taken using strong design leadership, driven by the vision. This stage must set out the process by which future post-consent decision-making will be made.

- ***Secure***

The essential output of this stage must be to set out how the project's good design is secured and will be delivered, including ongoing design advice and community engagement. It is important that applicants are clear about the influence procurement decisions could have and that any differences with future consenting authorities are aired. ExAs [Examining Authorities] *will expect designs to be progressed to a detailed level where the outcomes of the applicant's analysis, program and vision are defined. Clarity over how design elements that have less certainty at application stage will be decided and secured post-consent must be provided*.'

2.6.7 The guidance note also draws attention to the Environmental Impact Assessment (EIA) process and highlights how the EIA can and should inform the design process. The influence of the EIA process on the design should be clearly articulated in the Environmental Statement.

2.6.8 Annex A of the guidance note identifies 'good design issues' that applicants are encouraged to consider before submitting an NSIP application for examination. These issues include:

- The Design Approach Document;
- Analysis and research of key site issues;
- Response to main significant adverse effects identified in the EIA;

- Vision for the completed development and its surroundings;
- Design skills;
- Design development (including consideration of emerging design principles, use of digital techniques, design outcomes, and presentation of a design narrative);
- Independent design review;
- Delivery of the design post-consent;
- Placemaking and community benefit;
- Consultation with statutory consultees, local authorities, communities and people with interest in the land;
- Integrated design approach;
- Consideration of NPSs;
- Application of design principles; and
- Consideration of the NIC's four principles of good design.

2.6.9 Further detail on how the Planning Inspectorate's advice has been considered and applied in relation to the design evolution of the Project is set out in Section 2.8.3 of **Application Document 5.10 Design Approach Document**.

3. Statutory Consultation Feedback

3.1 Statutory Consultation 2025

3.1.1 National Grid held a statutory consultation between 18 February and 15 April 2025. This chapter provides a summary of this consultation that has informed the Project.

3.1.2 National Grid acknowledges amendments to the Planning Act 2008 introduced by the Planning and Infrastructure Act 2025, which came into effect on 24 July 2026. These changes amend the statutory pre-application consultation requirements and related provisions for Development Consent Order applications. However, as the Project's consultation activities have been undertaken in accordance with the approach established for the Project in compliance with sections 42, 43, 44, 45, 47, 48 and 49 of the Planning Act 2008, the approach to consultation reporting and the structure of the consultation documentation have not been amended to reflect the changes. This approach ensures that the consultation undertaken by National Grid is transparently recorded against the legislative and procedural framework that applied during the consultation period.

Context

3.1.3 National Grid held an eight-week statutory consultation between 18 February and 15 April 2025, the purpose of which was to seek views and feedback on elements of the Project including:

- Approximately 90 km of new 400 kilovolt (kV) overhead line between the proposed new 400 kV Birkhill Wood Substation and the proposed new 400 kV High Marnham Substation;
- Replacement and realignment of a section of the existing 400 kV overhead line route between Brantingham and east of Broomfleet;
- Replacement and realignment of a section of the existing 400 kV overhead line route between Ealand and west of Keadby;
- A new 400 kV Birkhill Wood gas insulated switchgear substation with a new permanent access;
- Replacement and realignment of a section of existing 400 kV overhead line to connect the new Birkhill Wood Substation;
- A new 400 kV High Marnham air insulated switchgear substation, with a new permanent access;
- Replacement and realignment of the existing 4ZV and XE 275 kV overhead line routes and existing 400 kV ZDA and ZDF overhead line routes, to allow for connection into the proposed new High Marnham Substation; and

3.1.4 Other required works, such as temporary diversions for works on existing overhead line routes, temporary access roads, highway works, temporary works compounds, work sites, utility diversions, drainage works and ancillary works.

Consultation Corridor

3.1.5 During non-statutory and statutory consultations, the route was presented in 11 geographical sections to aid consultees in providing feedback, shown in **Application Document 5.1 Consultation Report**. It should be noted that these sections differ to the six geographical sections which the Project has since been divided into for reader accessibility of the Application.

3.1.6 The Route Sections are illustrated on **Application Document 6.1.F1 Environmental Statement Figure 1.1 Project Location and Route Sections** and detailed in Table 3.1.

Table 3.1 – Project Route Sections

Route Sections within the application for development consent	Corresponding Route Sections at statutory consultation
Route Section A Between the proposed Birkhill Wood Substation and the River Ouse	**Route Section 1** – between Creyke Beck and Skidby **Route Section 2** – between Skidby and the A63 dual carriageway **Route Section 3** – between A63 dual carriageway and the River Ouse crossing
Route Section B Between the River Ouse and Crowle	**Route Section 4** – the River Ouse crossing **Route Section 5** – between the River Ouse crossing and Luddington; **Route Section 6** – between Luddington and the M180 motorway
Route Section C Between Crowle and North Moor (M180)	**Route Section 6** – between Luddington and the M180 motorway
Route Section D Between North Moor (M180) and the River Idle	**Route Section 7** – between the M180 motorway and Graizelound **Route Section 8** – between Graizelound and the Chesterfield Canal
Route Section E Between the River Idle and Darlton	**Route Section 8** – between Graizelound and the Chesterfield Canal **Route Section 9** – between the Chesterfield Canal and the A620 east of North Wheatley **Route Section 10** – between the A620 east of North Wheatley and Fledborough
Route Section F Between Darlton and the proposed High Marnham Substation	**Route Section 10** – between the A620 east of North Wheatley and Fledborough **Route Section 11** – between Fledborough and High Marnham

Changes to the Statutory Consultation Design Covered by the DDR

3.1.7 This report covers a range of design considerations and decisions that have informed the development of the Project, these are presented in Chapter 6 and the more extensive changes are shown in the table below.

Table 3.2 – Extensive Design Changes

Location	Project Design Change	Design Change Explanation
Route Section A	Temporary compound relocation near Birkhill Wood Substation	Engagement with other projects in the area required temporary compound to be moved further from a Local Wildlife Site and for other infrastructure projects to be deliverable.
Route Section B	Realignment of River Ouse crossing	Feedback from residents informed the movements of pylons 4AF76 and 4AF78 to 4AF84, moving the alignment further from Hall Garth Moated Site Scheduled Monument.
Route Section B	Realignment south of Luddington	A variety of feedback informed the movement of the alignment further from Luddington which enabled a reduction in both the heights of seven pylons and the number of bellmouths required.
Route Section D	Realignment east towards Beltoft	Landowner feedback informed a realignment between pylons 4AF132 and 4AF142 to increase the extent of triple paralleling and enable a reduction in pylon heights decrease in the area.
Route Section D	Pylon rationalisation east of Graizeland	Landowner feedback informed the repositioning of pylons for more efficient agricultural practices to take place and subsequent removal of a pylon which reduces the Project's local impact.
Route Section E	Realignment between pylons 4AF175 and 4AF185	The Project's surveys identified buried archaeology which required a realignment to reduce potential impacts.
Route Section E	Realignment to the west of Beckingham	The realignment was informed by feedback received from local landowners and iGas. This enabled a reduction in pylon heights and moved the alignment further from residential properties.
Route Section F	Pylon rationalisation towards High Marnham Substation	The Project team identified the opportunity to remove a pylon and reduce disruption on landowners in the area.

Consideration of Statutory Consultation Feedback

3.1.8 A total of 473 feedback submissions were received during the statutory consultation period from local communities, stakeholders and other consultees. This comprised paper response forms, online response forms, emails and letters.

3.1.9 All of the feedback received during the statutory consultation has been carefully reviewed and considered, alongside technical work on the engineering design and further environmental and socio-economic assessment work. A summary of all feedback received, and National Grid's responses, is presented within the **Application Document 5.1 Consultation Report**. This includes feedback which resulted in partial design changes being accepted, which are more minor changes that are not detailed within this DDR. Further consideration of this consultation feedback in relation to the design is set out in Chapter 6 of this DDR.

3.1.10 Some consultation feedback requested changes to the design. These requests were carefully considered in the context of environmental, land, socio-economic, health and wellbeing constraints and opportunities, engineering feasibility and cost, and planning policy considerations.

3.1.11 The process of considering the proposed design changes and requests comprised an initial feasibility review, an assessment incorporating inputs from relevant technical experts, and further stages of additional study if required. This was assessed in conjunction with the results of the closed questions from the feedback form which sought to gauge respondents' views on consultation and Project development processes.

3.1.12 The outcome of the consideration of potential design changes and requests was either that the request was accepted and incorporated into the design or that the request was not accepted following balanced and informed assessment.

Further Persons with Interest in Land Consultation 2025–2026

3.1.13 National Grid held further targeted consultations to provide previously consulted Persons with an Interest in Land (PILs) and newly identified PILs the opportunity to provide feedback on certain localised amendments made to the design of the Project.

3.1.14 This further PIL consultation and engagement included:

- Consultation under Section 42(1)(d) with PILs that had been previously consulted but were now impacted differently; and
- Consultation under Section 42(1)(d) with new PILs identified during and after the close of the statutory consultation, which may have arisen from design changes having introduced new land parcels into the Order Limits; from changes in land ownership within the previous Order Limits; or from ongoing diligent inquiry identifying new land interests. More information about the ongoing diligent inquiry is available in the **Application Document 5.1 Consultation Report**.

3.1.15 Feedback received as part of the consultation was considered following the process outlined for the previous non-statutory and statutory periods. Further PIL feedback provided potential design changes and requests that were either accepted and incorporated into the design or not accepted following balanced and informed assessment.

Changes to Statutory Consultation design not covered by the DDR

3.1.16 Following careful consideration of the feedback to the 2025 statutory consultation and further targeted PIL statutory consultations, further stakeholder engagement and as a response to survey findings and technical assessments, a number of changes to the location of individual elements of the permanent assets and temporary works have been taken forward in the design of the Project.

3.1.17 Many of these changes have been of a minimal nature and include, for example, minor amendments to pylon siting, adjustments to accesses and working areas. These changes are not reported within this DDR. However, changes which have been made in response to consultation feedback are reported within **Application Document 5.1 Consultation Report** which also addresses all feedback requesting changes and provides confirmation of whether the feedback resulted in a change to the design or not.

4. Review of Project Evolution

4.1 Project Evolution

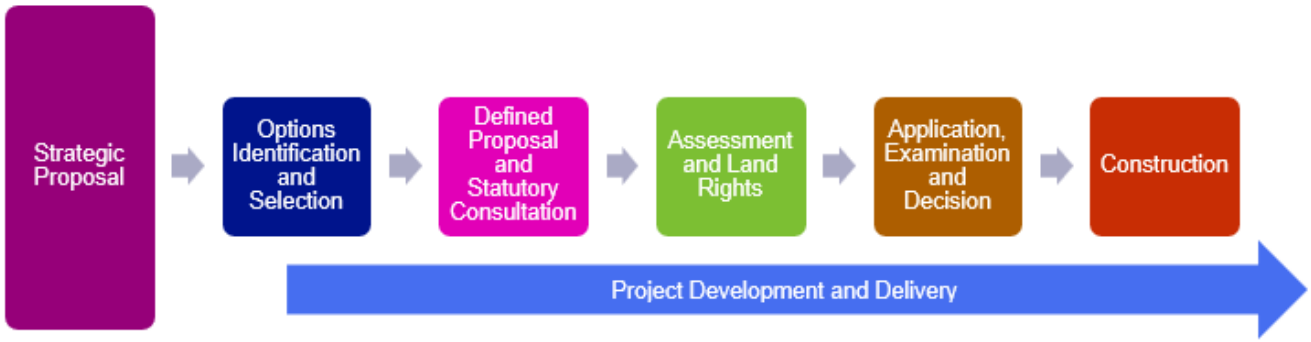
4.1.1 The design of the Project has been continuously developing throughout each stage of the project development process. The evolving design of the Project has undergone reviews of previously gathered and assessed information to ensure the decision-making rationale remains consistent and accurate.

4.1.2 This chapter summarises the reviews undertaken of the Applicant's work at the previous development stages of the Project. This work is further detailed in **Application Document 7.20 Design Development Report – 2025** which explains the Project's evolution through the following key documents:

- **Application Document 7.18 Corridor and Preliminary Routeing and Siting Study**; and
- **Application Document 7.19 Supplementary Corridor and Routeing Report**.

4.1.3 The design of the Project has followed a structured project development process that has integrated technical and environmental assessment with consultation feedback and stakeholder engagement. The key stages of the design evolution process are set out in Image 4.1.

Image 4.1 – National Grid's approach to project development and delivery



4.2 Strategic Proposal

4.2.1 The strategic proposal for the Project outlined that, without reinforcement, the transmission system between the North and South of England in the B8 and B9 system boundaries, will have insufficient capacity to accommodate contracted and predicted generation connections in the area. These boundaries refer to the defined internal transfer limits that separate major regions of the electricity network, with B8 marking the interface between northern England and the Midlands, and B9 marking the interface further south.

4.2.2 A range of options that might address the network reinforcement needs were identified and appraised at a strategic level. Five options were identified and assessed, these being:

- ECO 1 – New Creyke Beck to new High Marnham 85 km;
- ECO 2 – New Creyke Beck to Cottam 75 km;
- ECO 3 – New Creyke Beck to new Grimsby West, new Grimsby West to new Walpole 225 km;
- ECO 4 – New Creyke Beck to new Grimsby West, new Grimsby West to new Weston Marsh 200 km; and
- ECSS 1 – Subsea from new Creyke Beck to new Walpole 195 km.

4.2.3 Following assessment of the options to meet system need, it was proposed to to take forward a new, primarily overhead line connection between a new Birkhill Wood Substation and a new High Marnham Substation. This forms the North Humber to High Marnham Project and was the ECO 1 proposal option, known as East Coast Onshore 1.

4.2.4 **Application Document 7.17 Strategic Options and Needs Case** sets out details of the strategic options considered and the reasons for the selection of East Coast Onshore 1 as the preferred strategic option. This demonstrates that East Coast Onshore 1 remains the best overall option to solve the network need case when balancing cost, technical performance and environmental and socio-economic effects.

4.3 Options Identification and Selection

4.3.1 Following the selection of the chosen strategic option, a Corridor and Preliminary Routeing and Siting Study (CPRSS) was undertaken in 2023 to further define the location of the proposed Project infrastructure within a defined study area (**Application Document 7.18 Corridor and Preliminary Routeing and Siting Study**). The CPRSS established the process used to identify, appraise and select the four corridors presented. The CPRSS also presented a comparative analysis of the corridors identified, the emerging preferred corridor and the graduated swathe within the preferred corridor.

4.3.2 Appraisals were underpinned by a set of overarching principles that reflected National Grid's statutory duties, which assisted in decision-making and helped achieve an appropriate balance between competing interests. These principles were that:

- Using or adapting existing infrastructure will generally be of benefit/advantage compared with creating new infrastructure.
- Shorter routes will generally be of benefit/advantage compared with longer routes, as smaller scale infrastructure projects are generally likely to have lower environmental, safety, sustainability, and cost implications (for comparable technology options).
- Financially less-expensive options, both in terms of capital and lifetime cost, will generally be of benefit/advantage, as these support National Grid's statutory duty under Section 9 of the Electricity Act 1989 (HM Government, Electricity Act , 1989)to develop and maintain an 'efficient, co-ordinated and economical' transmission network

- Options which avoid or reduce and mitigate impacts on environmental or socio economic constraints will generally be of benefit/advantage compared with those which have likely significant residual effects, as less environmentally or socially damaging routes support National Grid's statutory duty under Schedule 9 of the Electricity Act 1989 to 'have regard to the desirability of preserving amenity' and will more readily achieve consent.

4.3.3 For the Project, four preliminary overhead line corridors were identified and appraised which identified an emerging preferred corridor which was considered to offer the optimum balance between environmental, technical, cost and socio-economic considerations. This:

- broadly followed the existing 4ZQ 400kV overhead line from the eastern edge of the Yorkshire Wolds to near Luddington (Lincolnshire) including crossing the River Ouse alongside the existing overhead line river crossing;
- from Luddington, loops west around Keadby Windfarm to pass east of Ealand and then parallels the two existing 400kV overhead lines south from near Beltoft to a point near the crossing of the Warping Drain, south-east of Haxey; and
- from there loops west to pass west of Misterton, then south, passing west of the line of villages along the edge of the Trent valley (Wallingham, Beckingham, Sturton le Steeple, North and South Leverton, Tresswell and Woodbeck) to pass west of East Drayton then approach High Marnham from the north-east.

4.3.4 Non-statutory consultation took place from 1 June to 27 July 2023 in which feedback and information was received on the CPRSS and the emerging preferred corridor for a new overhead line.

4.3.5 Feedback received from the non-statutory consultation prompted the consideration of an alternative corridor (the 'Eastern Corridor') to those presented in the CPRSS. The appraisal of this alternative corridor option is presented within **Application Document 7.19 Supplementary Corridor and Routeing Report**, with localised non-statutory consultation undertaken in relation to this option from 9 July to 6 August 2024. Feedback and information was received on the alternate option to inform the preferred alignment and the Project's next phase of consultation.

4.4 Defined Proposal and Statutory Consultation

4.4.1 During the next stage of the Project, **Application Document 7.20 Design Development Report - 2025** was produced, which presented how the design had been refined since non-statutory consultation, including identification of the preferred alignment. The preferred alignment (also referred to as the 2025 design) included the decision not to pursue the 'Eastern Corridor' consulted on in the localised non-statutory consultation period and broadly followed the emerging preferred corridor from the CPRSS (including the original 'Western Corridor').

4.4.2 The 2025 design was subject to statutory consultation for a period of eight weeks, from 18 February to 15 April 2025, which was in line with the requirements of the Planning Act 2008 and The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (HM Government, 2017).

4.4.3 Feedback received on the 2025 design during the 2025 statutory consultation, and the further development of the 2025 design, has resulted in changes and led to the design of the Project which forms the basis of the application for development consent. The main changes made to the 2025 design, whether prompted by feedback, assessments or in response to technical appraisal, are set out in Chapter 6 of this report.

4.5 Assessment and Land Rights

4.5.1 Feedback from statutory consultation and targeted supplementary statutory consultation with PILs has informed further refinement of the Project design. The Applicant has undertaken a significant design change process, which considered a number of proposed changes to the alignment and temporary construction working areas, submitted by stakeholders at statutory consultation.

4.5.2 The Project design was refined further during this stage, including temporary works compounds, haul road and site accesses. National Grid has now submitted an application for development consent including **Application Document 3.1 Draft Development Consent Order**.

5. Design Evolution

5.1 Overview

5.1.1 This chapter outlines the design and technical considerations of the Project and sets out how these have evolved through the Project's previous stages. These considerations are to align with the legislative and policy context set out in Chapter 2 of this DDR.

5.1.2 Through the Electricity Act 1989, as set out in Chapter 2, National Grid has statutory duties placed upon it to operate under the terms of its Transmission Licence. In addition, the Holford Rules guide National Grid's routeing and siting approach; this is further explained in Chapter 2 of this DDR.

5.1.3 The design of the Project has evolved following National Grid's design approach which is set out in **Application Document 5.10 Design Approach Document**.

5.2 Design Principles and Technical Considerations

Close Parallel Opportunities

5.2.1 National Grid recognises that close paralleling has the potential to reduce the overall extent of environmental impacts arising from the Project by focusing the degree of impact on receptors already affected by existing overhead lines, rather than spreading impacts to areas not currently affected.

5.2.2 Whilst the efficacy of close paralleling in reducing environmental impacts is strongly influenced by local factors (such as topography, settlement patterns, woodland cover), the optimum level of benefit is likely to result from lines that, as stated in Holford Rule 6, are planned with pylon types and conductors forming a coherent appearance. In most circumstances, this is likely to be more achievable the closer the overhead lines are to each other, as local conditions are likely to be similar for both overhead lines.

5.2.3 There are technical challenges associated with the construction and operation of a close parallel alignment, including difficulties with achieving the required offset from the existing overhead line and access where the existing overhead line is already within a relatively constrained working area. The introduction of a new overhead line in close parallel may limit the space needed for future works including maintenance, refurbishment, and temporary diversions. These restrictions, coupled with the existing constraints, may limit construction and operational activities.

5.2.4 There are locations within the Project where there are opportunities for close paralleling with existing overhead lines. These areas are discussed in detail in Chapter 6 of this DDR.

Line Swap Overs

5.2.5 Line swap overs comprise reconfiguration of an existing overhead line to allow two overhead lines to be routed in parallel to avoid local constraints. Line swap overs allow for the continuation of a route from a section of new pylons to a section of existing pylons, whilst the parallel route is a continuation of a route from a section of existing pylons to a section of new pylons.

5.2.6 Line swap overs are achieved by modifying a section of existing line and forming two unconnected ends, which are then each connected to a new line approaching from either side.

5.2.7 Swapping over from one side of an overhead line to the other increases construction, delivery and engineering complexity. Outages would be required on the electricity transmission network to undertake work safely on the existing overhead line. This would be subject to availability, depending on network conditions and other planned works on the network, leading to programme risk in the event an outage is cancelled, or delayed. Specialist personnel are required to plan the system outages and ensure the existing pylons, which transmit 400 kV electricity, can be worked on safely. Temporary structures such as masts, or pylons, would be required to re-route power from the existing overhead line and ensure continuity of power flow in the area whilst the line swap over work takes place. Assessment of the existing structures, foundations, conductors and fittings would be required to ensure the existing overhead line can connect to the new overhead line.

5.2.8 The Project includes two line swap overs in Route Section A. These are described in more detail in section 6.3 of this DDR.

5.3 Pylon Type Considerations

5.3.1 Whilst the vast majority of transmission lines in Britain use lattice steel pylons, alternative pylon types are available which the Project has previously assessed.

5.3.2 The choice of pylon design for overhead lines should be considered on a project-by-project basis. Section 6.3 of **Application Document 7.20 Design Development Report - 2025** sets out detailed information on the features of 'traditional' lattice pylons, low height lattice pylons and T-pylons, including their construction, operation and maintenance. Any assessment of the Project's overhead line must consider both:

- The conductor, which must be capable of carrying the required power; and
- The pylon type, which needs to be able to support the conductor bundles (wires) and an earth wire.

5.3.3 The proposals presented in the 2025 design assumed the use of lattice steel pylons. Feedback received from the 2025 statutory consultation and the development of the proposed design has not resulted in changes to the pylon type for the Project.

5.3.4 No further changes have been identified which would result in a change to the pylon type set out in **Application Document 7.20 Design Development Report - 2025**.

5.4 Conductor Type Considerations

5.4.1 The conductor bundle for the proposed 400 kV overhead line and sections on the existing 400 kV 4ZQ overhead line which require reconductoring would be Triple

Araucaria (700 mm² All Aluminium Alloy Conductor (AAAC)) or alternative technology that performs to the same or better standard in relation to noise on standard lattice pylons.

5.4.2 The conductor bundle for the proposed replacement and re-alignment of a section of the existing 400 kV ZDA overhead line route between Ealand and west of Keadby would be Twin Rubus (500 mm² AAAC), or alternative technology that performs to the same or better standard in relation to noise on standard lattice pylons.

5.4.3 Whilst the indicative design has been based on the conductor types stated above, flexibility on conductor type is required at the River Ouse crossing between proposed pylons 4AF76 and 4AF80 as further work would be required during detailed design to confirm the conductor type for this section.

5.5 Environmental, Socio-economic and Planning Considerations

5.5.1 Planning and environmental features have been considered throughout the routeing and siting process for the Project. These features have continued to be considered as part of assessments informing the Project's design. The features considered include, but are not limited to, the following:

- **Air Quality:** Residential properties, education establishments (such as schools and colleges), buildings (other than residential properties, e.g. retail, industrial estates), and Air Quality Management Areas.
- **Aviation and Defence:** Radar, radio navigation beacon, or radio sites, Ministry of Defence Low Flying Zone (only high priority and regular), licensed airfields, unlicensed airfields with buildings, unlicensed airstrips, Ministry of Defence properties, Civil Aviation Authority airports, Civil Aviation Authority aerodromes, military airfield/passenger airport.
- **Ecology:** Ramsar sites, Special Areas of Conservation, Special Protection Areas, National Nature Reserves, Sites of Special Scientific Interest, ancient woodland, protected species, aquatic ecology, Local Nature Reserves, Important Bird Areas, Priority Habitats, National Forest Inventory woodland, and RSPB Reserves.
- **Socio-economic Activity:** Buildings (other than residential properties, e.g. retail, industrial estates), woodland/forestry operations, National Trust inalienable land, wind farms and solar farms, planning applications/consents (only for NSIPs registered with the Planning Inspectorate), and local plan allocations.
- **Geology and Soils:** Geological Sites of Special Scientific Interest, Local Geodiversity Sites, peaty soils, Aggregate and Mineral Resource Areas, quarries, Best and Most Versatile agricultural land, and landfill sites (historic and authorised).
- **Historic Environment:** Scheduled monuments, listed buildings (Grade I, II and II*), Historic Environment Records, areas of potential archaeology, Registered Parks and Gardens, conservation areas, and National Trust inalienable land.
- **Landscape and Visual:** Areas of Outstanding Natural Beauty (now known as National Landscapes), Areas of Great Landscape Value, Important Landscape Areas, residential properties, National Trails, National Cycle Network, National Trails, European long-distance paths, viewpoints, recreational areas (e.g. country

parks, Countryside and Rights of Way access land), and outdoor recreational facilities (e.g. canals, caravan parks).

- **Noise and Vibration:** Residential properties, education establishments (e.g. schools and colleges), places of worship, buildings (other than residential properties, e.g. retail, industrial estates).
- **Traffic and Transport:** National Cycle Network, National Trails, European long-distance paths, rail network (including railway stations), public rights of way (PRoWs), local road network, Strategic Road Network and trunk road network.
- **Water:** Statutory main rivers, Water Framework Directive surface waters, floodplains (including storage areas), Groundwater Dependent Terrestrial Ecosystems, and Groundwater Source Protection Zones – Inner/Zone 1.

5.6 Approach to Mitigation

5.6.1 The Project's primary mitigation strategy is for design considerations to prioritise the mitigation of impacts through avoidance. Where this has not been possible, additional mitigation measures have been specified in order to ensure that the Project is compliant with relevant planning policy and other regulatory requirements.

Environmental Statement

5.6.2 National Grid is committed to delivering mitigation measures to avoid and reduce the likely significant effects that would be experienced during implementation of the Project. The assessment and rationale behind the Project's mitigation measures are set out in **Application Documents 6.1 to 6.22 Environmental Statement** (Volume 6 of the application for development consent).

6. Design Development

6.1 Introduction

6.1.1 This chapter describes the Project's design which forms the DCO application. The alignment has been developed in response to feedback received during statutory consultation, supported by further environmental and technical assessments and survey work, and a review of work undertaken to date.

6.1.2 This chapter describes design considerations and decisions made that have informed the development of the Project, including permanent infrastructure and temporary construction works. All proposed changes to the 2025 design requested in feedback received during statutory consultation in 2025 were considered; however, not all design changes were accepted and incorporated into the Project's design. **Application Document 5.1 Consultation Report** provides details on all the statutory consultation feedback which requested design changes (both those accepted as well as those not taken forward).

6.1.3 The images within this chapter show the specific design components of the Project between Route Sections A to F. The images have been produced to aid viewers' understanding of the development of the proposals and are not intended to show all of the design elements of the Project or the features considered in identifying the preferred design.

6.2 Whole Route

Distribution Network

6.2.1 Once an alignment had been identified, assumptions were made regarding the scope and extent of required distribution network operator (DNO) mitigation to enable these to be included in the design presented and consulted on at statutory consultation. These assumptions comprised indicative routes for modification and diversion of DNO assets.

6.2.2 Following statutory consultation, ongoing engagement has been undertaken with the relevant DNOs to refine the connection strategy and confirm technical and operational requirements for necessary diversions of DNO assets. As a result, the design has evolved to reflect DNO feedback and these refinements have been incorporated into the current design iteration, reflected within the Order Limits. The feedback and design changes requested by the DNOs have been considered and reviewed against other technical, environmental, socio-economic and cost factors to agree on the most suitable design. The Order Limits now accounts for the land required for the mitigation works to be carried out ensuring sufficient land is secured to deliver the connection in line with the agreed technical solutions.

6.2.3 The DNO works therefore represent a coordinated and iterative design outcome, progressing from initial assumptions at statutory consultation to a more robust and aligned solution developed in consultation with the relevant network operators.

Mitigation Planting

6.2.4 The 2025 design presented at statutory consultation included initial draft locations for mitigation planting within the draft Order Limits. These areas were identified to provide suitable space for planting to offset the loss of trees removed during construction of the overhead line. At this stage of project development, they were considered sufficient and, in some locations, also offered opportunities for screening or filtering views of the proposed overhead line. Following the statutory consultation period, the design of the Project has evolved to reflect feedback received from landowners and stakeholders, in regard to the most appropriate location, orientation and area required for planting to take place.

6.2.5 Subsequent to further assessment of the extent of tree removal required for the overhead line, additional mitigation planting areas have been incorporated within the draft Order Limits. This ensures that sufficient land is available to deliver mitigation planting in accordance with the required replacement ratios. The location of these areas has been informed by the existing landscape context, including established woodland and tree belts, and is designed to respond positively to these features. The proposed planting will comprise a mix of native species and is generally located adjacent to the overhead line alignment and areas affected by tree removal. In addition to replacing trees removed during construction of the overhead line, new planting will filter or fully screen lower-level elements of a development. The approach to mitigation planting is set out in **Application Document 7.8 Outline Landscape and Ecology Management Plan including an Outline Landscape Maintenance and Management Plan**

Species Mitigation

6.2.6 The Project has been designed to avoid environmentally sensitive features, where reasonably practicable. Embedded mitigation measures have been incorporated into the design to avoid or reduce potentially significant effects, during both construction and operation. As the Project design has been refined, requirements for species mitigation have been reviewed and updated in response to completed survey work and design iterations. This includes the incorporation of appropriate buffer zones to maintain suitable stand-off distances between temporary construction activities (such as haul roads) and protected species populations where reasonably practicable.

6.2.7 Following further assessment, a number of species mitigation measures have been identified and incorporated to further reduce potential significant environmental effects. These measures are set out in **Application Document 7.3 Register of Environmental Actions and Commitments and Application Document 7.8 Outline Landscape and Ecology Management Plan**.

Landowner Requests

6.2.8 A number of requests for design changes were received through consultation feedback and further engagement with landowners, which often explained the reasons for the change to support the continued use and management of wider land holdings.

6.2.9 There were instances where a landowner or tenant farmer requested a minor amendment to pylon siting, or adjustments to accesses and working areas, to minimise disturbance to land use or ensure existing practices could continue. One such example would be an amendment to the proposed alignment to ensure there remains sufficient space to navigate agricultural machinery around pylons to maintain agricultural practices.

6.2.10 All of these types of requests were considered and appraised. Where the design change was technically feasible, and could be accommodated without introducing other impacts which outweighed the benefit of the change, they were accommodated.

6.2.11 Due to the large number of these requests and the often minimal nature of changes, they are not all detailed within this report. Where these requests came through consultation feedback, they are summarised and responded to in **Application Document 5.1 Consultation Report**, including confirmation of whether the suggested change was incorporated into the Project's design or not.

6.3 Route Section A – between the proposed Birkhill Wood Substation and the River Ouse

Overview

6.3.1 The proposed overhead line in Route Section A is shown within **Application Document 6.4.F1 Environmental Statement Figure 4.1 Proposed Project Design** (Sheets 1 to 11) and the pylons detailed in **Application Document 6.4.A1 Environmental Statement Appendix 4.1 Indicative Pylon Schedule**.

6.3.2 As part of ongoing design development some pylon numbers have changed. Where a pylon number has been used to describe a change the current Project pylon number has been used and the 2025 design numbering has also been provided where necessary.

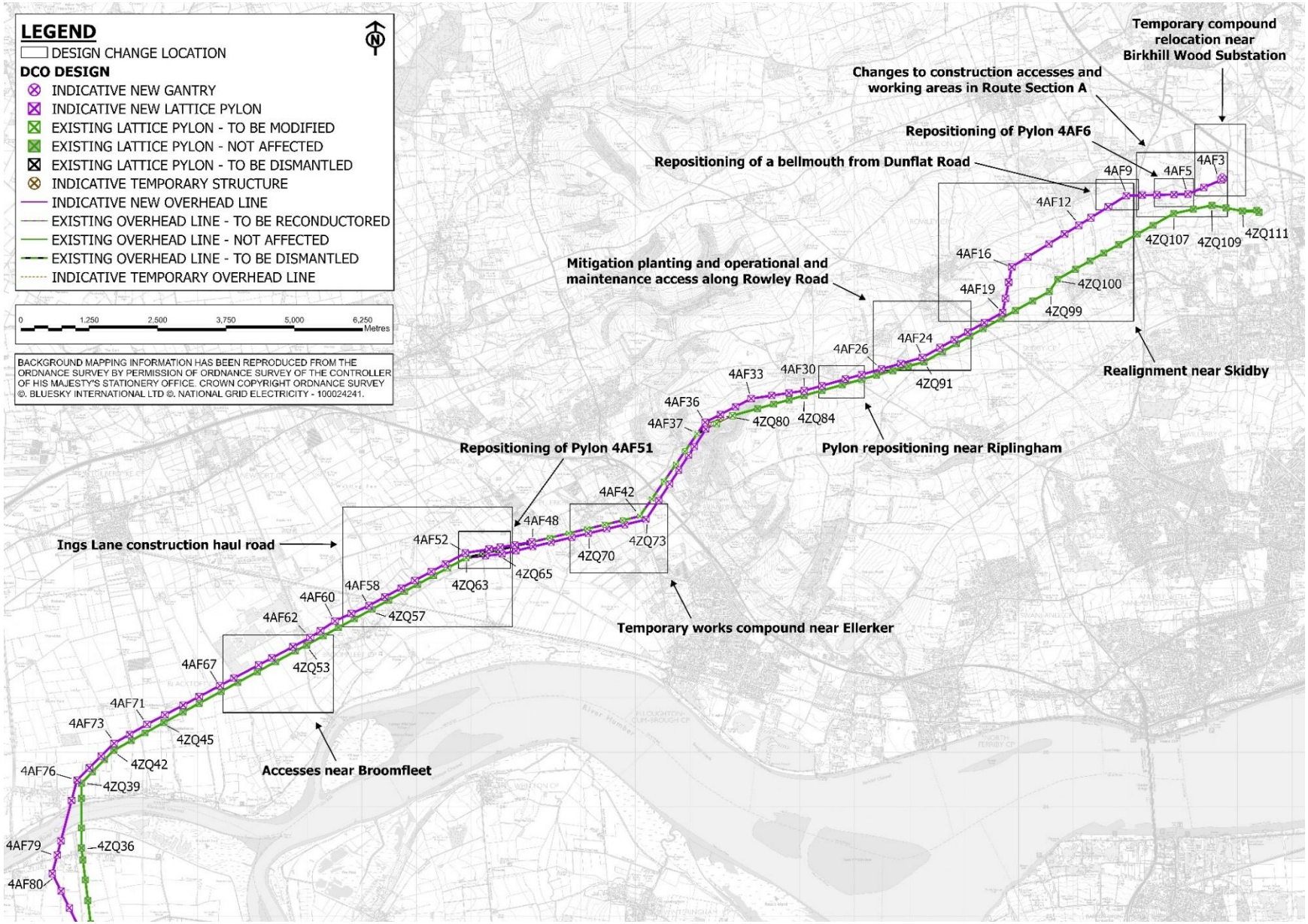
6.3.3 From the proposed Birkhill Wood Substation, the proposed overhead line is routed west for approximately 1.8 km, passing to the south of Jillywoods wood and crossing the A164 Beverley Road to pylon 4AF9. From pylon 4AF9, the overhead line is routed southwest for approximately 3.3 km to the north and west of the settlement of Skidby, crossing Little Weighton Road to pylon 4AF19.

6.3.4 From pylon 4AF19, the proposed overhead line is routed southwest for approximately 6.1 km in close parallel with the existing 4ZQ 400 kV overhead line to the south of the settlement of Little Weighton, crossing Riplingham Road and Lambwell Hill and routeing to the north of Brantingham Dale Site of Special Scientific Interest to pylon 4AF37.

6.3.5 Between pylons 4AF37 and 4AF48, the proposed overhead line is swapped onto pylons on the existing 4ZQ 400 kV overhead line. This is referred to as a line swap. To facilitate this line swap, 16 new pylons would be constructed to the south of the existing 4ZQ 400 kV overhead line alignment from the pylon 4ZQ79A through to pylon 4ZQ64, crossing the A63 and routeing to the south of the settlement of Ellerker, crossing Brough Road and Sands Lane. A new section of overhead line would be installed diverting the existing 4ZQ 400 kV overhead line route onto the 16 new pylons.

6.3.6 From pylon 4AF48, the new pylons would swap back to being installed in close parallel to the north of the existing 4ZQ 400 kV overhead line alignment for a further 9.3 km to the north of the settlement of Broomfleet. The 4ZQ 400 kV overhead line would route back onto its existing alignment from pylon 4ZQ63.

Image 6.1 – Route Section A – Design Change Overview



Temporary compound relocation near Birkhill Wood Substation

6.3.7 As part of the construction approach set out as per the 2025 design, a temporary works compound was located to the north of pylon 4AF4. As a result of ongoing engagement with the promoter of the proposed Creyke Beck Solar Farm and the Birkhill Wood Substation project team, the temporary works compound was required to be relocated from its 2025 design position.

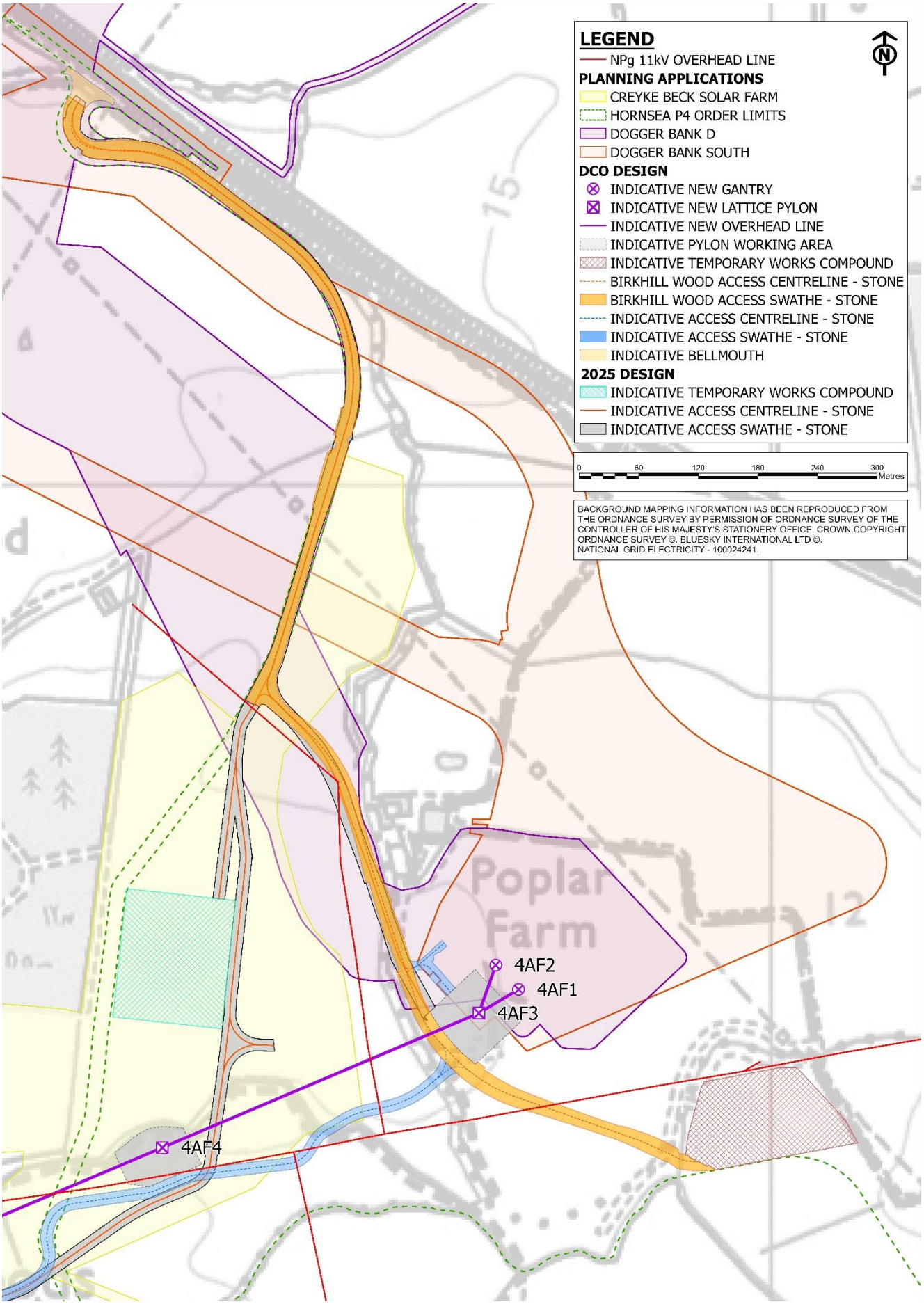
6.3.8 The temporary works compound could be moved southeastwards to the south of pylon 4AF3. This position would partly fall within the Hornsea Four Offshore Windfarm project order limits, and would be accessible via the permanent proposed Birkhill Wood Substation and Hornsea Four Offshore Windfarm project access route.

6.3.9 This would enable removal of the north to south construction access spur through the Creyke Beck Solar Farm, as shown in the 2025 design. Instead, access to the compound would be taken directly from the Birkhill Wood Substation permanent access route, with a new east to west spur added south of the substation to provide access to pylons 4AF4 and beyond.

6.3.10 Overall, the compound would minimise interaction with third-party developments noting that the site would partly fall within the Hornsea Four Offshore Windfarm order limits. Coexistence of both projects is likely to be achievable with ongoing coordination. In addition, the compound would be further from the Creyke Beck Solar Farm and the Birkhill Wood Local Wildlife Site

6.3.11 This change was considered the preferred approach and was incorporated into the design, noting that while there are interactions with the Hornsea Four Offshore Windfarm project, coexistence of both projects is likely to be achievable with ongoing coordination. This decision was taken as it relocates the compound away from the Birkhill Wood Local Wildlife Site, enables the use of the Birkhill Wood Substation permanent access route, moves the compound further from the proposed Creyke Beck Solar Farm area.

Image 6.2 – Temporary compound relocation near Birkhill Wood Substation



Changes to construction accesses and working areas in Route Section A

6.3.12 The 2025 design from pylon 4AF3 to 4AF9 routed in a westerly direction and would oversail the A164. National Grid undertook a review of the 2025 design and identified the opportunity to alter the construction accesses, working areas, and operational access in this area. This alteration was developed in collaboration with the promoter of Creyke Beck Solar Farm to minimise impacts to their infrastructure and reduce the Project's footprint. The proposed changes to the construction of the Project included:

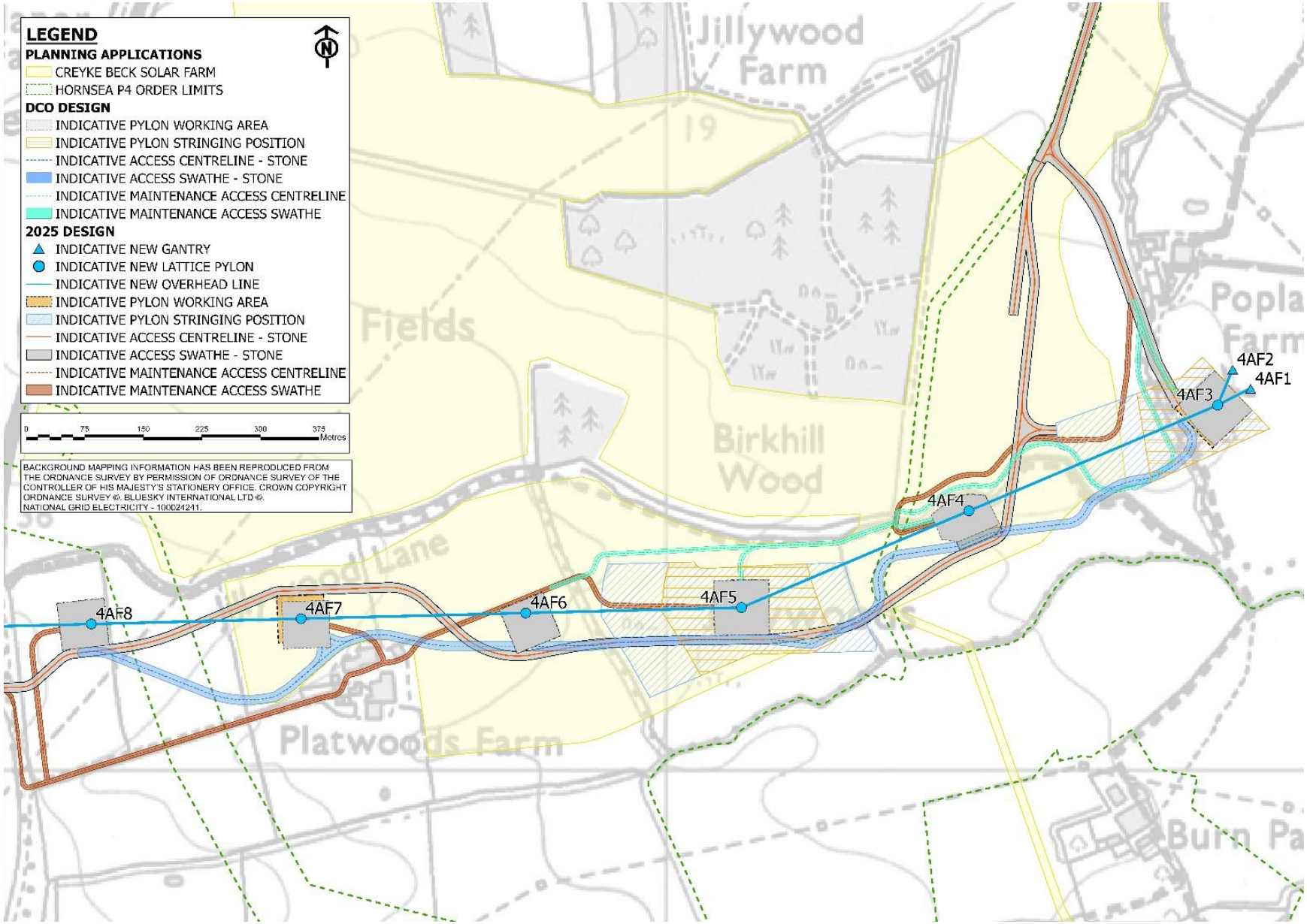
- Pylons 4AF3 and 4AF4: reorientate working areas to reduce interactions with Creyke Beck Solar Farm;
- Pylon 4AF3: reduce the extent of the stringing position to minimise impacts on Creyke Beck Solar Farm infrastructure and reroute the construction access via the proposed Birkhill Wood access road;
- Pylon 4AF5: reduce the extent of the stringing position to minimise impacts on Creyke Beck Solar Farm infrastructure;
- Pylon 4AF7: move the working area to the southeast to reduce impacts on Creyke Beck Solar Farm infrastructure;
- Pylons 4ZQ74 and 4ZQ73: move the construction access to avoid below ground archaeological features associated with a well preserved Roman Settlement that were identified during trial trenching; and
- Amend the construction haul road to avoid Creyke Beck Solar Farm's infrastructure, whilst minimising impacts on vegetation where possible. As part of this, a short section of the construction haul road interfaced with the Hornsea Four Offshore Windfarm project access road between pylons 4AF4 and 4AF5.

6.3.13 The proposed changes to the operational, maintenance and third-party access of the Project included:

- Pylons 4AF3 to 4AF5: operational and maintenance access were adjusted to avoid Creyke Beck Solar Farm infrastructure and utilise the proposed internal access tracks forming their development;
- Pylons 4AF3 to 4AF5: third-party access would also reroute south to follow the above approach; and
- Pylon 4AF8: shift the third-party access closer to the boundary of the southern field.

6.3.14 The rationalisation of accesses between pylons 4AF3 and 4AF9 would limit interaction with Creyke Beck Solar Farm, thereby resulting in a beneficial effect through reduced disturbance. On balance, this design change was preferred to the 2025 design due to the reduced impacts and interaction with Creyke Beck Solar Farm, which could be achieved through continuing engagement with the project as they develop their proposals.

Image 6.3 – Changes to construction accesses and working areas in Route Section A



Repositioning of Pylon 4AF6

6.3.15 As part of the 2025 design pylon 4AF6 was positioned near a field boundary with the proposed overhead line routing westwards from tension pylon 4AF5. National Grid has continued to undertake environmental survey work which identified two veteran trees on the field boundary closest to 4AF6. The Project reviewed the alignment in this area and identified an opportunity to reposition the pylon to reduce the impact on the veteran trees and their root protection areas. The repositioning would move pylon 4AF6 by 23 m eastwards and require height increases of pylons 4AF6 and 4AF7 to ensure sufficient clearance to the trees along the field boundary between pylons 4AF5 and 4AF6.

6.3.16 Incorporating this change would ensure that pylon temporary working area could be positioned outside of the veteran trees' root protection areas and would move pylon 4AF6 further from the residential property to the west. Given these benefits the design change was preferred to the 2025 design.

Image 6.4 – Repositioning of Pylon 4AF6

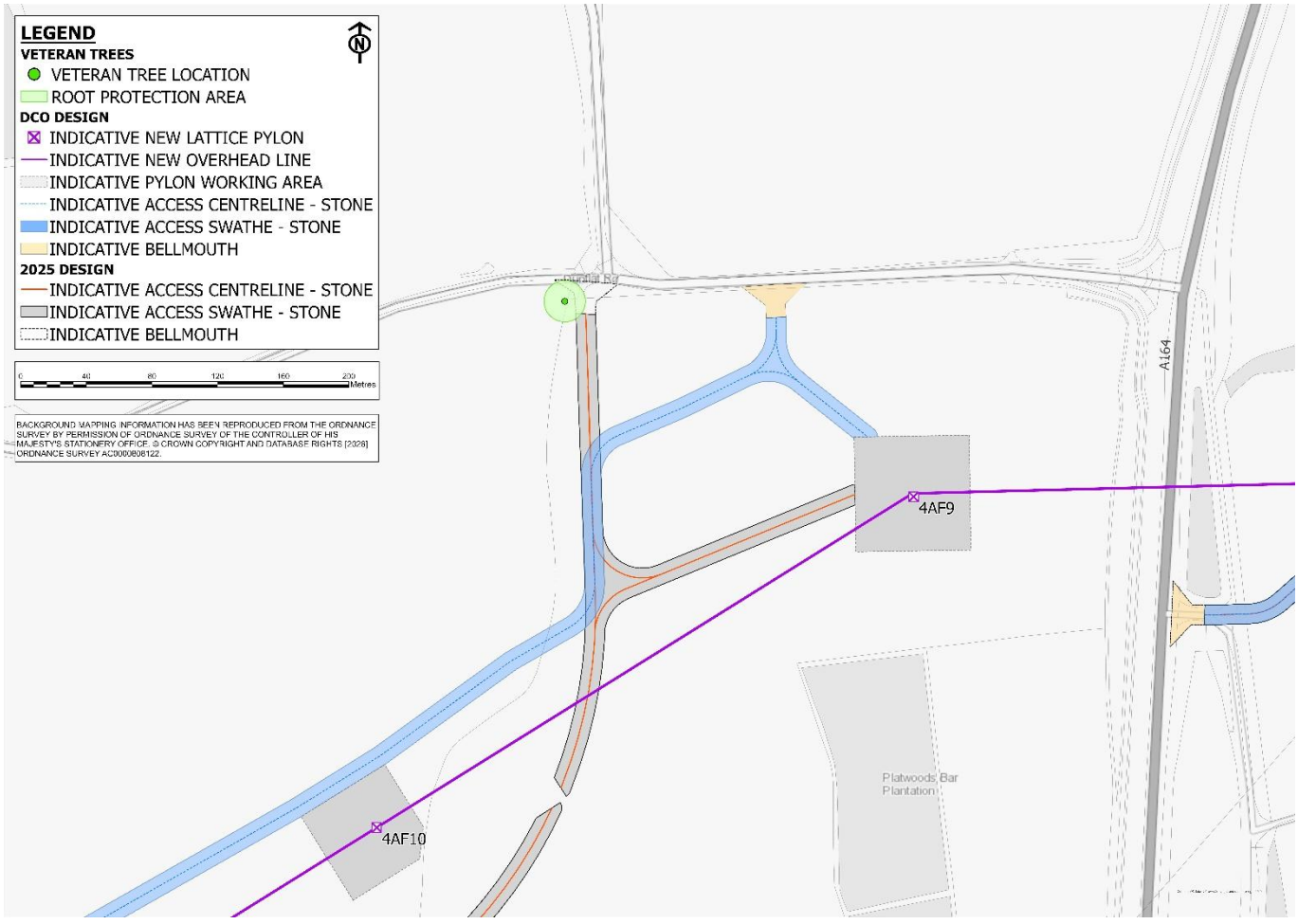


Repositioning of a bellmouth from Dunflat Road

6.3.17 The 2025 design included a bellmouth off Dunflat Road for the construction haul road by pylon 4AF9. National Grid has undertaken environmental surveys which identified a veteran tree on the field boundary by the bellmouth's proposed position. Therefore, the Project developed a change to reposition the bellmouth eastwards along Dunflat Road, towards the A164 Minster Way. This change would require the construction haul road to be altered within the field.

6.3.18 The change would avoid the veteran tree and the root protection area. The change would move the bellmouth further from the junction connecting to Coppleflat Lane, reducing visibility. This would result in a minor increase in construction haul road length within agricultural land. In addition, the change would remove an interaction with utilities provider KCOM's asset in the area. On balance, the avoidance of a veteran tree being impacted when compared to the 2025 design meant that the change was incorporated into the Project's design.

Image 6.5 – Repositioning of a bellmouth from Dunflat Road



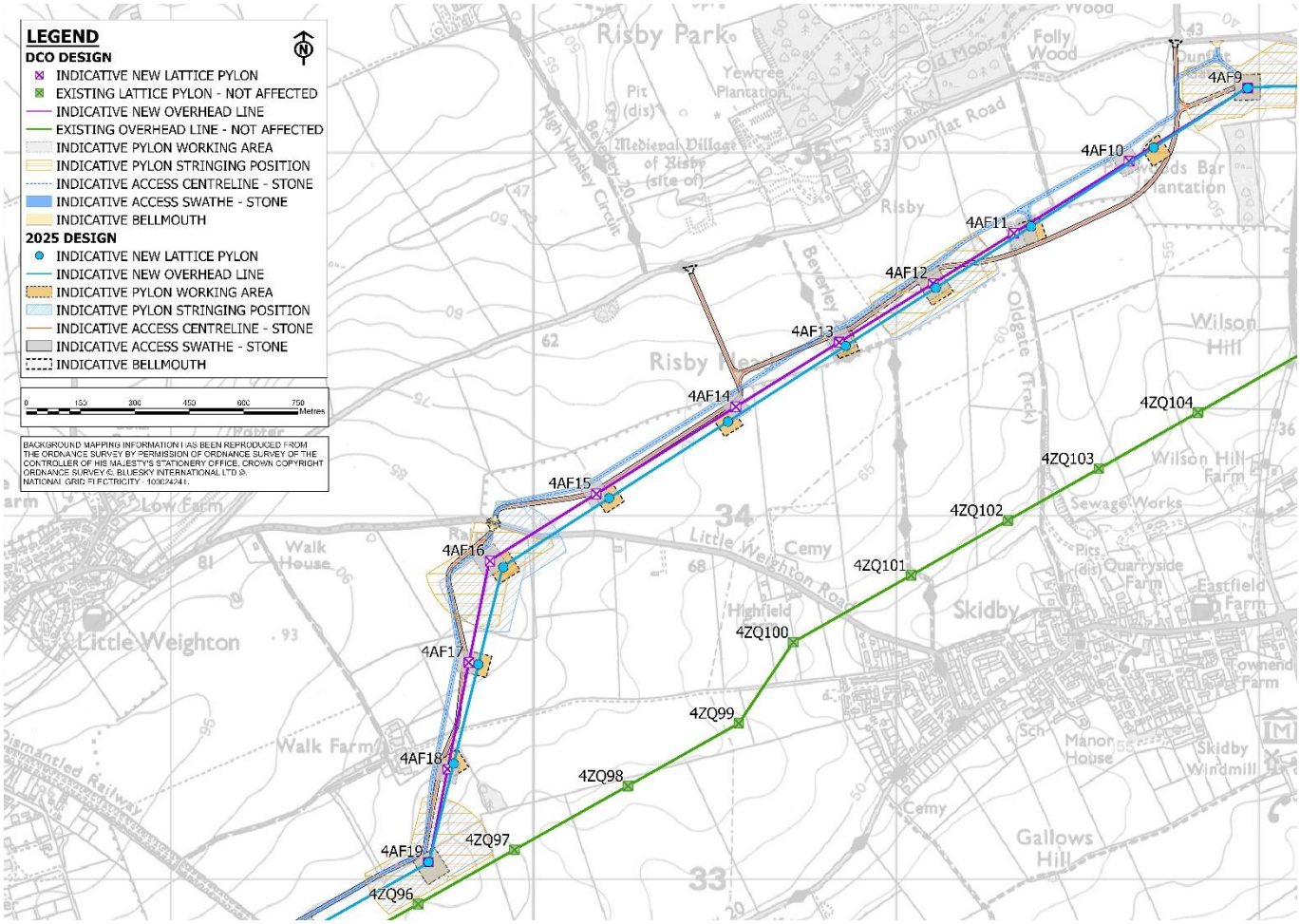
Realignment near Skidby

6.3.19 Following the 2025 design, National Grid has carried out further environmental survey work and as a result, archaeological assets have been identified near to pylons 4AF15 and 4AF16. In order to minimise impacts, National Grid has reviewed the alignment and pylon positions in this area to the west of Skidby. The proposed change would reposition pylon 4AF16 approximately 40 m northwest and, consequently, pylons 4AF9 to 4AF19 would also be realigned. The construction haul road was optimised from the 2025 design to facilitate new pylon positions, working areas and stringing positions. These changes include an extension to the working area for pylon 4AF11 to accommodate a construction haul road spur that sufficiently avoids mature trees.

6.3.20 The repositioning of pylon 4AF16 was developed with a preference to be sited outside of known archaeological assets, and the amendments to the construction haul road would avoid multiple crossings under the overhead line.

6.3.21 The Project incorporated the realignment and the associated working area movements as the design change would reduce the likelihood of interaction with known archaeological assets.

Image 6.6 – Realignment near Skidby



Mitigation planting and operational and maintenance access along Rowley Road

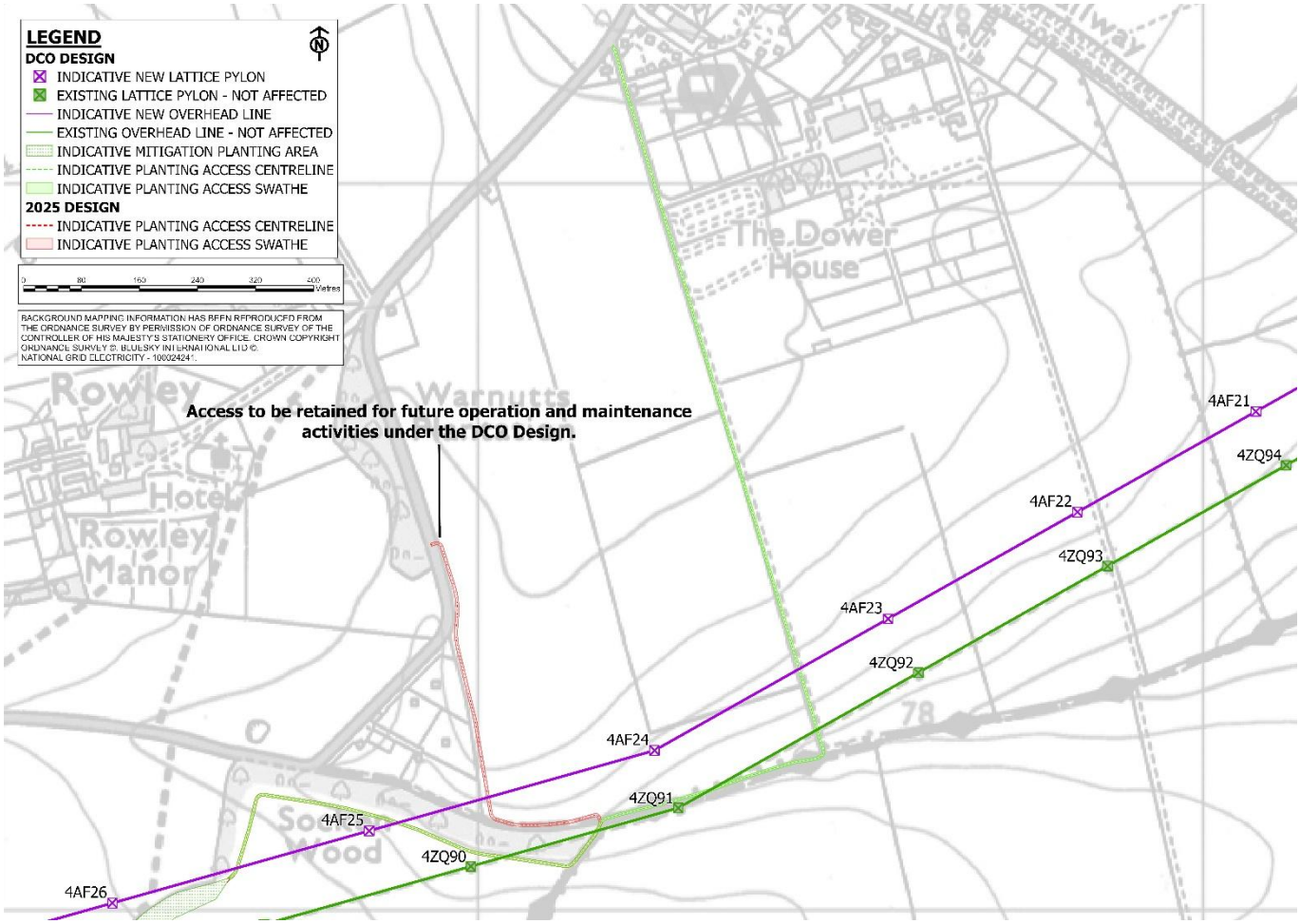
6.3.22 The proposed overhead line would continue to the west of Little Weighton. Survey work undertaken by National Grid identified a protected species nest that could be potentially disturbed near the mitigation planting access off Rowley Road, west of pylon 4AF24. Considering this, National Grid developed a change that would reduce the disturbance.

6.3.23 The 2025 design positioned the access along the field boundary between pylons 4AF24 and 4AF25. The change would move the access eastwards to be along the field boundary between pylons 4AF23 and 4AF24, with operational and maintenance access being maintained via Rowley Road and pylon 4AF24's land parcel.

6.3.24 Moving the planting access would not impact the feasibility of delivering the mitigation planting. Furthermore, the change would reduce the impact to the landowner, adding additional benefit. The change would reduce potential disturbances to the confirmed nest site for a protected species nearby and lessen the amount of works near the eastern end of Socken Wood.

6.3.25 The access would be used for future operational and maintenance activities only. The change was implemented given the benefits to landowners and the presence of a confirmed nest site for a protected species. This incorporated change would alter mitigation planting accesses but does not change the 2025 design's order limits.

Image 6.7 – Mitigation planting and operational and maintenance access along Rowley Road



Pylon repositioning near Riplingham

6.3.26 As the 2025 design approaches Riplingham it oversails the junction of Rowley Road and Riplingham Road. National Grid's ongoing engagement with landowners and internal design reviews identified potential repositioning of pylons 4AF27, 4AF28 and 4AF29. This proposed repositioning would result in:

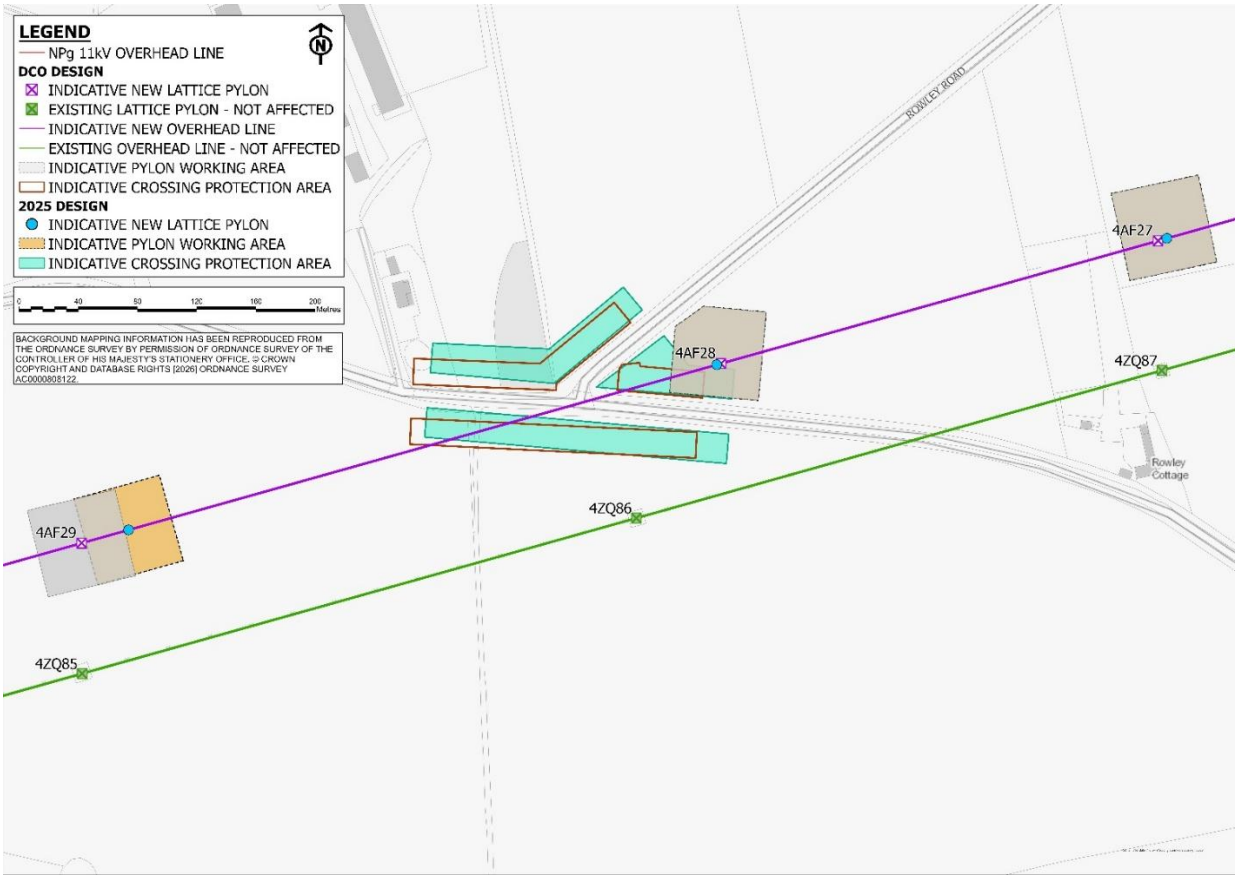
- Pylon 4AF27 moving by 6 m in a southwestern direction at the request of the landowner;
- Pylon 4AF28 moving by 3 m in a northeastern direction to ensure sufficient room for scaffolding and reduce technical complexity; and
- Pylon 4AF29 moving by 33 m in a southwestern direction at the request of the landowner.

6.3.27 The repositioning of pylon 4AF27 achieves the landowners request, is technically feasible and takes into consideration its proximity to the 11 kV overhead line. The repositioning is needed to facilitate the wider changes and was incorporated into the Project's design.

6.3.28 The repositioning of pylon 4AF28 was required to allow sufficient space for construction and installation of the scaffold structures that will protect Riplingham Road during stringing works. As a result of this movement, the pylon had to increase 3 m in height to ensure statutory clearances to ground were maintained.

6.3.29 The repositioning of pylon 4AF29 was made at the landowner's request and would allow for some better synchronisation of pylon 4AF29 with the existing 4ZQ 400 kV overhead line.

Image 6.8 – Pylon repositioning near Riplingham



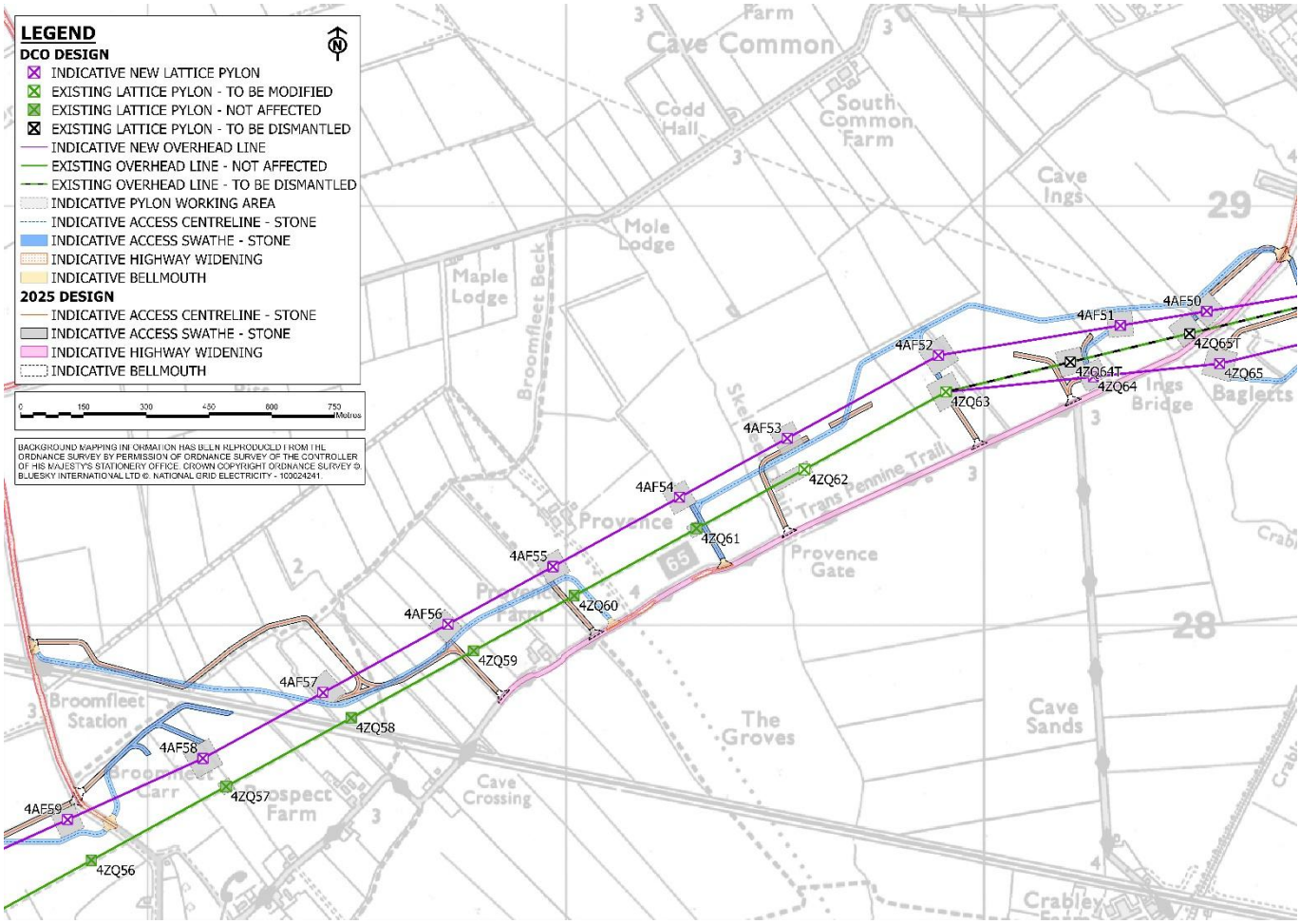
Ings Lane construction haul road

6.3.30 As the 2025 design routes to the south of Ellerker, oversailing Ings Lane, the proposed construction practices in this area include 1.2 km of non-continuous haul road, requiring multiple bellmouths and 2.1 km of highway widening along Ings Lane. A review of the 2025 design identified an opportunity for a more continuous construction access between pylons 4AF50 and 4AF57. As part of this change, it was proposed that the construction access rejoined Ings Lane for approximately 300 m, to avoid it crossing the driveway of Provence Farm.

6.3.31 The continuous construction haul road arrangement would be more cost-effective due to a reduction in the extent of highway widening and the number of bellmouths required. A 1km increase of the construction haul road length, one additional watercourse crossing, and the crossing of more individual fields by the construction access, when compared to the 2025 design, are outweighed by the reduction in bellmouths and highway widening in terms of cost and impact. The rejoining of Ings Lane would reduce potential impacts to Provence Farm by avoiding the need for the haul road to cross the driveway of this property.

6.3.32 The change would also redirect heavy goods vehicles (HGVs) predominantly onto the construction access, thereby removing them from a section of Ings Lane, reducing traffic volumes on the public highway and thus disruption to local users. Overall, it was considered the change was an improvement to the 2025 design and the change was incorporated into the design of the Project, including the haul road rejoining Ings Lane for 300 m, in light of the associated benefits.

Image 6.9 – Ings Lane construction haul road

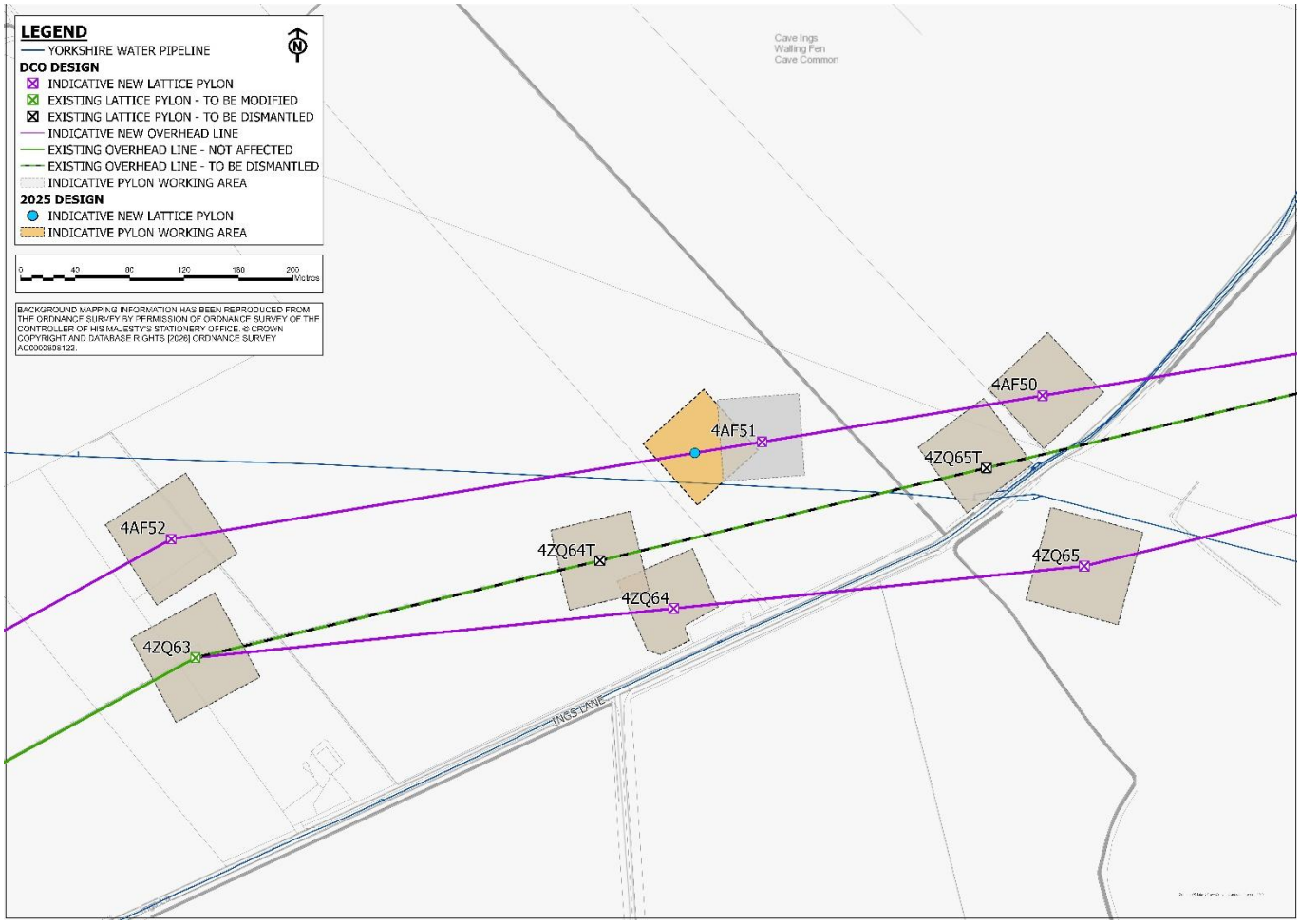


Repositioning of Pylon 4AF51

6.3.33 A review of the 2025 design identified that pylon 4AF51 should be relocated further east to maximise the distance between the pylon foundations and the existing underground Yorkshire Water pipeline located nearby. This change would also enable the pylon working area to be repositioned so as not to interfere with the pipeline.

6.3.34 The pipeline would be avoided with the repositioning but would require a 3 m increase in the height of pylons 4AF51 and 4AF52 to maintain sufficient electrical clearances to ground. The change would also increase the distance from any habitats situated in the field boundary. The change was implemented by National Grid as it avoids impacting the Yorkshire Water pipeline whilst causing no notable impacts when compared to the 2025 design.

Image 6.10 – Repositioning of Pylon 4AF51

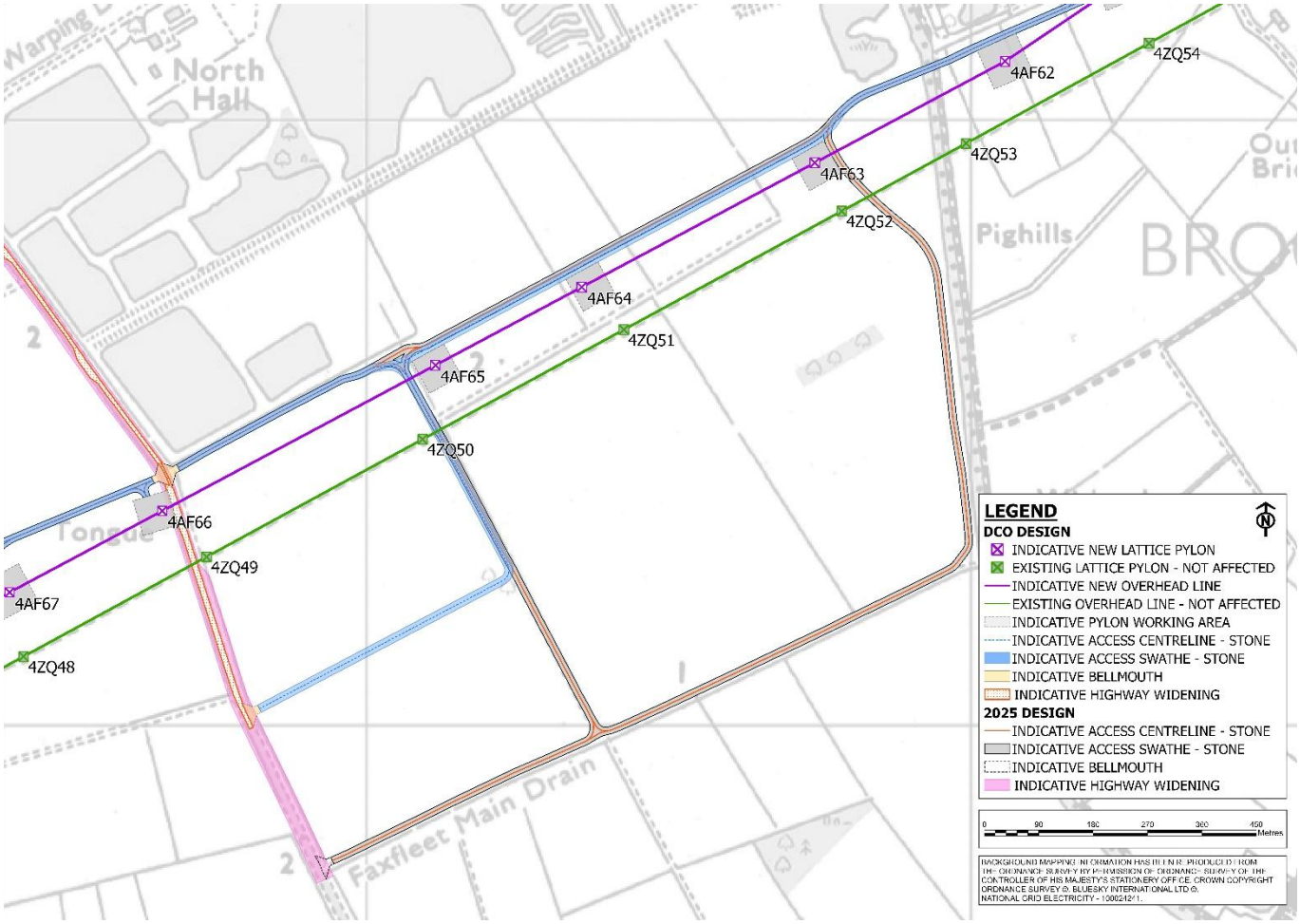


Accesses near Broomfleet

6.3.35 The construction haul road within the 2025 design routed from Tongue Lane westwards along existing farm tracks adjacent to Flaxfleet Drain before routeing northwards to the west of the Market Weighton Canal. This route was to be used for both operational and maintenance activities. Following National Grid's evaluations of the Project, and feedback from stakeholders an opportunity was identified to amend the access routes. The change would remove access along the track adjacent to the Market Weighton Canal and move the access route away from Flaxfeet Drain.

6.3.36 The change would allow the construction haul road to have an increased standoff from watercourses and drain networks. The realignment of the access route would reduce the requirement for farmland sterilisation during temporary construction period, as well as reducing the extent of road widening required along Tongue lane reducing potential impacts to landowners and communities. The Project's ongoing environmental surveys identified protected species along the Market Weighton Canal and Flaxfeet drain in this area and the change would avoid or reduce potential impacts to these. Therefore, the Project incorporated this change into its design to reduce potential impact on the land and species.

Image 6.11 – Accesses near Broomfleet



Temporary works compound near Ellerker

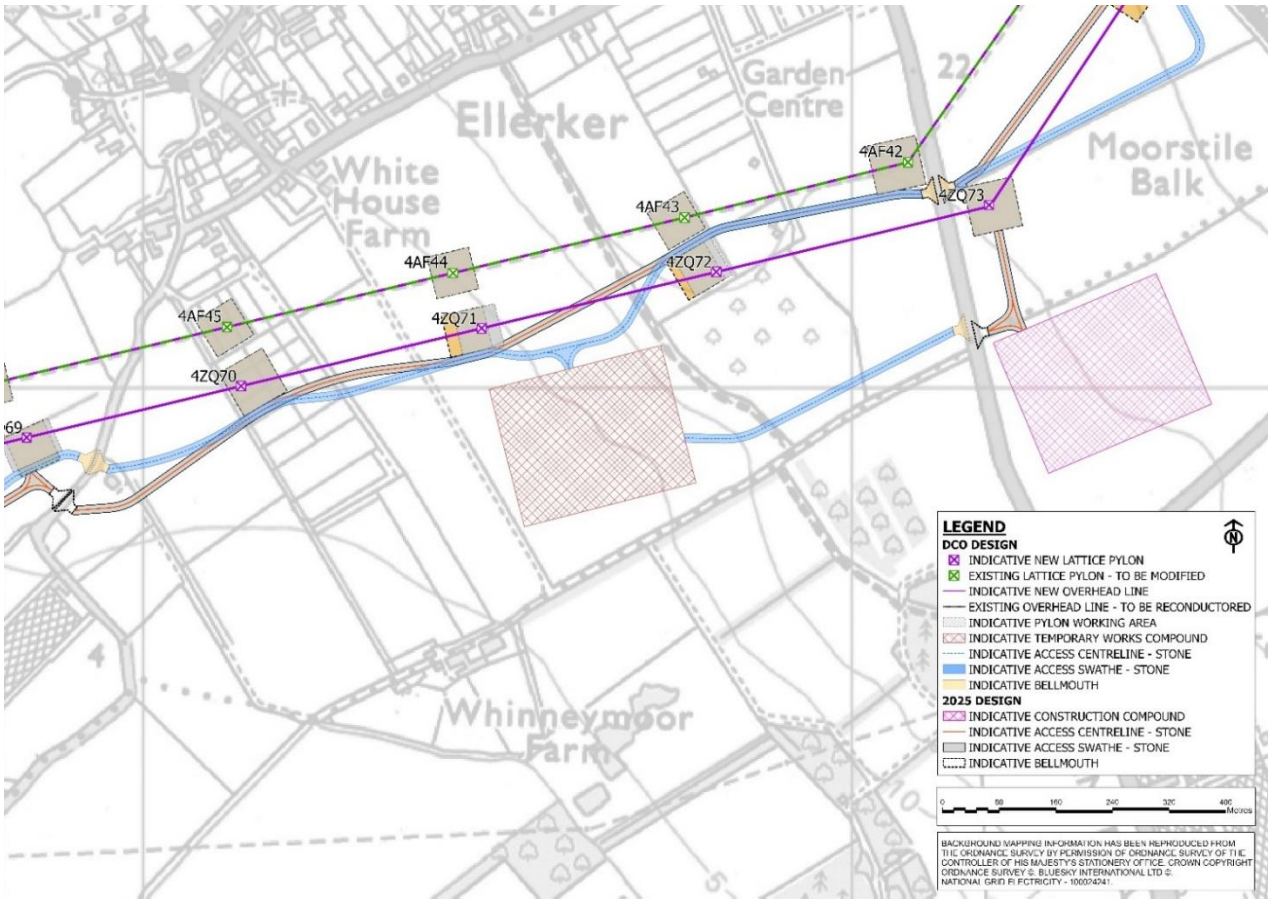
6.3.37 As part of the construction approach for the 2025 design, a temporary works compound was proposed to the southeast of pylons 4AF42 and 4ZQ73. Following National Grid's continued survey efforts, archaeological remains were identified in the area. Therefore, National Grid identified an alternative compound location. The proposed relocation was further west than the 2025 design site, located to the south of pylons 4AF44 and 4ZQ71, in a large field with Whin Moor Lane on its southern boundary.

6.3.38 The relocation of the temporary works compound would reposition it to the south of the proposed overhead line within an agricultural field, meaning it would no longer have a short, direct access from the public highway network for all construction traffic. As a result, construction movements would need to access it via the proposed bellmouth located between the two proposed overhead lines working areas. To avoid routeing traffic through construction zones, an individual compound access was designed south of the 4ZQ overhead line to allow direct, independent access into the compound for the duration of the works.

6.3.39 The proposed site is in an area where surveys had not identified significant archaeological assets. The change would bring the compound closer to residential receptors in Ellerker but this visual impact would be temporary during construction of the Project.

6.3.40 The relocation of the temporary works compound presented clear benefits compared to the 2025 design location, given the potential impact to archaeological remains; therefore, this change was incorporated into the Project.

Image 6.12 – Temporary works compound near Ellerker



6.4 Route Section B – between the River Ouse and Crowle

Overview

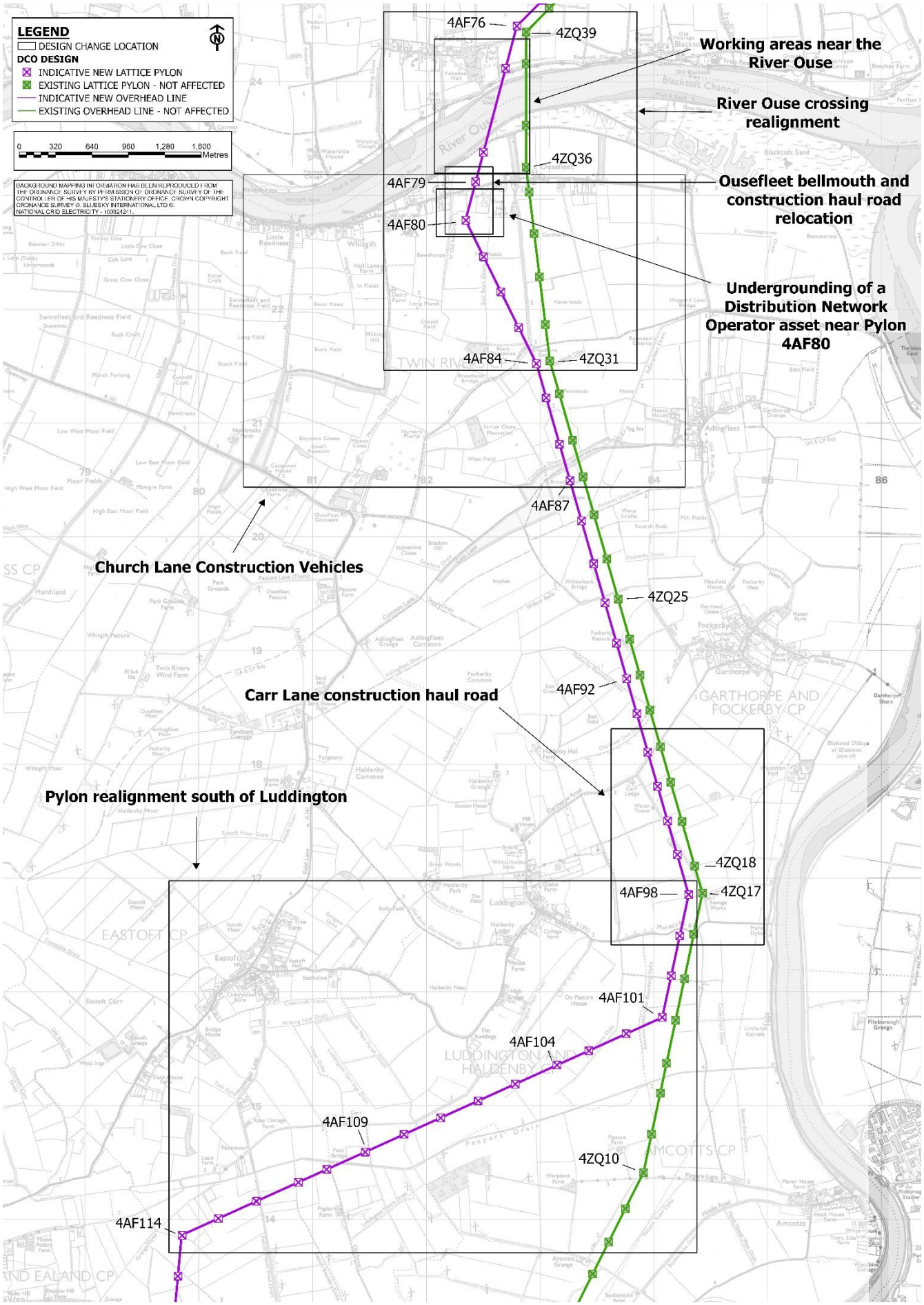
6.4.1 The proposed overhead line in Route Section B is shown in **Application Document 6.4.F1 Environmental Statement Figure 4.1 Proposed Project Design** (Sheets 11 to 16) and the pylons detailed in **Application Document 6.4.A1 Environmental Statement Appendix 4.1 Indicative Pylon Schedule**.

6.4.2 As part of ongoing design development some pylon numbers have changed. Where a pylon number has been used to describe a change the current Project pylon number has been used and the 2025 design numbering has also been provided where necessary.

6.4.3 From the start of Route Section B at Blacktoft Lane, the proposed overhead line is routed in a general southerly direction, crossing the River Ouse and Main Street between the settlements of Ousefleet and Whitgift. The proposed overhead line deviates away from close parallel between pylons 4AF77 and 4AF84 to avoid oversailing the Hall Garth Moated Site Scheduled Monument as well as properties within Ousefleet. Returning to close parallel routeing at pylon 4AF84, the overhead line continues in a southerly direction to the west of the existing 4ZQ 400 kV overhead line. From pylon 4AF84, the proposed overhead line is routed south, to the west of, and in close parallel with the existing 4ZQ 400 kV overhead line. The route passes to the west of the settlements of Adlingfleet and Garthorpe and east of the settlement of Luddington, crossing Cow Lane, Pasture Lane, Garthorpe Road, Carr Lane and Meredyke Road to pylon 4AF101. From pylon 4AF101, the proposed overhead line routes southwest around the north of Keadby Wind Farm and away from being in close parallel with the existing 4ZQ 400 kV overhead line. Through this section the proposed overhead line passes to the south of the settlements of Luddington and Eastoft, crossing Pasture Lane and Carr Lane to pylon 4AF114. Here, the proposed overhead line routes south to the end of this Route Section, just before pylon 4AF115.

6.4.4 In Route Section B, pylons 4AF77 and 4AF78 would be bespoke pylons to facilitate the crossing of the River Ouse. These pylons would be similar in height to the existing river crossing pylons on the 4ZQ 400 kV overhead line. Indicative pylon heights are provided in **Application Document 6.4.A1 Environmental Statement Appendix 4.1 Indicative Pylon Schedule**.

Image 6.13 – Route Section B – Design Change Overview



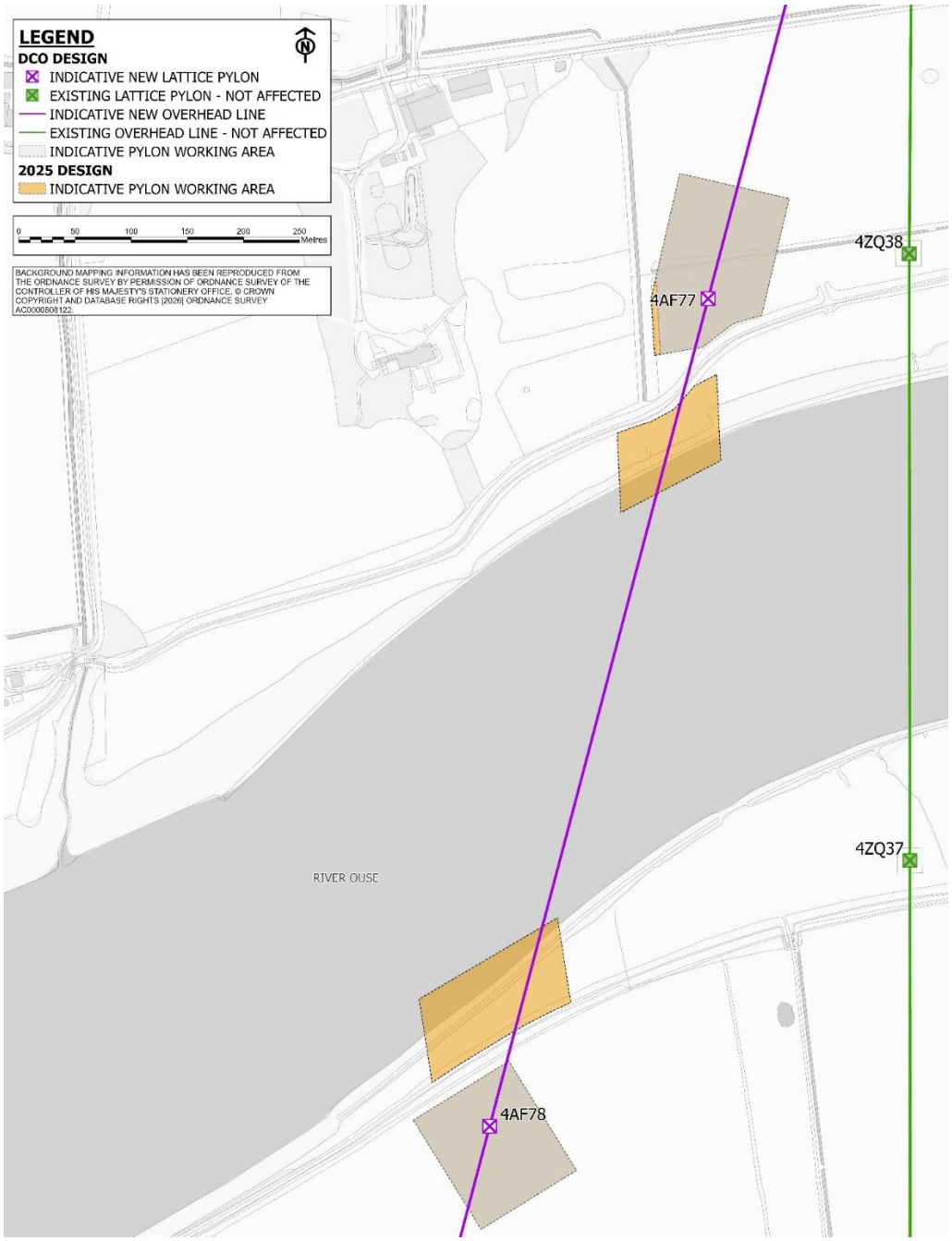
Summary of Design Development

Working areas near the River Ouse

6.4.5 Flexibility was built into the 2025 design for multiple construction and conductor stringing methodologies to be used for the River Ouse crossing between pylons 4AF77 and 4AF78. Following investigation into the stringing methods, National Grid deemed that the use of vessels launched from the bank of the river could be ruled out due to the risk of impacts on the ecological designated sites.

6.4.6 The refinement of the construction and stringing methodologies, and thus removal of the working areas, were assessed by National Grid. The change reduces the Project's Order Limits by removing working areas within a designated ecological site, and has therefore been accepted and incorporated into the Project.

Image 6.14 – Working areas near the River Ouse



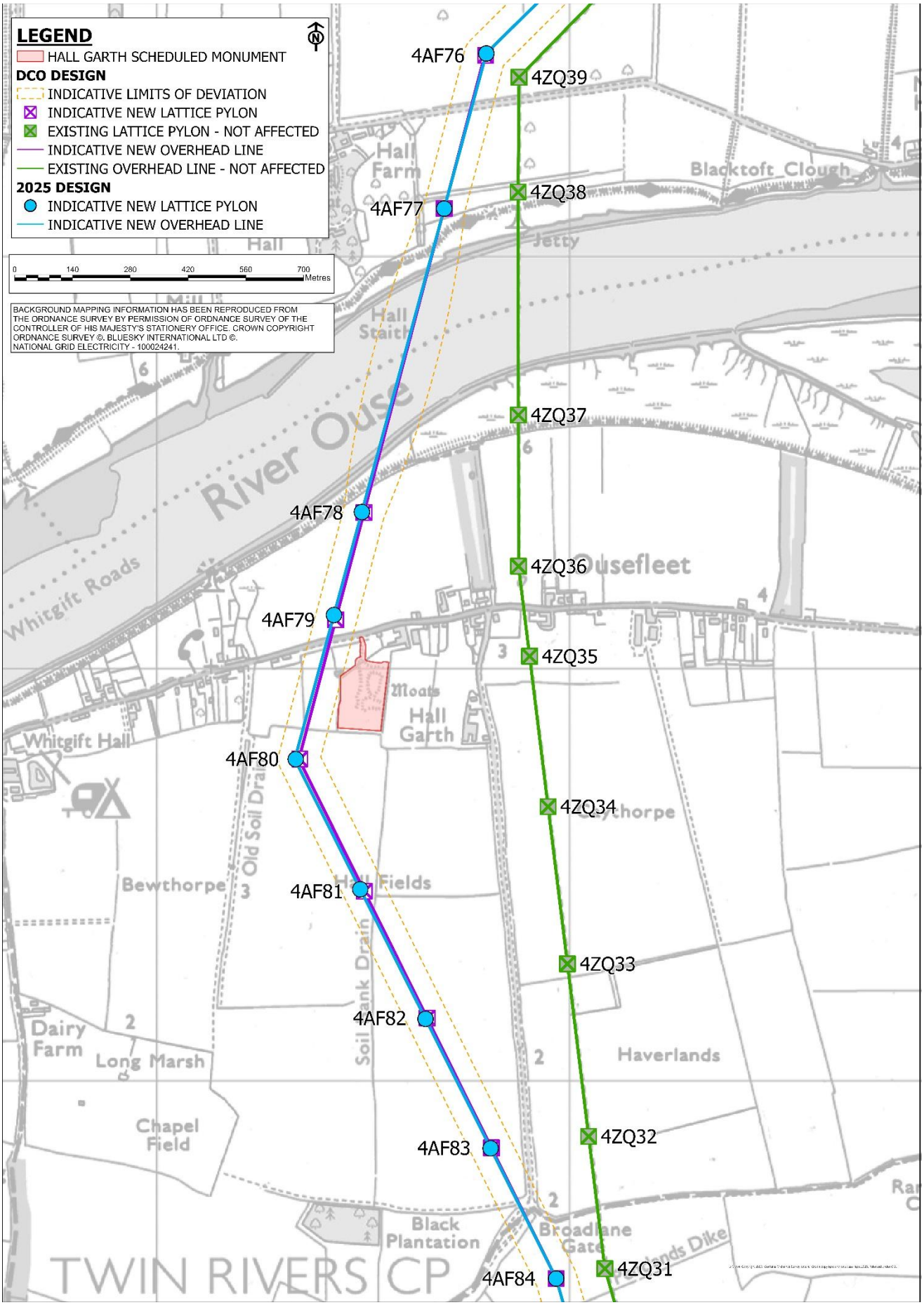
River Ouse crossing realignment

6.4.7 National Grid gathered a range of feedback in this area after consulting on the 2025 design. The feedback received had included requests to reposition pylons 4AF78, 4AF79 and 4AF80 to the east. The proposed repositioning would require the subsequent movements:

- Pylon 4AF76 to be moved 5 m southwest;
- Pylon 4AF78 to be moved 5 m east;
- Pylon 4AF79 to be moved 12 m east, remaining as an inline tension pylon; and
- Pylon 4AF80 to be moved 10 m east, requiring pylons 4AF81, 4AF82 and 4AF83 to be moved for the section through to pylon 4AF84.

6.4.8 As a result of the OHL movement east, the limits of deviation were restricted by ~5m to avoid infringement on the scheduled monument. The change would cause no materially different environmental impacts when compared to the 2025 design. On balance, National Grid incorporated this change into the Project to achieve the requests from the local community.

Image 6.15 – River Ouse crossing realignment



Ousefleet bellmouth and construction haul road relocation

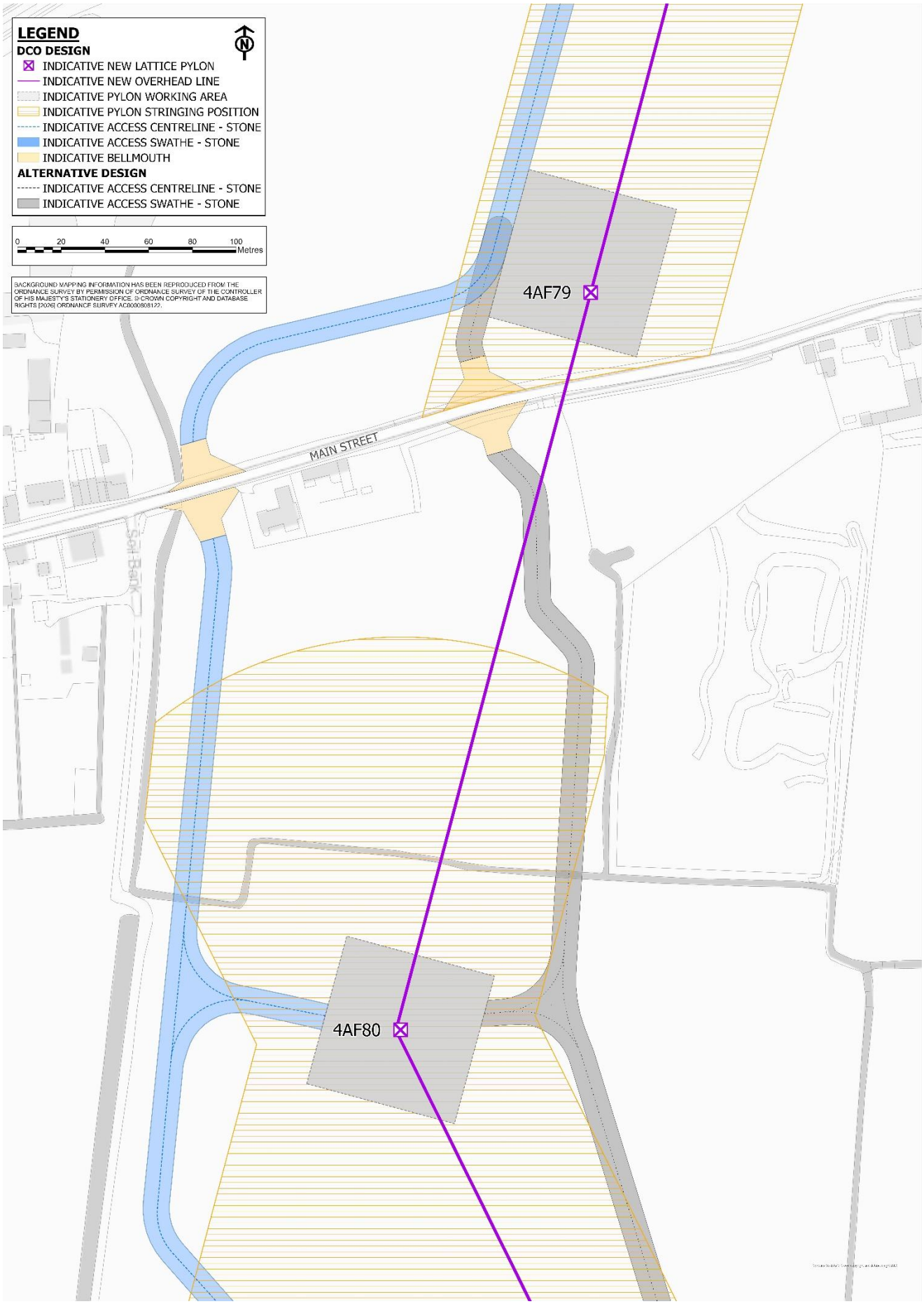
6.4.9 As part of the 2025 design, a construction haul road was proposed to the west of the proposed overhead line crossing Pennyhill Cottages. The construction haul roads are required to access the pylons north and south of the public highway. The haul road then continued along the field boundary west of pylons 4AF80 and 4AF81 before crossing beneath the proposed alignment to route southwards to the east of pylon 4AF82. Local landowner and community feedback received by National Grid suggested the relocation of the construction access points on Pennyhill Cottages to the east of the residential properties. This would bring the accesses closer to the proposed overhead line, and would be in combination with an amendment to the routeing of the construction haul road at these access points.

6.4.10 The relocation of the access points would bring them closer to the proposed overhead line, which could locate them directly beneath the proposed overhead line and the crossing protection structures at Pennyhill Cottages. This introduces construction complexity whilst also reducing flexibility. Movement of the access points, and therefore the construction haul road itself, would also route the proposed overhead line closer to the DNO diversion works, the pylon and the stringing works, when compared to the 2025 design. An area of archaeological features identified in geophysical surveys impacted both the 2025 design as well as the relocated access points.

6.4.11 However, the alteration would reduce the construction haul road length by approximately 330 m when compared to the 2025 design. The change would avoid the encirclement of residential receptors on Pennyhill Cottages.

6.4.12 National Grid incorporated the change into the design as it would achieve the requests from the local community. Due to ongoing archaeological trial trenching, the survey findings at this stage are not yet known. Therefore, these alternative access points were incorporated into the Project's design alongside the access points proposed in the 2025 design. This flexibility will allow the Project to obtain the site survey findings and make an informed decision during the detailed design phase as to which set of access points will be the most suitable on balance.

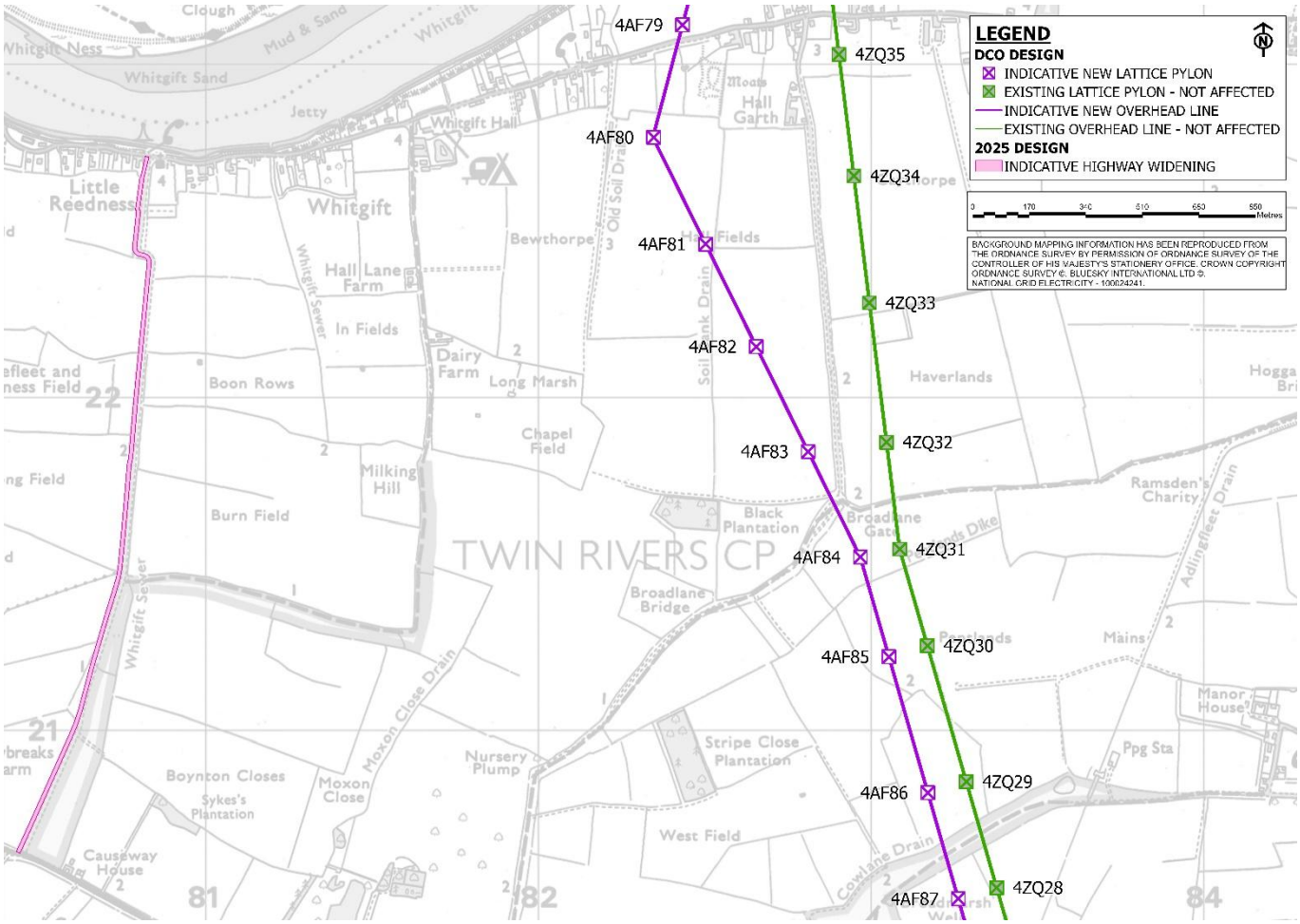
Image 6.16 – Ousefleet bellmouth and construction haul road relocation



Church Lane Construction Vehicles

6.4.13 The 2025 design included the proposed widening of Church Lane to the west of the proposed overhead line near Ousefleet. The highway widening measures would allow the passage of HGVs during the construction period. However, during National Grid's review of the 2025 design and with the Local Highway Authority informing the Project of their concern, a refined construction approach that would remove the need to widen Church Lane. The change would alleviate potential traffic issues and management whilst reducing potential damage to habitats along Church Lane. Instead the Project would use Pennhull Cottages for LGV access and the Local Highway Authority were supportive of this change. Therefore, the change was incorporated into the Project's design.

Image 6.17 – Church Lane Construction Vehicles



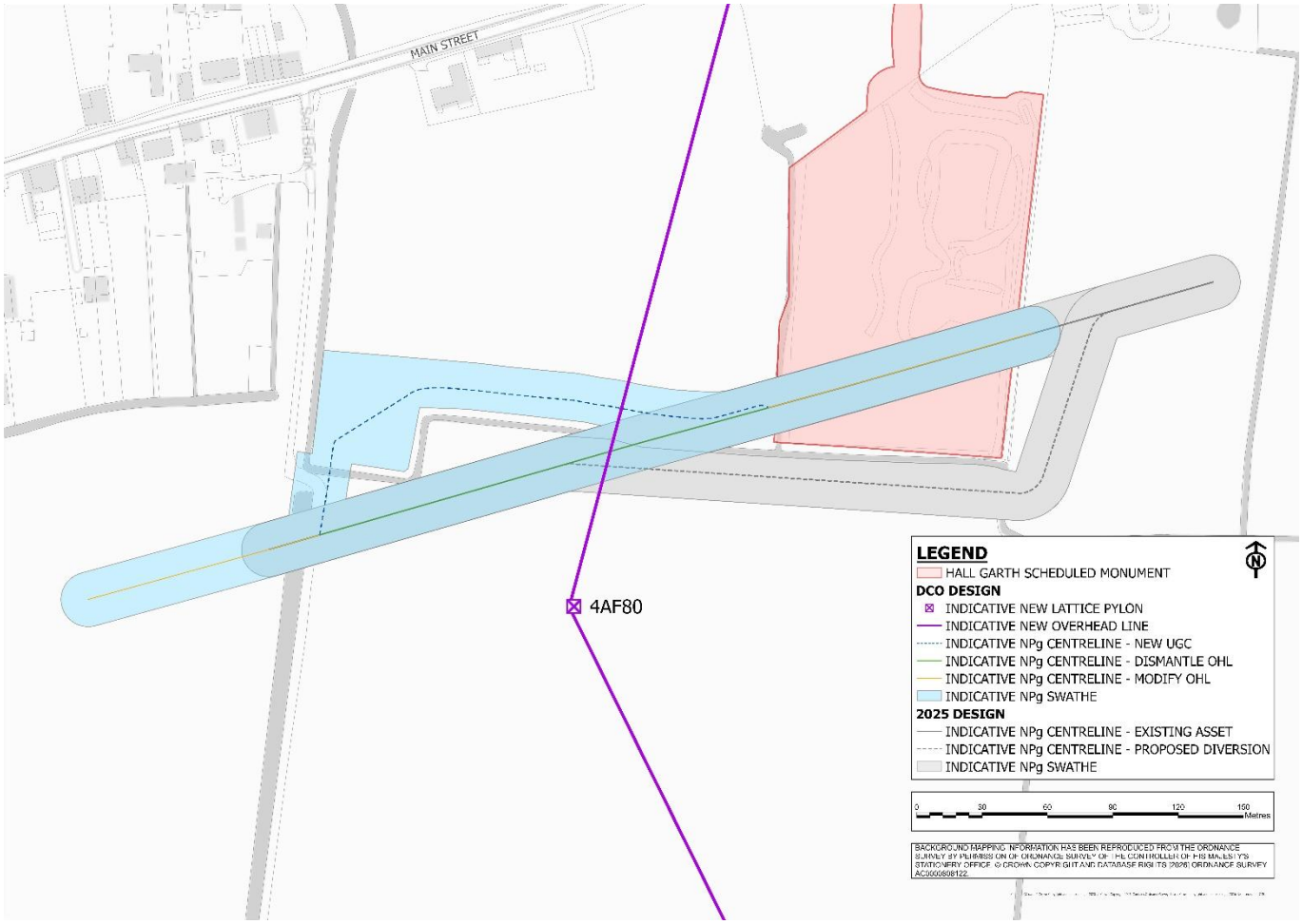
Undergrounding of a Distribution Network Operator asset near Pylon 4AF80

6.4.14 As set out above, the position of tension pylon 4AF80 has been amended compared to the 2025 design. North of pylon 4AF80, an existing 11 kV Northern Powergrid overhead line was proposed to be undergrounded to facilitate the Project's proposed overhead line. Since the 2025 design was developed, National Grid has continued to conduct environmental surveys which have subsequently identified ecological issues near the proposed undergrounding works.

6.4.15 As a result, National Grid engaged further with Northern Powergrid to develop an alternative design that avoided impacts on the protected species and the scheduled monument. The alternative design sought to reduce the extent of the diversion works to the east, which minimise impacts on the agricultural field, whilst also avoiding the protected species and ground disturbance within the scheduled monument.

6.4.16 Overall this change was implemented as it was a feasible design put forward by Northern Powergrid which achieved the diversion requirements whilst minimising impacts on local landowners, designated sites and protected species.

Image 6.18 – Undergrounding of a Distribution Network Operator asset near Pylon 4AF80



Carr Lane construction haul road

6.4.17 The 2025 design continues in a southeastern direction passing to the west of Garthorpe and to the east of Luddington. In this area, the 2025 design proposed that 2.8 km of highway widening along Carr Lane would be required, with individual access points for pylons 4AF94 to 4AF99.

6.4.18 As part of ongoing assessments, surveys and design refinement, an opportunity was identified to refine the construction accesses in the area. The proposed alternative was to construct a construction haul road to the east of Carr Lane, before crossing over the highway network near pylon 4AF97 and again towards pylon 4AF99.

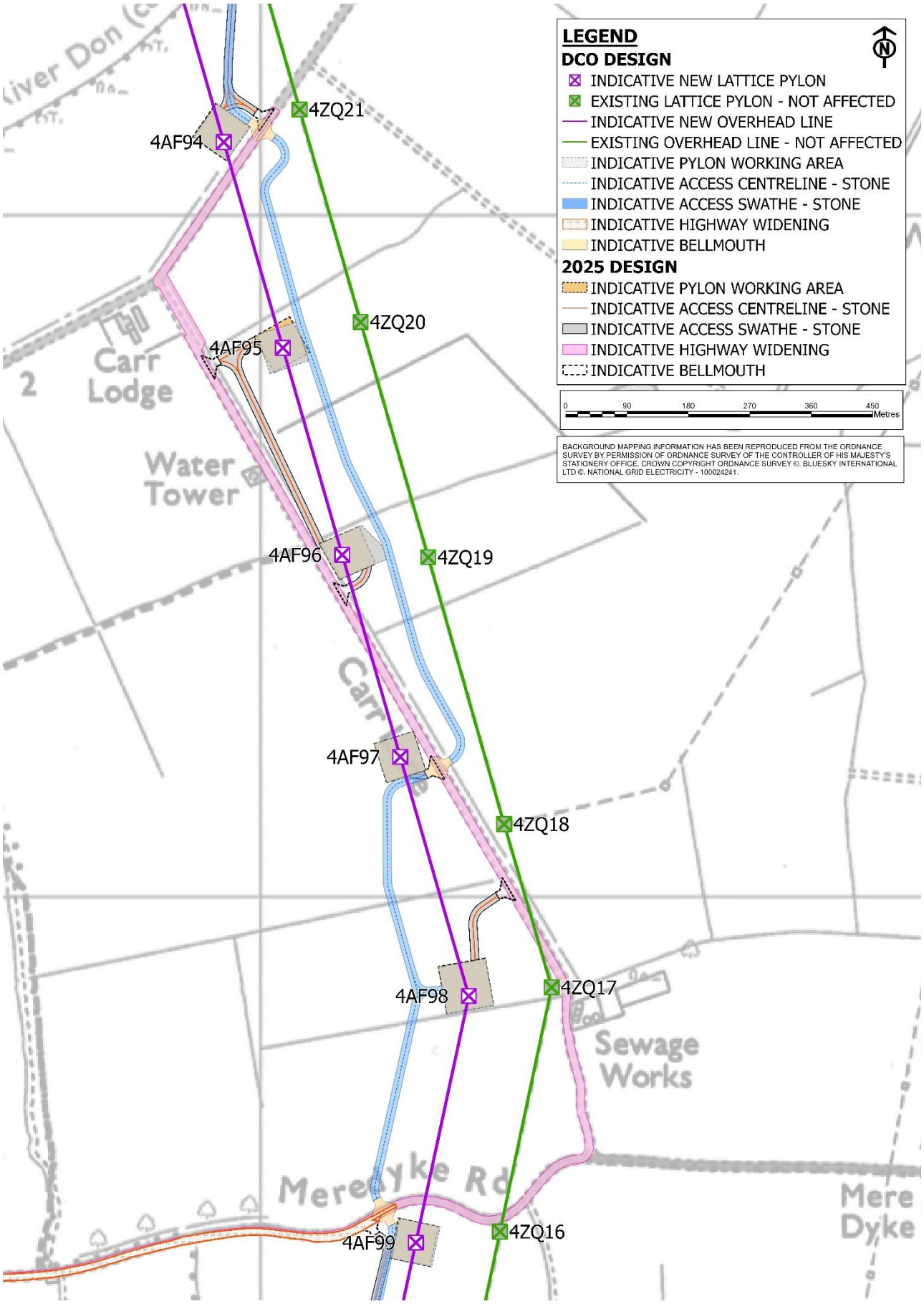
6.4.19 The change would reduce the extent of highway widening and traffic management requirements, therefore reducing disruption to local residents and road users. These changes would benefit the enabling works programme and the construction sequencing by removing the dependency on the completion of highway widening before bellmouth construction could begin. The change would increase the construction haul road length by approximately 1.2 km.

6.4.20 A continuous construction haul road in this area would impact areas of farmland temporarily during the construction phase and require engagement with new landowners. However, the change would direct construction traffic, including HGVs, off the public highway network, reducing disruptions to local road users whilst also moving construction traffic further from residential properties in the area.

6.4.21 The change would reduce the noise impacts on the local communities and the level of PRoW management required when compared to the 2025 design. The proposed construction haul road reduces the loss of existing vegetation compared to the 2025 design approach and keeps construction activities off the public highway. However, the change would increase the number of watercourse crossings required.

6.4.22 On balance, National Grid decided to incorporate this change into the Project given the reduced highway widening and vehicle movements on Carr Lane. The potential effects on soils, buried archaeology and landowners arising from ground disturbance were considered; however, given their temporary impact and the substantial wider benefits, the change was incorporated.

Image 6.19 – Carr Lane construction haul road



Pylon realignment south of Luddington

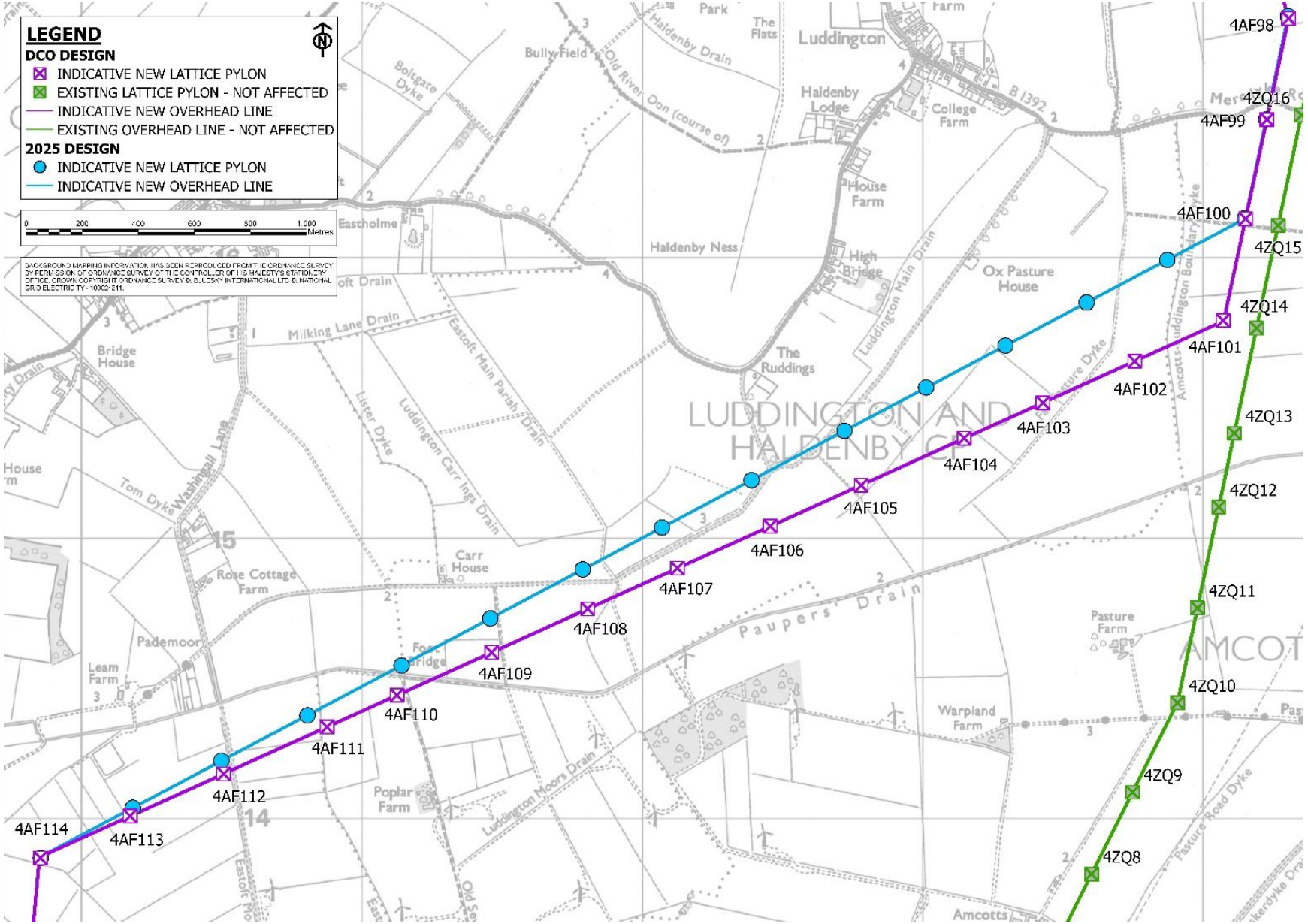
6.4.23 The 2025 design presented a route to the east of Luddington, which then changes direction at tension pylon 4AF100, to the southwest. The alignment then continues southwest towards the village of Crowle, oversailing Ox Pasture Lane before then routeing south at pylon 4AF114. A variety of feedback was received in relation to this part of the 2025 design, all of which was considered. The feedback received identified an opportunity for a realignment in the area, whilst maintaining safety in respect of the Keadby Wind Farm situated nearby to the south. This feedback informed a realignment that were considered by the Project.

6.4.24 The change would realign pylons 4AF100 to 4AF114 by extending the alignment in a southerly direction, continuing in close parallel along the existing 4ZQ 400 kV overhead line. The 2025 design had 4AF100 as the tension pylon adjacent to 4ZQ15, but option one relocated the tension pylon to 4AF101 adjacent to 4ZQ14. The alignment would then continue in a straight line to 4AF114.The change would provide sufficient clearance from the Keadby Wind Farm

6.4.25 The change would enable seven pylon height decreases but would require two height increases on pylons 4AF100 and 4AF112. This more southerly alignment removes the previous complex crossing of Ox Pasture Lane, Carr Lane and the associated junction, avoiding the need for large and complex scaffold structures. The realignment would reduce the quantity of bellmouths and the extent of highway widening requirements in the area. Furthermore, this would provide a straighter route between pylons 4AF101 and 4AF114, bringing the alignment further from properties and heritage assets at Luddington.

6.4.26 National Grid identified that this change provided the best opportunity by keeping the engineering designs within specifications and avoiding the large scaffold arrangement at Carr Lane. The change maximises reductions in pylon height while minimising increases and reducing the total number of bellmouths required. A bellmouth and section of highway widening will be retained on Carr Lane near pylon 4AF106 to reduce the reliance on Luddington Road. Considering these advantages, the realignment was preferred to the 2025 design and incorporated into the Project.

Image 6.20 – Pylon realignment south of Luddington



6.5 Route Section C – between Crowle and North Moor (M180)

Overview

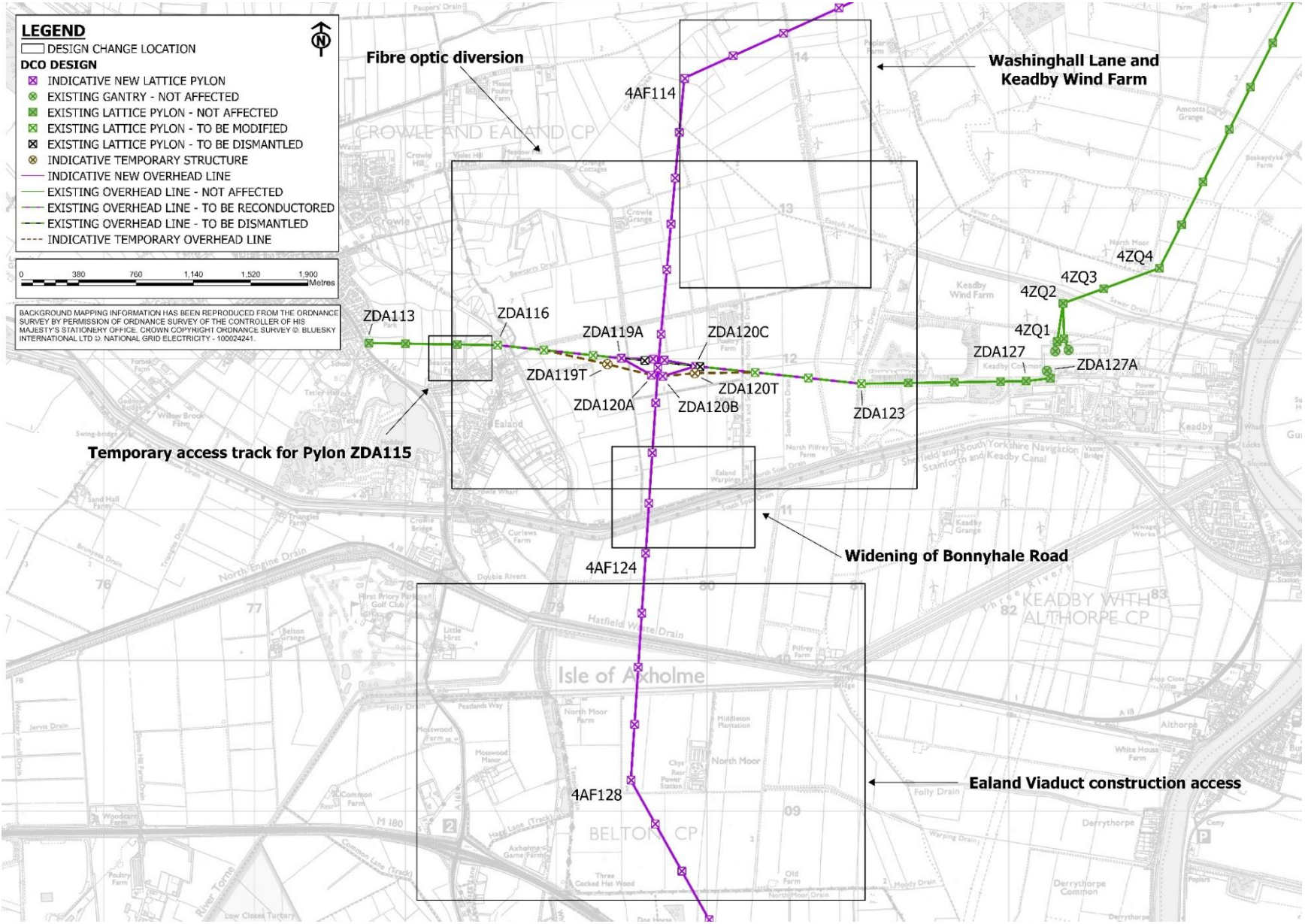
6.5.1 The proposed overhead line in Route Section C is shown in **Application Document 6.4.F1 Environmental Statement Figure 4.1 Proposed Project Design** (Sheets 16 to 19), and the pylons detailed in **Application Document 6.4.A1 Environmental Statement Appendix 4.1 Indicative Pylon Schedule**.

6.5.2 As part of ongoing design development some pylon numbers have changed. Where a pylon number has been used to describe a change the current Project pylon number has been used and the 2025 design numbering has also been provided where necessary.

6.5.3 From pylon 4AF115, the proposed overhead line is routed broadly south to the east of Crowle for approximately 6.4 km. The route crosses Outgate, the existing ZDA 400 kV overhead line, the Sheffield and South Yorkshire Navigation, and the A18 to the end of Route Section C between pylons 4AF128 and 4AF129 to the north of the M180.

6.5.4 Within Route Section C, the proposed overhead line crosses the existing ZDA 400 kV overhead line between Keadby and Crowle. To facilitate this crossing, the existing ZDA overhead line would be split between pylons ZDA119A and ZDA120C, beneath the proposed overhead line. This is to give the required clearance between the proposed and existing lines. Six new pylons are proposed and approximately 520 m of existing ZDA overhead line, including two pylons, would be removed. This type of crossing is referred to as a ‘diamond duck under’.

Image 6.21 – Route Section C – Design Change Overview



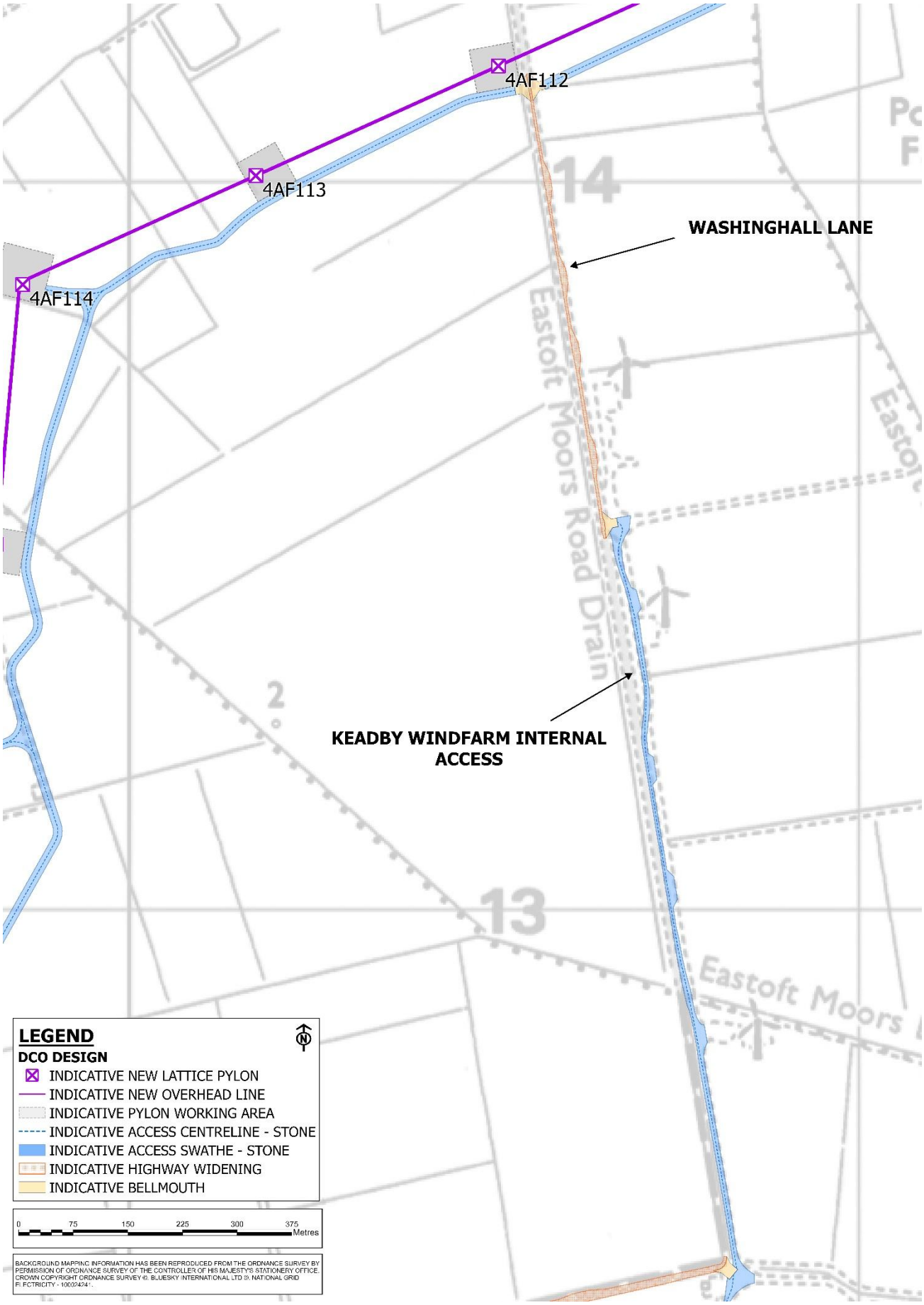
Summary of Design Development

Washinghall Lane and Keadby Wind Farm

6.5.5 Following the realignment to the south of Luddington, the Project routes southwards from pylon 4AF115 to the east of Crowle. The Keadby Wind Farm is located within this area and National Grid proposed to use the Keadby Wind Farm's internal access route only. In the 2025 design, the Project proposed to use this access from Bonnyhale Moor Road down to the A18 over the canal. After statutory consultation, National Grid identified an additional access route that comprised partial use of the internal Keadby access road, north of Bonnyhale Moor Road, alongside an upgraded section of Washinghall Lane.

6.5.6 The use of this access route would help improve distribution of HGVs across the network and alleviate pressures on other road networks. This change would alleviate reliance on access points on Bonnyhale Moor Road and Outgate during enabling works and construction by providing additional access for HGVs. As part of the highway works along Washinghall Lane, passing places have been positioned on the opposite side of the road to existing ditches so as to mitigate any potential impacts on protected species. Considering these benefits, the change was preferred by National Grid and taken forward to enable more efficient construction works in the area.

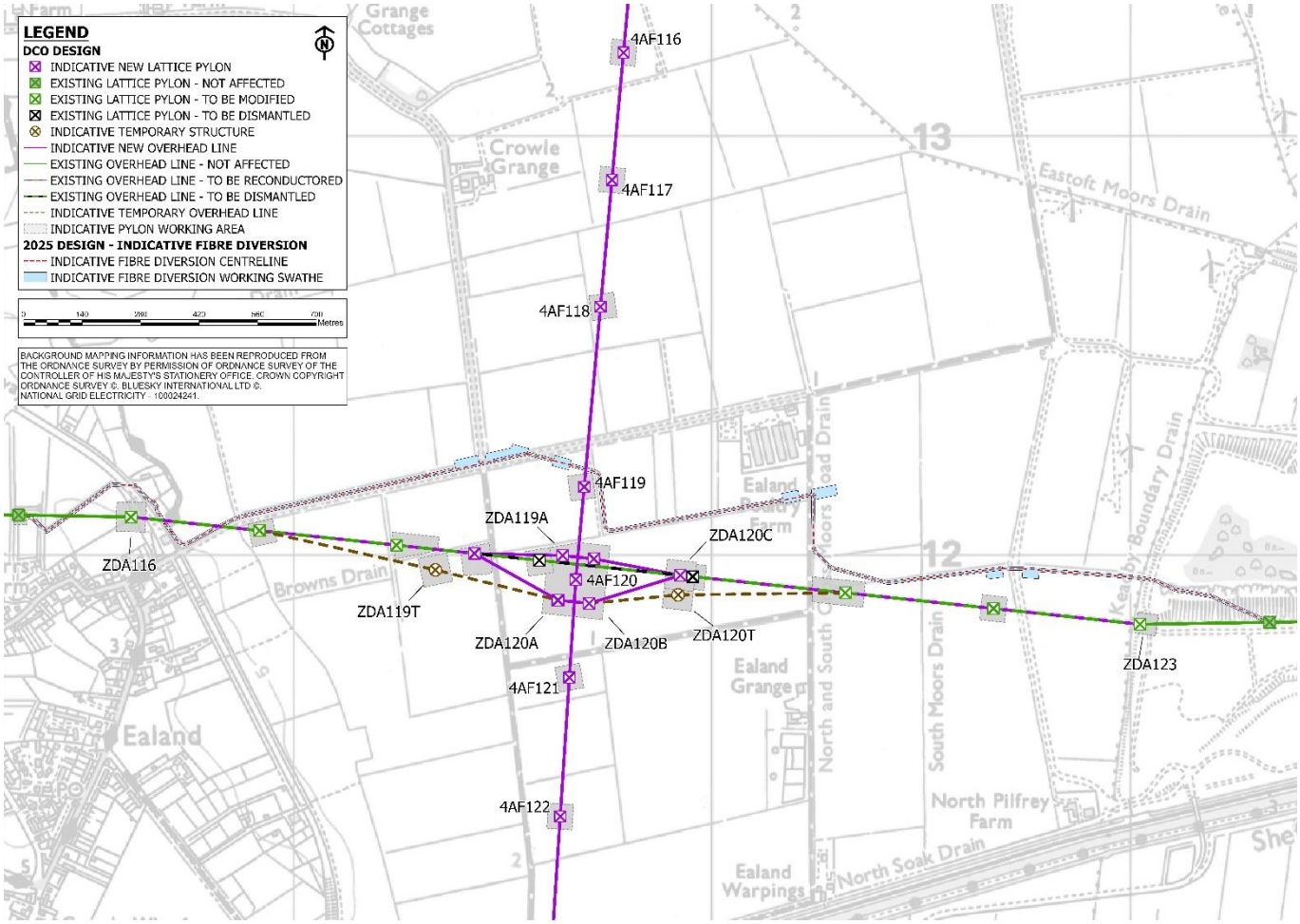
Image 6.22 – Washinghall Lane and Keadby Wind Farm



Fibre optic diversion

6.5.7 As part of the 2025 design, a fibre optic diversion was proposed in the Project's Order Limits to enable continuation of the fibre optic supply that would have been impacted during the proposed ZDA overhead line crossing works. As the Project developed, collaboration with local telecommunications providers resulted in an agreement to temporarily divert the fibre services onto their existing network. As a result, the fibre optic diversion was no longer required and was removed from the proposed project design.

Image 6.23 – Fibre optic diversion

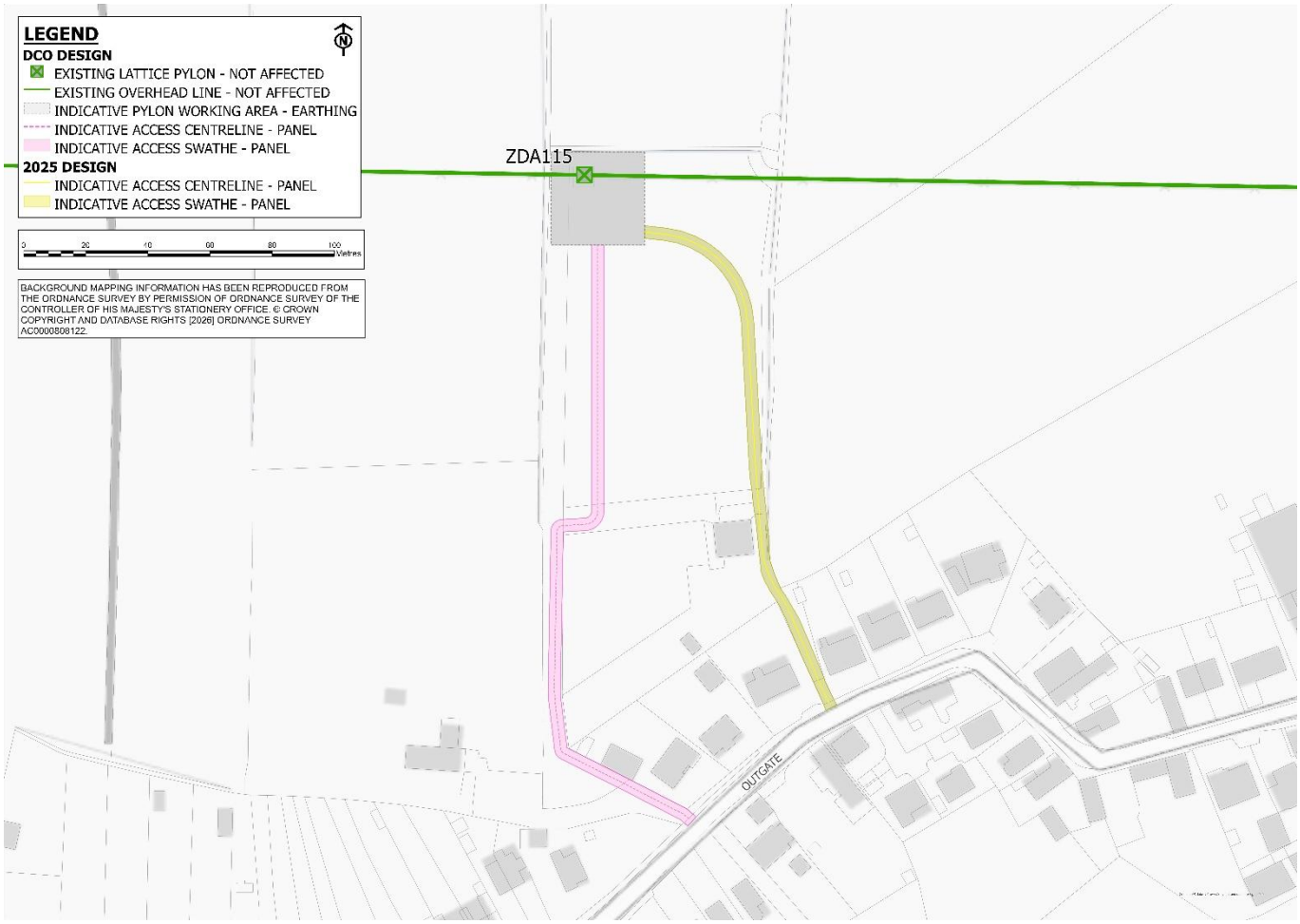


Temporary access track for Pylon ZDA115

6.5.8 The Project includes works to the existing 400 kV ZDA overhead line and access is required to pylon ZDA115 for earthing works. The access comes off Outgate to the north of Ealand and, following a request from a landowner in the area, a change to the 2025 design was considered. The alteration would move the temporary access track 55 m westwards along Outgate to use an existing track.

6.5.9 The proposed route was less direct than the original access track. However, the affected landowner who provided the feedback for this opportunity has a strong preference for this approach and the change would require some vegetation management. In addition, the 2025 design and proposed accesses had similar levels of overall impact. National Grid decided to take forward the proposed change of the access track as it was at the request of the landowner and caused no major impacts.

Image 6.24 – Temporary access track for Pylon ZDA115

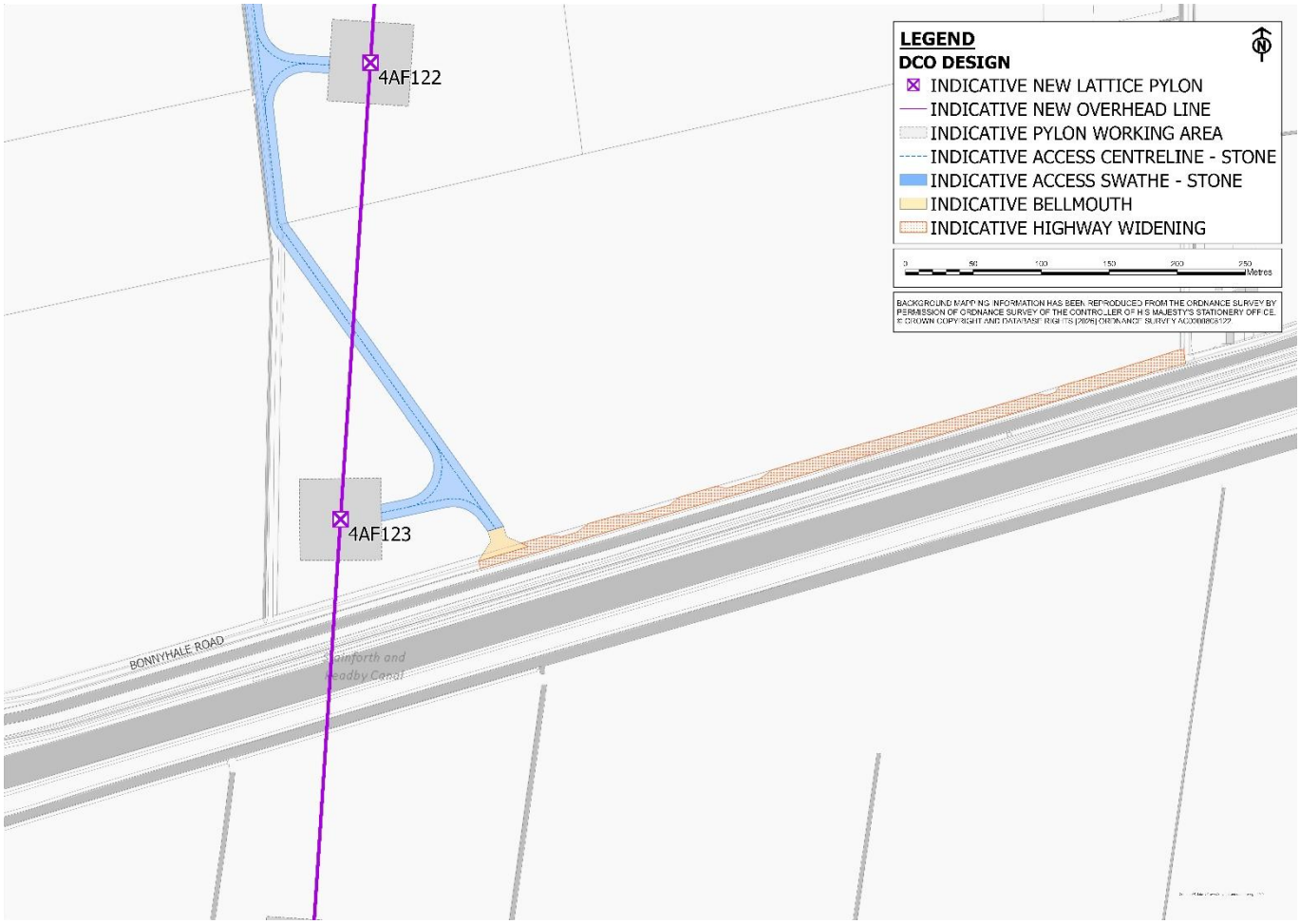


Widening of Bonnyhale Road

6.5.10 As the 2025 design continues southwards after the 400 kV 4ZQ overhead line crossing, National Grid identified the opportunity to amend the Order Limits along Bonnyhale Road near the crossing of the Sheffield and South Yorkshire Navigation. As part of the 2025 design, the Order Limits stopped 300 m short of South Cross Moors Road. Further investigations deemed that the existing highway width was not suitable to accommodate two passing HGVs and, as a result, localised widening was proposed. The introduction of localised widening would enable HGVs to pass each other on the highway network for delivery of the works across the duration of the construction phase.

6.5.11 This extension will result in greater interaction with local landowners than the 2025 design; however, this impact is minimal and will be carefully managed through landowner engagement. In addition, the localised widening was designed to avoid impacts on mature vegetation and hedgerows, and was designed to minimise impacts on landowners and watercourses where practicable. As a result, National Grid favoured this change based on the benefits it provided for construction traffic.

Image 6.25 – Widening of Bonnyhale Road



Ealand Viaduct construction access

6.5.12 The 2025 design included a construction haul road network serving pylons 4AF126 to 4AF130, between the crossing of the River Torne and the M180. This area was subject to a series of technical and landowner feedback responses during the statutory consultation period. Due to the absence of survey conclusions, and as part of ongoing landowner discussions, access optionality in this area was included in the Order Limits as part of the 2025 design.

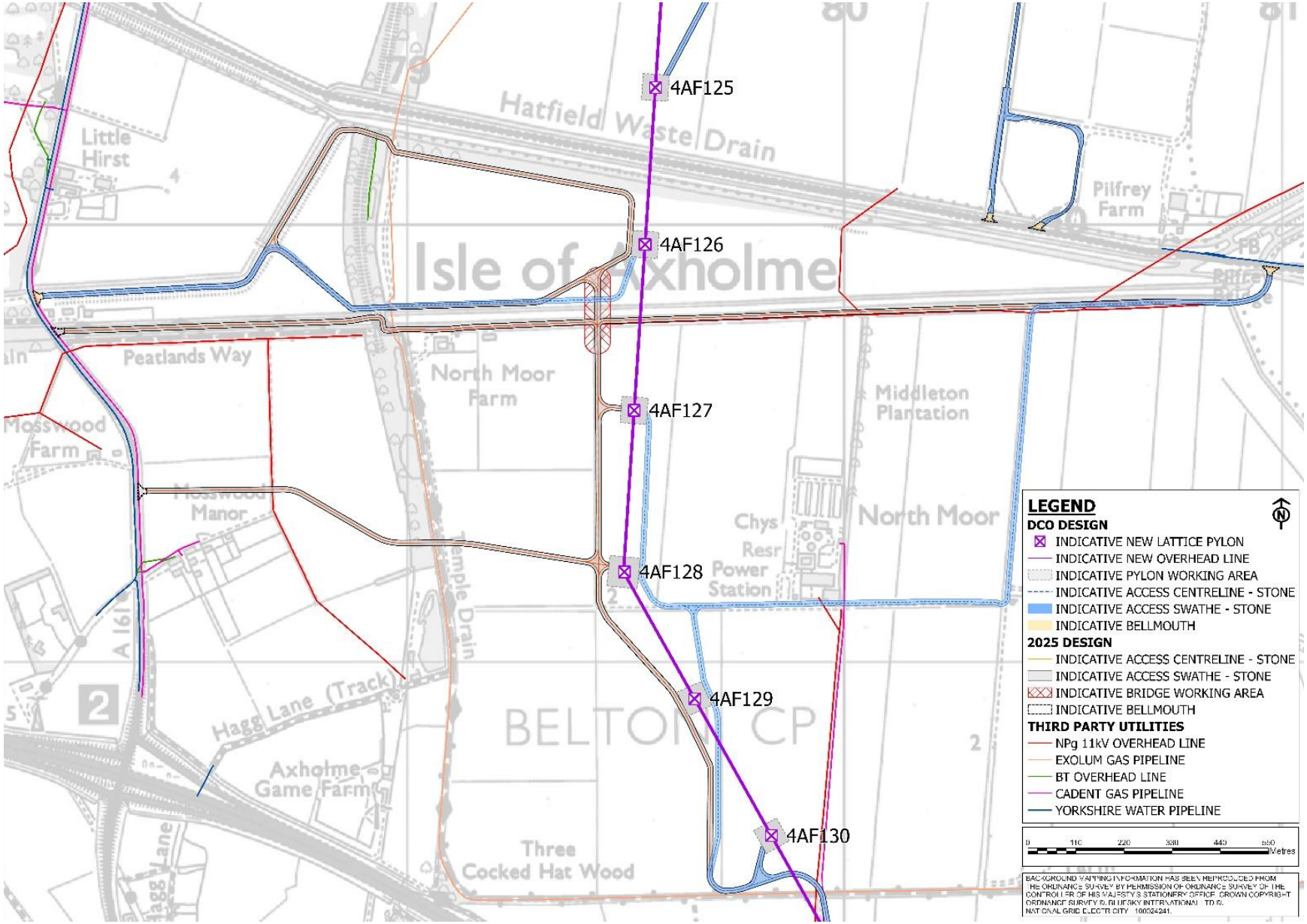
6.5.13 Following site investigations and engagement with local landowners, National Grid was able to reduce the access optionality in this area and refine the construction access route down to one proposed route. The change would facilitate a substantial reduction in the length of the stone haul road by an estimated 3.6 km, reduce the required number of bellmouths by two, and reduce the number of watercourse crossings by eight, one of which would have included a large bridge structure over the watercourses near the old viaduct which would have been a substantial undertaking due to the width of the crossing.

6.5.14 In this area there are a number of utility assets that the 2025 design access would have interacted with. Through the proposed change, there are now two fewer interactions with the Exolum pipeline, one less interaction with the Cadent Gas pipeline, two Northern Powergrid assets that no longer need to be undergrounded (including a significant reduction in the mitigation extent of an 11 kV asset south of South Engine Drain) and six fewer BT underground cables impacted. Incorporating this change would also remove the access alongside the River Torne, which also removed a long section of 11 kV Northern Powergrid overhead line proposed to be undergrounded due to its proximity to the south of the construction haul road. Leaving this 11 kV asset in-situ would restrict the width of the access thus reducing flexibility in the design.

6.5.15 The change also offers benefits to landowners in the area. Landowner engagement and feedback demonstrated that the 2025 design would have required using wet ground that routed through two mature hedgerows. Therefore, the change would reduce impacts on landowners and the Order Limits overall. The removal of accesses allows for a reduction in watercourse crossings and interactions with PRoWs, Local Wildlife Sites, a priority woodland, and the length of access tracks in close proximity to residential receptors.

6.5.16 This change was preferred by National Grid given the reduction in interactions and crossings of multiple receptors compared to the 2025 design.

Image 6.26 – Ealand Viaduct construction access



6.6 Route Section D – between North Moor (M180) and the River Idle

Overview

6.6.1 The proposed overhead line in Route Section D is shown in **Application Document 6.4.F1 Environmental Statement Figure 4.1 Proposed Project Design** (Sheets 19 to 24), and the pylons detailed in **Application Document 6.4.A1 Environmental Statement Appendix 4.1 Indicative Pylon Schedule**.

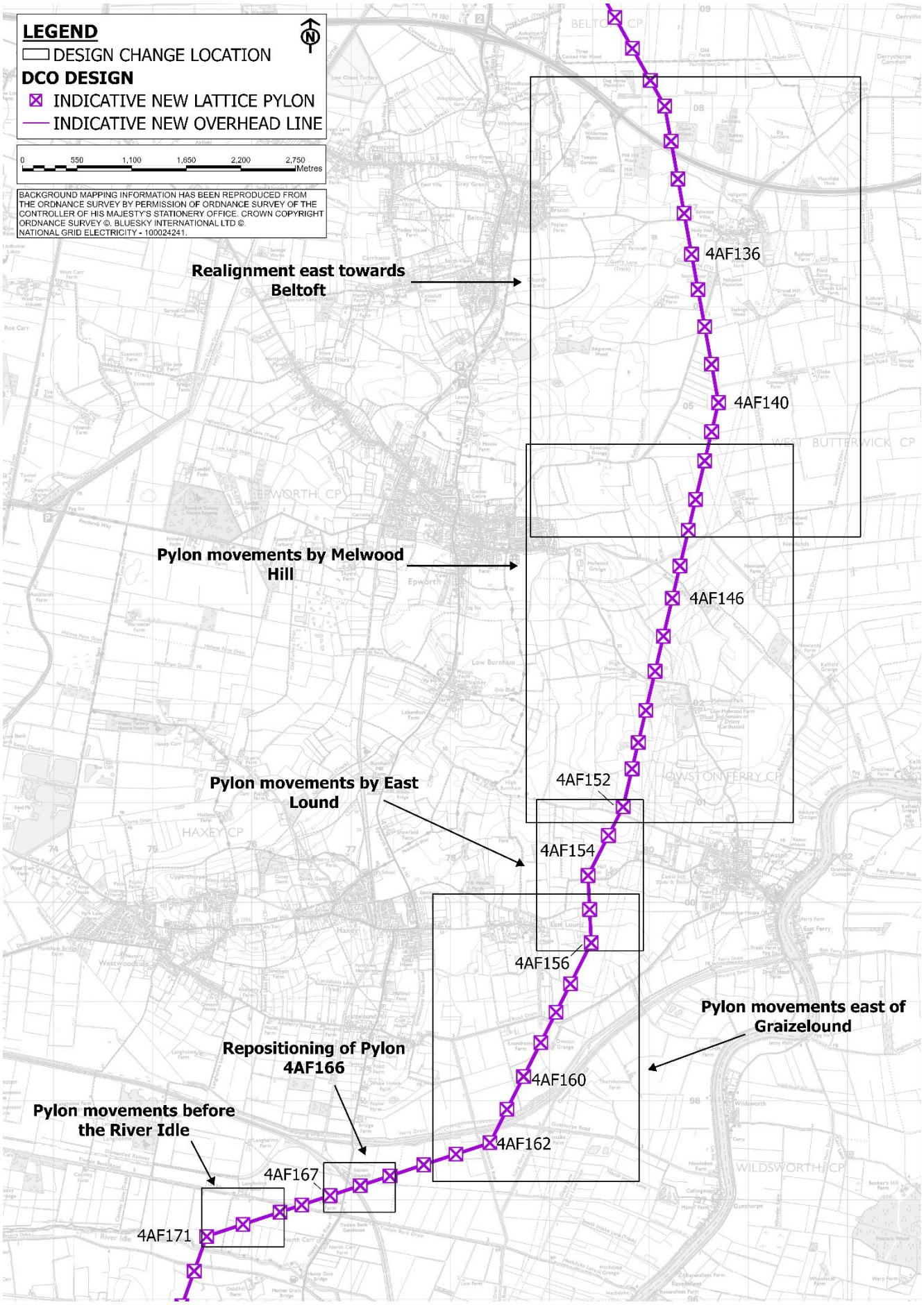
6.6.2 As part of ongoing design development some pylon numbers have changed. Where a pylon number has been used to describe a change the current Project pylon number has been used and the 2025 design numbering has also been provided where necessary.

6.6.3 From the start of Route Section D in North Moor, between pylons 4AF128 and 4AF129, the proposed overhead line is routed southeast crossing the M180, passing to the west of the settlement of Beltoft and east of the settlement of Belton. The proposed overhead line Belton Road, Gurry Lane, Epworth Road and Sand Road to pylon 4AF140.

6.6.4 From pylon 4AF140, the proposed overhead line is routed southwest, in close parallel with the existing 4TM and ZDA 400 kV overhead lines, to the east of the settlements of Epworth and Low Burnham to pylon 4AF152, crossing Newlands Lane and Melwood Hill. From pylon 4AF152, the proposed overhead line passes to the west of the settlement of Owston Ferry and east of the settlements of East Lound and Graizelound. The proposed overhead line remains broadly parallel with the existing overhead lines, deviating away from being in close parallel, crossing Burnham Road and East Lound Road between pylons 4AF152 and 4AF156, in order to avoid residential properties.

6.6.5 The proposed overhead line comes back into close parallel with the existing overhead line at pylon 4AF156 before diverting away to the southwest, crossing Ferry Road, Warping Drain, Gunthorpe Road, Stockwith Road, a railway line, Tindale Bank Road and the River Idle to the end of this Route Section, just to the north of pylon 4AF172.

Image 6.27 – Route Section D – Design Change Overview



Realignment east towards Beltoft

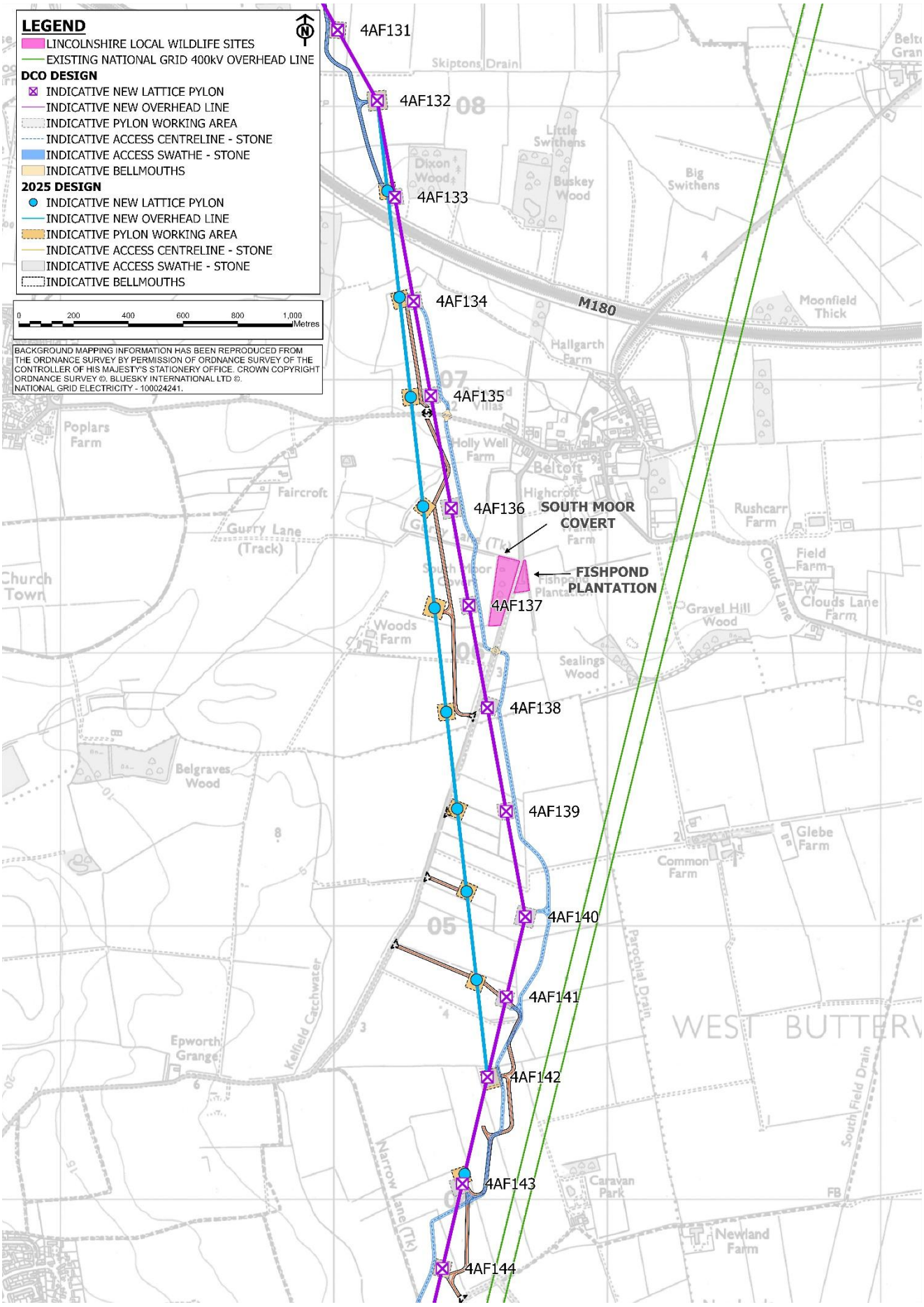
6.6.6 Feedback was received by landowners in the area between pylons 4AF132 and 4AF142, which requested the repositioning of pylons to be further from their residential property. Within the 2025 design, the overhead line routed in a straight line between Belton to the west and Beltoft to the east, oversailing the M180. A proposed change was identified that routes the 4AF proposed overhead line in close parallel with existing ZDA and 4TM overhead lines for two additional spans when compared to the 2025 design, bringing the proposed overhead line into close parallel earlier. This change would mean the tension pylon would change from pylon 4AF142 to pylon 4AF140.

6.6.7 Taking forward this option would enable a general reduction in pylon heights in the area, reducing their visual impact. The realignment and associated use of a continuous haul road would increase the length of the stone haul road by approximately 500 m but would reduce the extent of highway widening by 880 m, taking HGVs off the local road network and facilitating a net reduction of two bellmouths compared to the 2025 design. The realignment would make the M180 crossing angle more oblique, requiring larger temporary scaffold structures during construction to be used.

6.6.8 The realignment would bring the Project closer to Beltoft and further from Belton, whilst avoiding the woodland area north of the M180. The 2025 design would keep the Project further away from the property at Woods Farm, South Moor Covert and Fishpond Planting Local Wildlife Site. However, the change would move 4AF137 closer to the woodland off Gurry Lane, which would screen more views from Beltoft when compared to the 2025 design positioning. The change would incorporate additional mitigation planting along the western edge of the village to further assist in filtering views.

6.6.9 On balance, National Grid agreed to accept the realignment between pylons 4AF132 and 4AF142, given the reduced impact to the landowner who raised the feedback, greater length of triple paralleling and a general decrease in pylon heights.

Image 6.28 – Realignment east towards Beltoft



Pylon movements by Melwood Hill

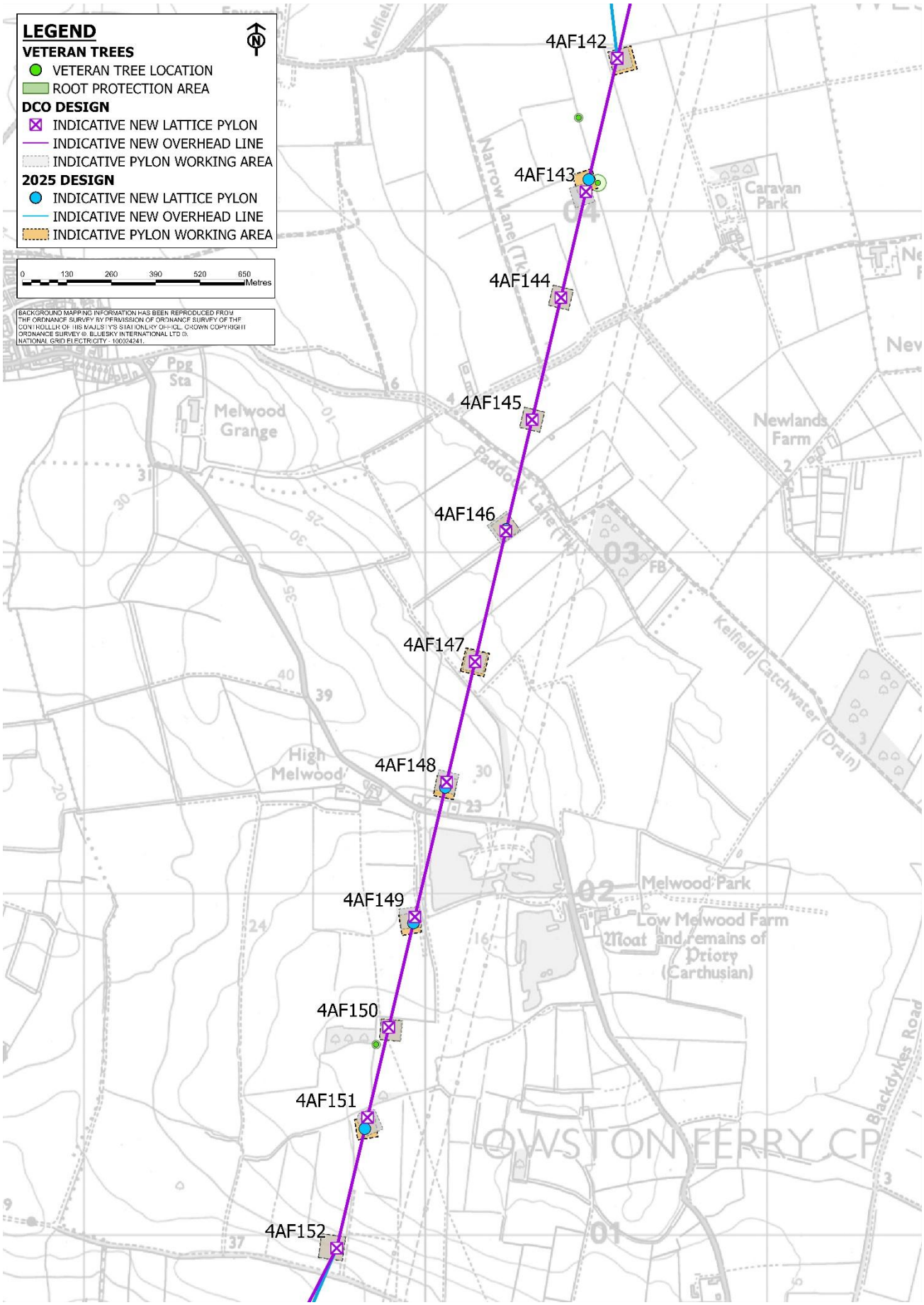
6.6.10 In the 2025 design, the tension pylon 4AF142 aligned the route in triple parallel with the ZDA and 4TM 400 kV overhead lines from the east of Epworth down to the west of Owston Ferry until tension pylon 4AF152. In this location, consultation feedback identified the opportunity to move some pylon positions towards field boundaries to reduce the Project's impact on agricultural practices.

6.6.11 All feedback was considered and a change was proposed, which included the following changes compared to the 2025 design:

- Pylon 4AF142 increased in height by 3 m, as a result of 4AF143 movement;
- Pylon 4AF143 moved approximately 37 m southwest, avoiding the root protection zone of a veteran tree, resulting in an increase in pylon height by 3 m;
- Pylon 4AF146 moved approximately 5 m south, achieving 10 m distance from the field boundary;
- Pylon 4AF147 moved approximately 4 m north, achieving 40 m distance from the track;
- Pylon 4AF148 moved approximately 16 m north, achieving 40 m distance from the field boundary;
- Pylon 4AF149 moved approximately 18 m north, achieving 10 m distance from the field boundary; and
- Pylon 4AF151 moved approximately 34 m northeast, achieving 10 m distance from the field boundary.

6.6.12 The pylon movements would achieve the landowner requests and minimise agricultural impacts. As a result, pylons 4AF142 and 4AF143 would increase in height by 3 m. Despite these height increases, the pylon 4AF148 movement increased the distance from the residential property near High Melwood and the movement of pylon 4AF143 avoided impacts on a veteran tree. These, as well as achieving the landowner request, outweigh the eight height increases and the movements would not cause material differences in impacts when compared to the 2025 design. Due to this, National Grid incorporated this change.

Image 6.29 – Pylon movements by Melwood Hill



Pylon movements by East Lound

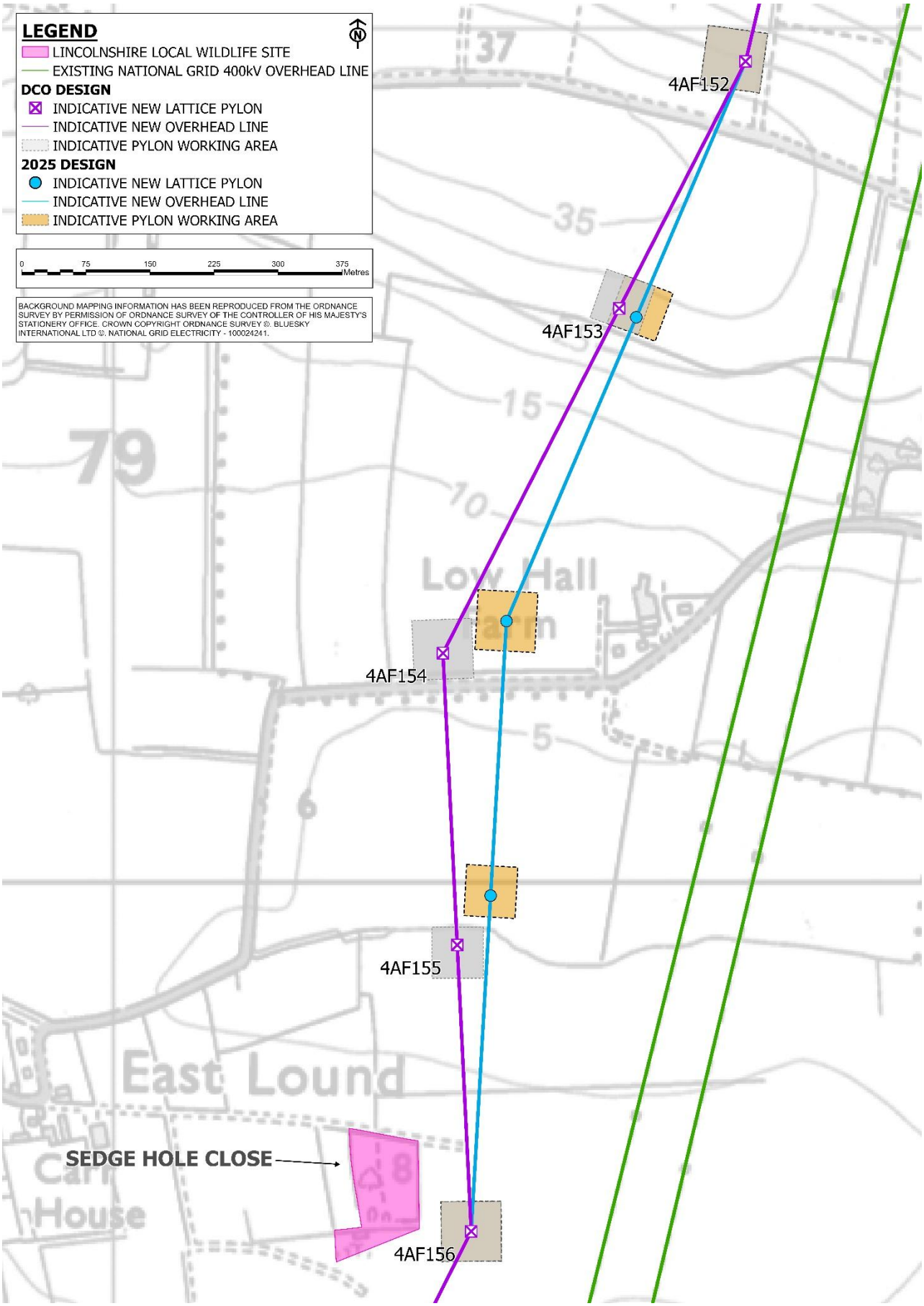
6.6.13 This section of the 2025 design enables close paralleling of the alignment with the ZDA and 4TM 400 kV overhead lines up until tension pylon 4AF152, which alters the direction of routeing as it oversails Burnham Road. The tension pylon 4AF154 in the 2025 design deviated the overhead line away from close parallel to avoid local receptors. The alignment then briefly came back into close parallel for one span via the tension pylon 4AF156.

6.6.14 In response to landowner feedback, an alignment option was identified that routed the alignment further west, further away from local receptors, between pylons 4AF152 and 4AF156. The realignment would then route back towards the 2025 design at pylon 4AF156 to the east of East Lound.

6.6.15 The proposed movements of pylons 4AF154 and 4AF155 would increase adjacent span lengths, taking them closer to the limits of the technical specification which could limit future flexibility for pylon movement during construction. In addition, the realignment would move further from the residential property and Low Hall Farm on East Lound Road whilst being closer to the field boundaries, as preferred by landowners given the reduced disruption to agricultural practices. This change would ensure that the Sedge Hole Close Local Wildlife Site is protected with a 10 m buffer, as set out in **Application Document 7.3 Register of Environmental Actions and Commitments**.

6.6.16 National Grid decided to take forward the change given the benefits to the landowners in the area and the Local Wildlife Site being protected.

Image 6.30 – Pylon movements by East Lound



Pylon movements east of Graizelound

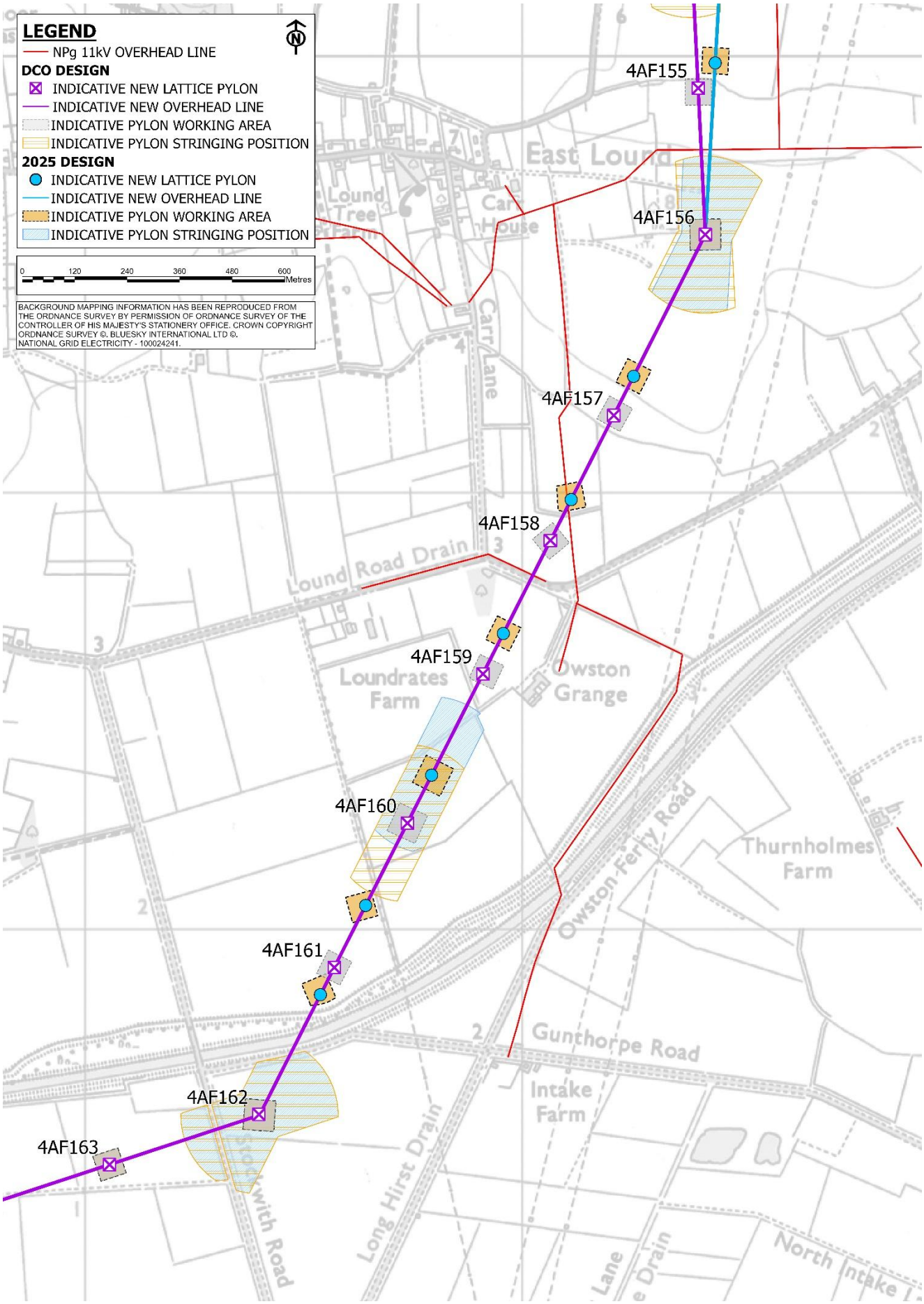
6.6.17 As the route continues south of East Lound, the 2025 design at pylon 4AF156 redirects in a southwesterly direction oversailing Ferry Road towards Ferry and Warping Drains. Feedback was received which proposed the relocation of pylon 4AF157 by 100 m southwest to be closer to the field boundary, reducing disruption to agricultural practices. As part of this pylon relocation, National Grid assessed other pylons in this section in attempt to optimise the design, pylon locations and span lengths. This optimisation enabled one pylon to be removed and resulted in the following changes:

- Pylon 4AF155 moved south by 75 m to reduce the sum of adjacent spans as a result of the 4AF157 movement, requiring a height increase of 6 m;
- Pylon 4AF156 required a height increase of 3 m;
- Pylon 4AF157 moved southwest by 100 m as per landowner request with a height increase of 9 m;
- Pylon 4AF158 moved southwest by 105 m to optimise span lengths as a result of pylon 4AF157 movement, which would maintain sufficient standoff from the DNO's overhead line. This movement enabled a height decrease of 3 m;
- Pylon 4AF159 moved southwest by 100 m to optimise span lengths;
- Pylon 4AF160 moved southwest by 125 m to optimise span lengths with a height decrease of 3 m;
- The 2025 design pylon 4AF161 was removed entirely from the design based on other pylon movements and span length optimisation; and
- Pylon 4AF161 (previously pylon 4AF162 in the 2025 design) moved northeast by 70 m to optimise span lengths with a height increase of 3 m.

6.6.18 As a result of the pylon 4AF157 movement and design optimisation throughout, and despite the height increases of certain pylons, it was possible to remove one pylon from the proposed overhead line, reducing the amount of infrastructure in the area.

6.6.19 National Grid incorporated this change into the Project due to the pylon removal, optimised span lengths and reduced impacts to landowners.

Image 6.31 – Pylon movements east of Graizelound



Repositioning of Pylon 4AF166

6.6.20 As part of the 2025 design pylon 4AF166 (previously pylon 4AF167) was positioned close to the field boundary adjacent to a railway. National Grid continued to evaluate the Project and identified the need to reposition pylon 4AF166 and its temporary working area further from the railway. This was to allow more space for scaffolding structures to be located between the pylon and railway line during the construction phase. As a result, a change was identified to move the pylon position by 12 m eastwards. This change would not cause any changes to the proposed pylon type or height when compared to the 2025 design. Considering this, the change was incorporated into the Project's design.

Image 6.32 – Repositioning of Pylon 4AF166



Pylon movements before the River Idle

6.6.21 Within the 2025 design, pylons 4AF169 and 4AF170 (previously 4AF170 and 4AF171) were positioned towards the centre of their respective fields, to balance span lengths throughout the section. Following engagement with the relevant landowner, a request for repositioning led to a proposed design change. The landowner expressed a preference for both pylons to be repositioned closer to the field boundary to reduce the Project's impact on agricultural practices. This change would result in pylon 4AF169 moving northeast by 140 m and pylon 4AF170 moved northeasterly by 73 m, requiring minor bellmouth and construction haul road amendments. Given the benefit to the landowner and no significant impacts when compared to the 2025 design positionings, the change was incorporated into the Project's design.

Image 6.33 – Pylon movements before the River Idle



6.7 Route Section E – between the River Idle and Darlton

Overview

6.7.1 The proposed overhead line in Route Section E is shown on **Application Document 6.4.F1 Environmental Statement Figure 4.1 Proposed Project Design** (Sheets 24 to 33), and the pylons detailed in **Application Document 6.4.A1 Environmental Statement Appendix 4.1 Indicative Pylon Schedule**.

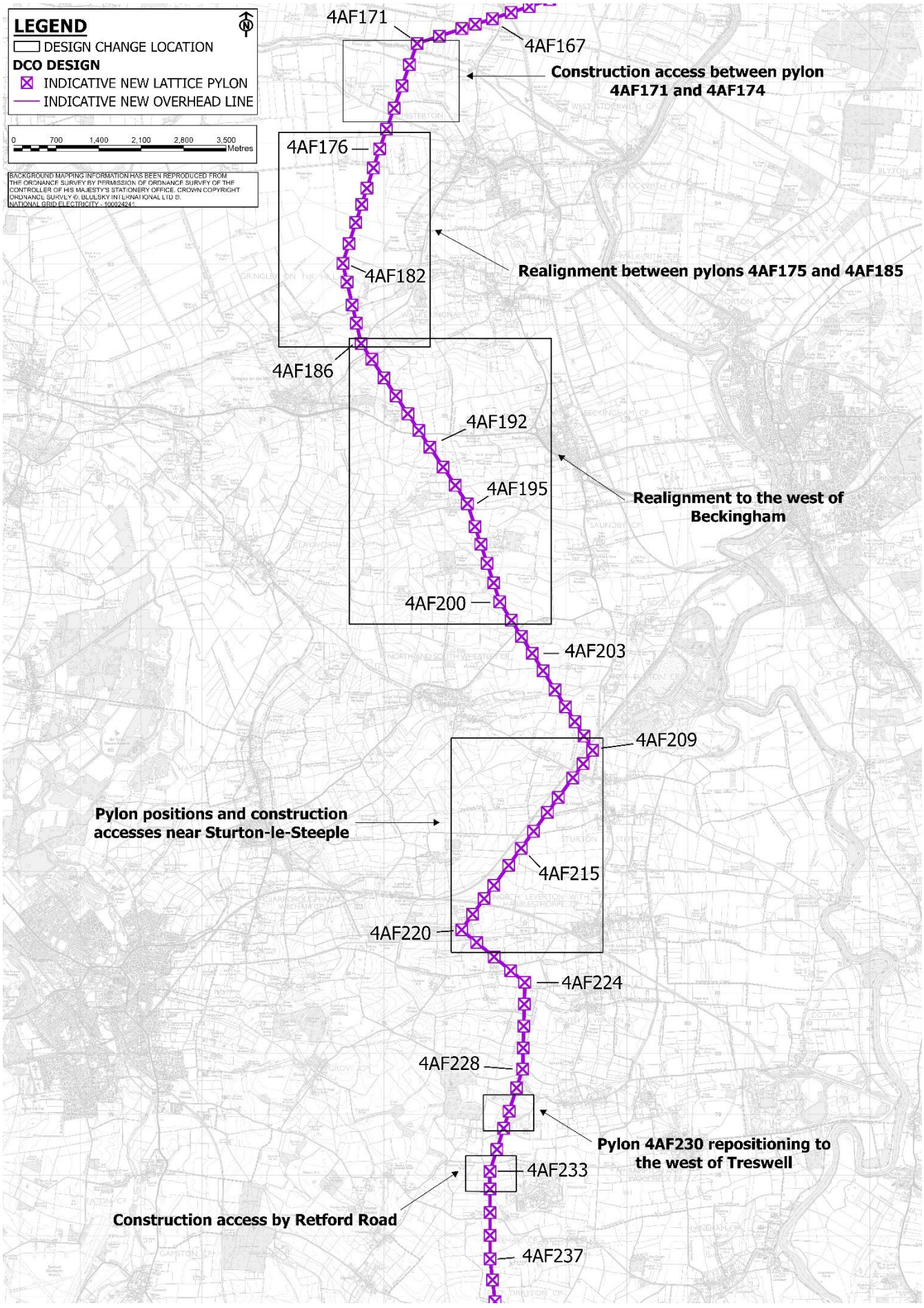
6.7.2 As part of ongoing design development some pylon numbers have changed. Where a pylon number has been used to describe a change the current Project pylon number has been used and the 2025 design numbering has also been provided where necessary.

6.7.3 From the start of Route Section E, just to the south of the River Idle and north of pylon 4AF172, the overhead line is routed southwest for approximately 3.5 km to the west of the settlement of Misterton, crossing Cornley Road and Cattle Road to pylon 4AF182.

6.7.4 From pylon 4AF182, the proposed overhead line turns to route southeast for approximately 9 km to the west of the settlements of Walkeringham, Beckingham and Saundby, and east of the settlements of Gringley on the Hill and North and South Wheatley. The route crosses the Chesterfield Canal, the B1403, Walkeringham Road, the A631, Wood Lane, the A620 Gainsborough Road and a railway line to pylon 4AF209. From pylon 4AF209, the proposed overhead line is routed in a southwesterly direction for approximately 3.6 km to the east of the railway and west of Sturton le Steeple. The route crosses over Station Road, Springs Lane, a disused railway line and Dunstone Road to pylon 4AF220, adjacent to Caddow Wood. From pylon 4AF220, the proposed overhead line routes back in a southeasterly direction for approximately 1.3 km to the west of the settlement of North Leverton with Habblesthorpe, crossing Retford Gate and Retford Road West to pylon 4AF224.

6.7.5 From pylon 4AF224, the proposed overhead line is routed generally south for approximately 8.1 km to the west of South Leverton, Treswell, Woodbeck, East Drayton and east of Darlton. The route crosses Hallowgate Road, Cowsland Road, Forewood Lane, Ashley Lane, Retford Road, Main Street, Retford Road (East Drayton) and Dalton Road to the end of this Route Section at the A57.

Image 6.34 – Route Section E – Design Change Overview



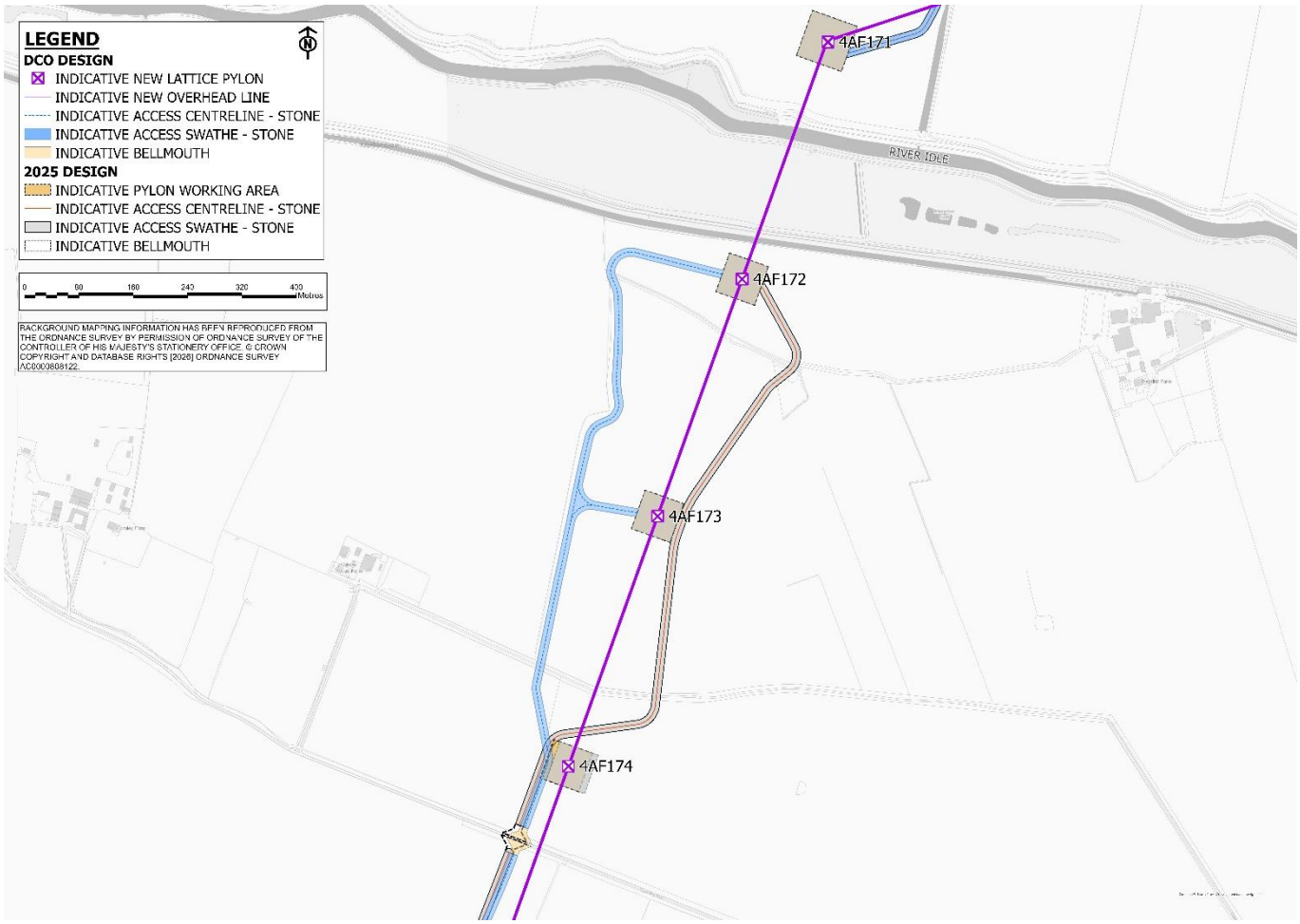
Construction access between pylon 4AF171 and 4AF174

6.7.6 The 2025 design routed in a southwesterly direction from pylon 4AF171 (previously pylon 4AF172), crossing the River Idle and the construction haul road to access pylons 4AF172 and 4AF173 (previously pylons 4AF173 and 4AF74). Feedback was received that requested a change to the construction route. The change would reposition the construction haul road from routeing along the east of the proposed overhead line to the west of the alignment along the field boundary.

6.7.7 This alteration would increase the stone haul road length by 230 m compared to the 2025 design; however, it would avoid crossing beneath the overhead line and would not increase the number of bellmouths and watercourse crossings. Repositioning the construction haul road along the western field boundary would reduce disruption to agricultural practices through keeping construction accesses closer to the field boundaries.

6.7.8 The change was incorporated into the Project's design to meet the landowner's request and not cause material environmental impacts when compared to the 2025 design.

Image 6.35 – Construction access between pylon 4AF171 and 4AF174



Realignment between pylons 4AF175 and 4AF185

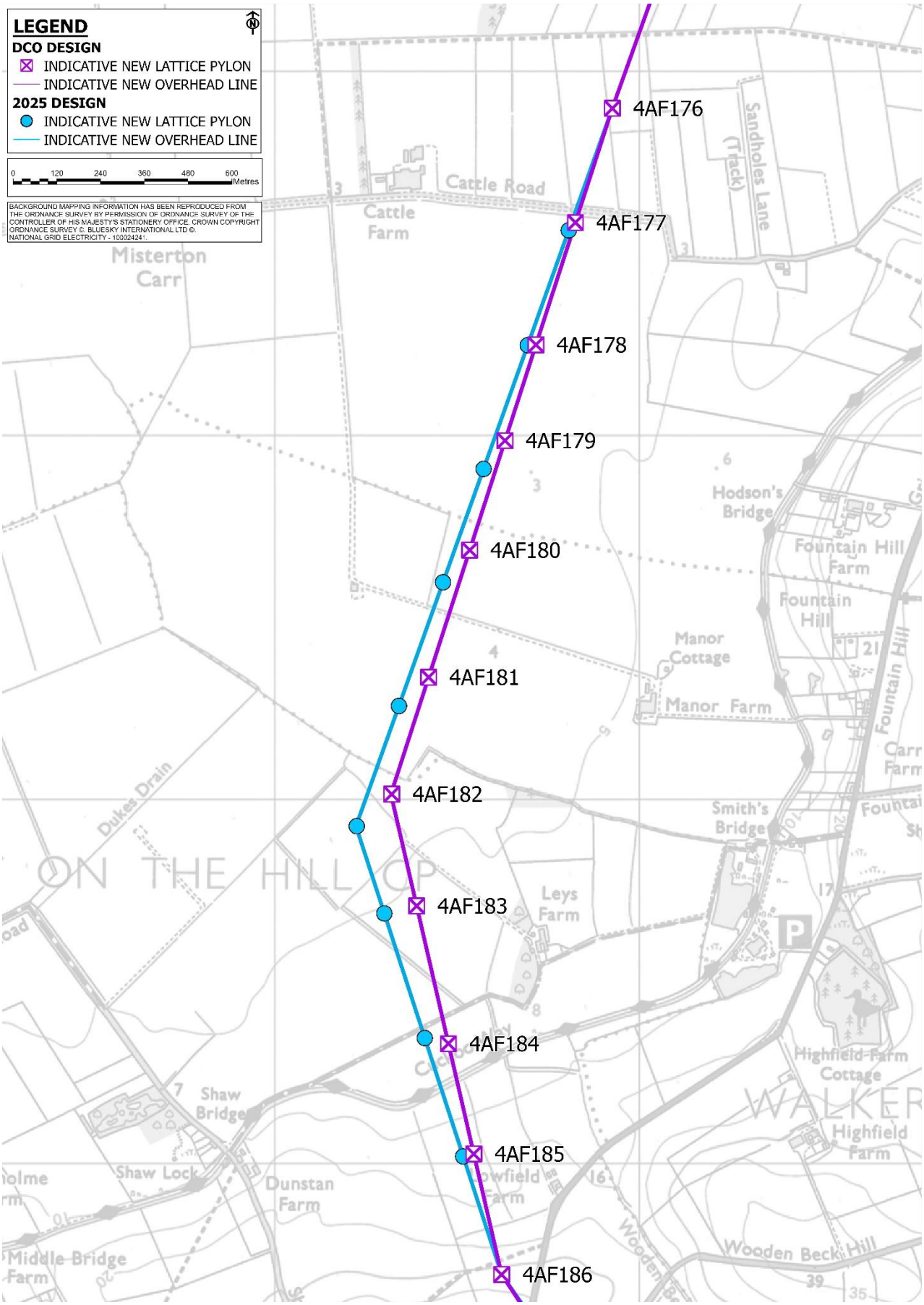
6.7.9 The 2025 design routed in a southwesterly direction, crossing the River Idle before deviating at pylon 4AF182 (previously pylon 4AF183) to route south over the Chesterfield Canal towards pylon 4AF186 (previously pylon 4AF187). Since the 2025 design was developed, National Grid has undertaken further surveys in this area which have identified buried archaeology in proximity to pylon 4AF182 (previously pylon 4AF183). National Grid developed a potential realignment in this area which would reposition pylon 4AF182 in a northeasterly direction to the eastern side of known archaeological remains.

6.7.10 This change included the movement of pylon 4AF184 (previously pylon 4AF185) as per a landowner request to move the pylon closer to the field boundary. This movement enabled a height decrease of 3 m on this pylon.

6.7.11 Although the realignment would avoid any pylon height increases, it presented some technical disadvantages as the orientation of watercourses in proximity to pylon 4AF182 would make it less optimal for stringing. This change would relocate pylon 4AF182 to positions further than 40 m from the field boundary, which would support farming operations.

6.7.12 The realignments would move the overhead line further from a known protected species in the area and reduce potential disturbance. The appraisal evidenced that the relocation of pylon 4AF182 would avoid potential archaeological assets identified during geophysical surveys. Any impact to the potential archaeological assets may result in impacts to a non-designated heritage asset, requiring substantial excavations to mitigate. Considering this, National Grid agreed to incorporate this change into the Project design, as it would move the alignment further from the potential archaeological assets and protected species.

Image 6.36 – Realignment between pylons 4AF175 and 4AF185



Realignment to the west of Beckingham

6.7.13 A 4.5 km long section of the 2025 design routes from 4AF186 (previously pylon 4AF187) to the northeast of Gringley-on-the-Hill, to 4AF200 (previously pylon 4AF201) to the west of Saundby in a southeasterly direction oversailing the B1403, A631 and Gainsborough Road. A variety of feedback was collected in relation to this stretch of the alignment including a change that was developed through effective ongoing stakeholder engagement and coordination with iGas, who have existing infrastructure in the area.

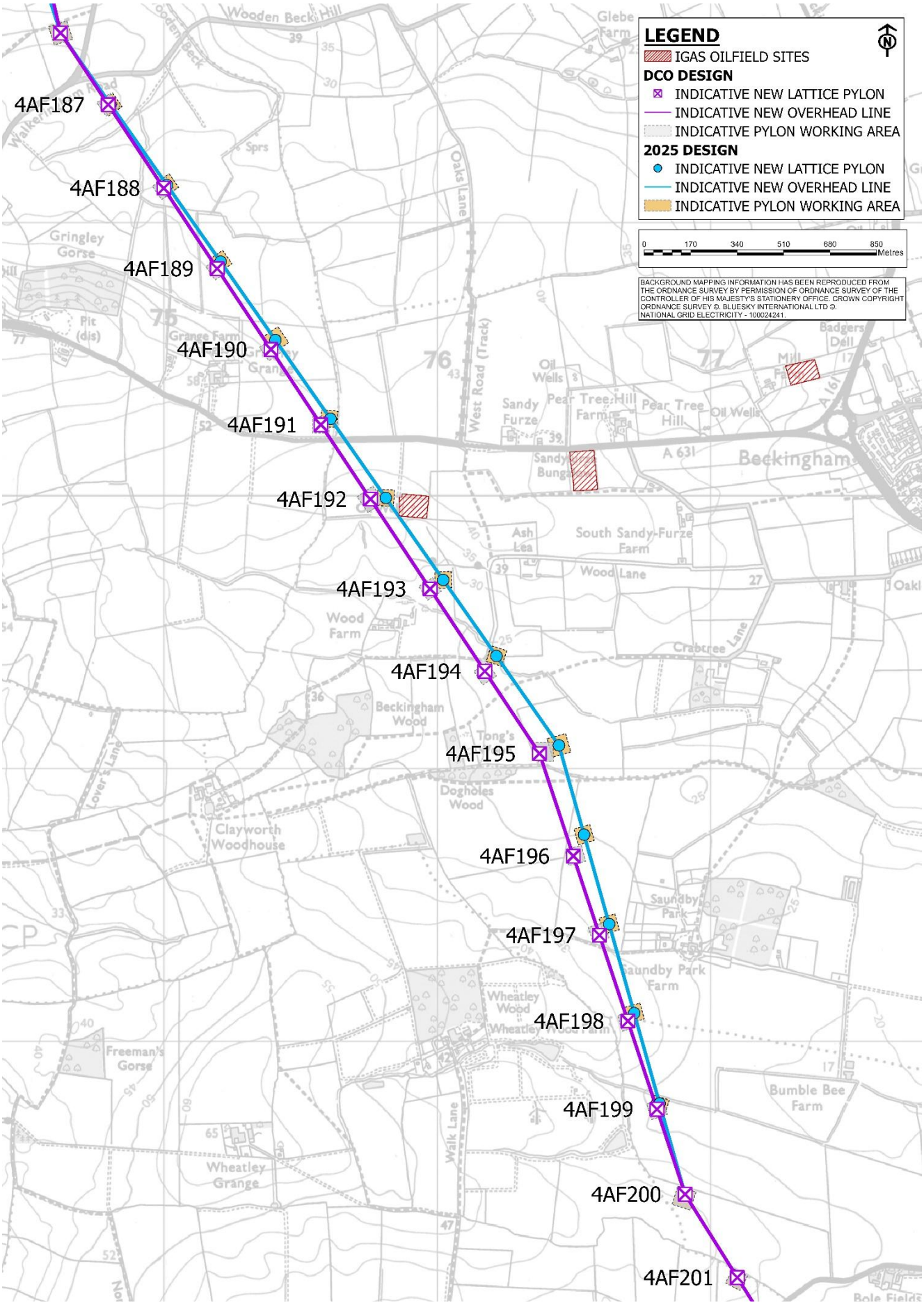
6.7.14 The option that was assessed and in combination with a landowners feedback the Project proposed to shift the 2025 design to the west by moving pylon 4AF195 (previously pylon 4AF196) by 75 m. The proposed realignment includes the relocation of the pylons 4AF192 and 4AF199 (previously pylons 4AF193 4AF200), based on landowner feedback.

6.7.15 The realignment has removed proposed overhead line oversail of the iGas oil well site and has enabled a general reduction in pylon heights, compared to the 2025 design. Repositioning pylons 4AF193 and 4AF200 to be at least 40 m from the field boundary was deemed preferrable to moving them closer, as this would provide more room for construction and minimise impacts on farming practices. In addition, the revised pylon positions generally move the alignment further from residential properties.

6.7.16 The change would lessen the Project's visual effects by reducing the height of five pylons. However, the change could impact the edge of a potential ancient woodland through the proposed movement of pylon 4AF194 (previously pylon 4AF195). The change would move the alignment closer to the Grade II listed Gringley Grange Farmhouse, but the impact would not be materially different to the 2025 design.

6.7.17 Compared to the 2025 design, the Project would avoid the iGas oil well site and meet landowner preferences. This change was incorporated into the Project.

Image 6.37 – Realignment to the west of Beckingham



Pylon positions and construction accesses near Sturton-le-Steeple

6.7.18 As the 2025 design oversails the Sheffield to Lincoln railway line to the west of West Burton Power Station, tension pylon 4AF209 (previously pylon 4AF210) angles the overhead line in a southwesterly direction in parallel to the railway line until it meets tension pylon 4AF220 (previously pylon 4AF221). National Grid identified potential changes to the pylon positions and the associated construction haul roads. These changes were developed through engagement with the promoter of the Steeple Renewables Project in order to minimise interface with the development and its proposed infrastructure.

6.7.19 National Grid developed a change to move 4AF211 (previously pylon 4AF212) outside of the areas of infrastructure, which required other pylons in this section to be optimised for span length, pylon heights and other local constraints. The combination of these changes included:

- Pylon 4AF210 moved by 50 m northeast;
- Pylon 4AF211 moved by 87 m northeast;
- Pylon 4AF212 moved by 19 m northeast with a height increase of 3 m;
- Pylon 4AF214 moved by 33 m southwest;
- Pylon 4AF215 moved 50 m southwest;
- Pylon 4AF216 moved 39 m southwest; and
- Pylon 4AF217 moved 87 m southwest and its working area moved southwards.

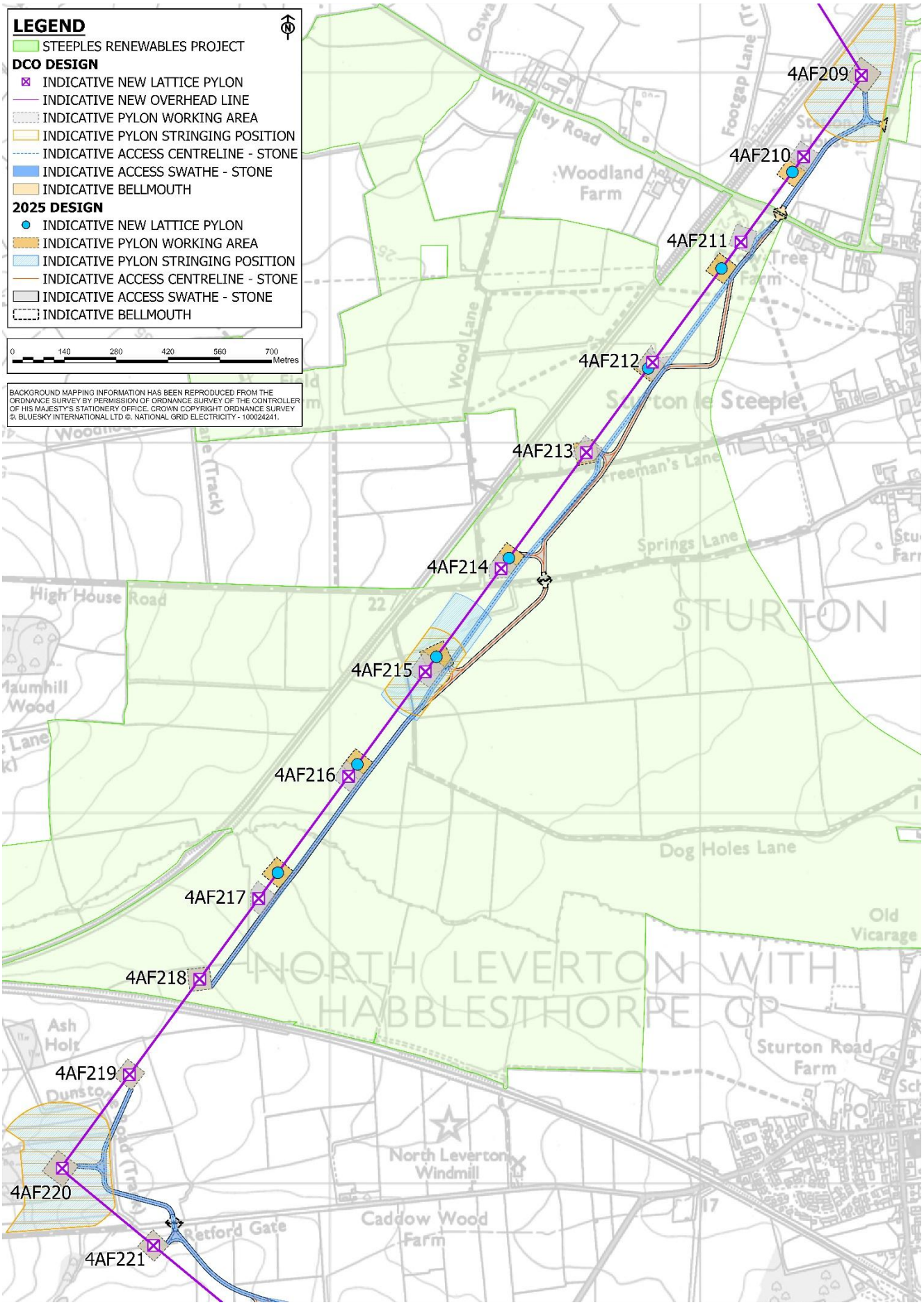
6.7.20 The potential change would require a 3 m height increase for pylon 4AF212 (previously pylon 4AF213). The relocation of pylon 4AF217 (previously pylon 4AF218) closer to the field boundary would also achieve a landowner request.

6.7.21 In the 2025 design, the construction haul road followed the alignment where possible, but deviated away to navigate local constraints such as gaps in field boundaries and watercourse crossings.

6.7.22 Following further engagement with the promoter of the Steeple Renewables Project, the haul road was refined to minimise impacts on potential solar infrastructure, whilst reducing the length of the haul road and the number of spurs, noting an increase in the number of watercourse crossings required.

6.7.23 In conclusion, repositioning the pylons and optimising the construction haul road would benefit landowners and reduce interaction with the Steeple Renewables Project as well as minimise the Project's Order Limits. The change was therefore incorporated into the Project

Image 6.38 – Pylon positions and construction accesses near Sturton-le-Steeple

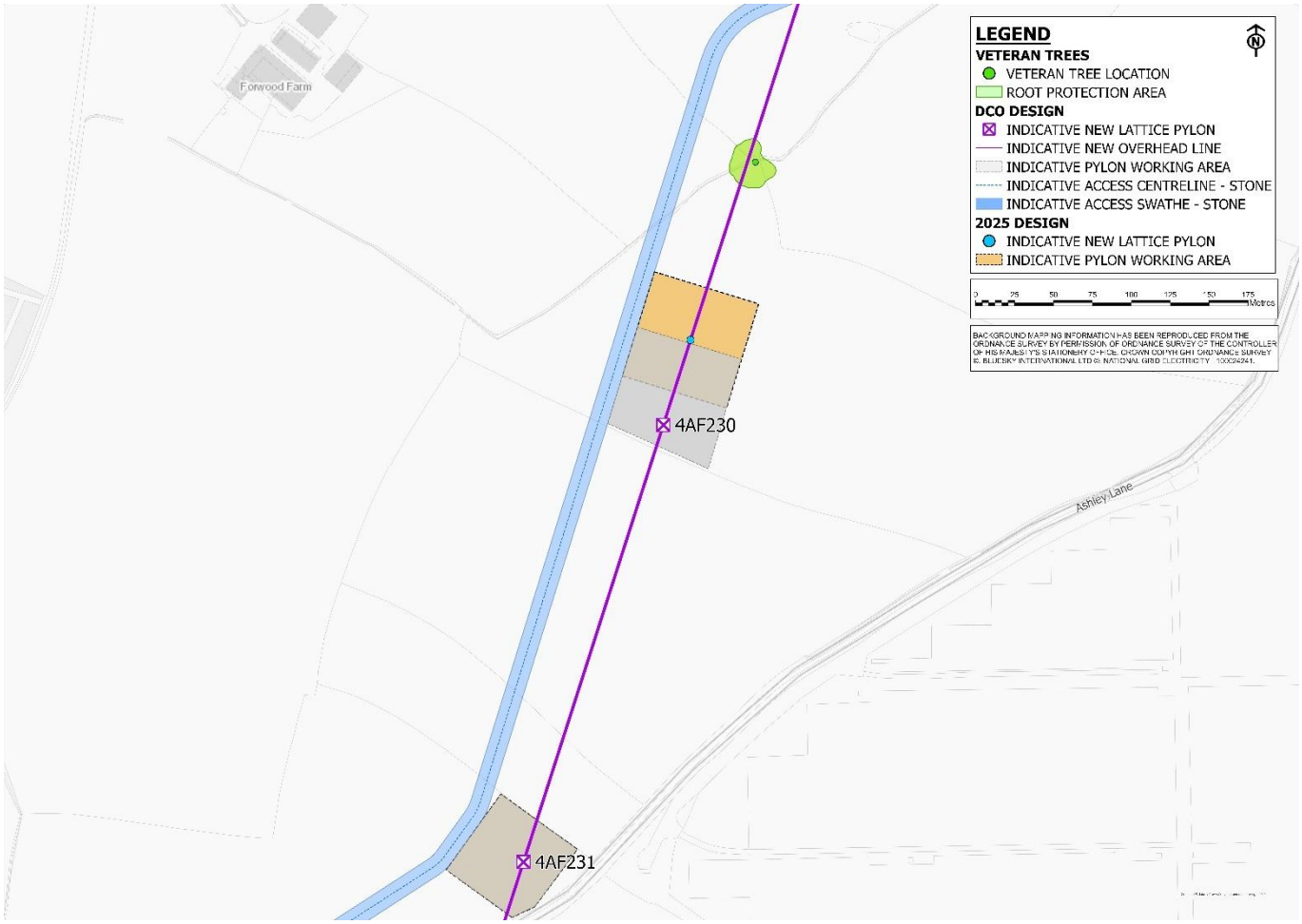


Pylon 4AF230 repositioning to the west of Treswell

6.7.24 Landowner feedback received on the 2025 design highlighted a preference for locating specific pylons closer to field boundaries. This was received in relation to pylon 4AF230 (previously pylon 4AF231) which was also located in an area where veteran trees were identified. National Grid assessed whether moving pylon 4AF230 60 m southwest, closer to the field boundary, would infringe on a veteran tree in the overhead line span north of pylon 4AF230.

6.7.25 It was deemed that the pylon could be moved south, closer to the field boundary, with minimal changes to the construction access. Following investigations on potential vegetation impacts, it was deemed that some vegetation management was required on the veteran tree through canopy and stem management. Therefore, the repositioning of pylon 4AF230 (previously pylon 4AF231) has been incorporated into the Project's design.

Image 6.39 – Pylon 4AF230 repositioning to the west of Treswell

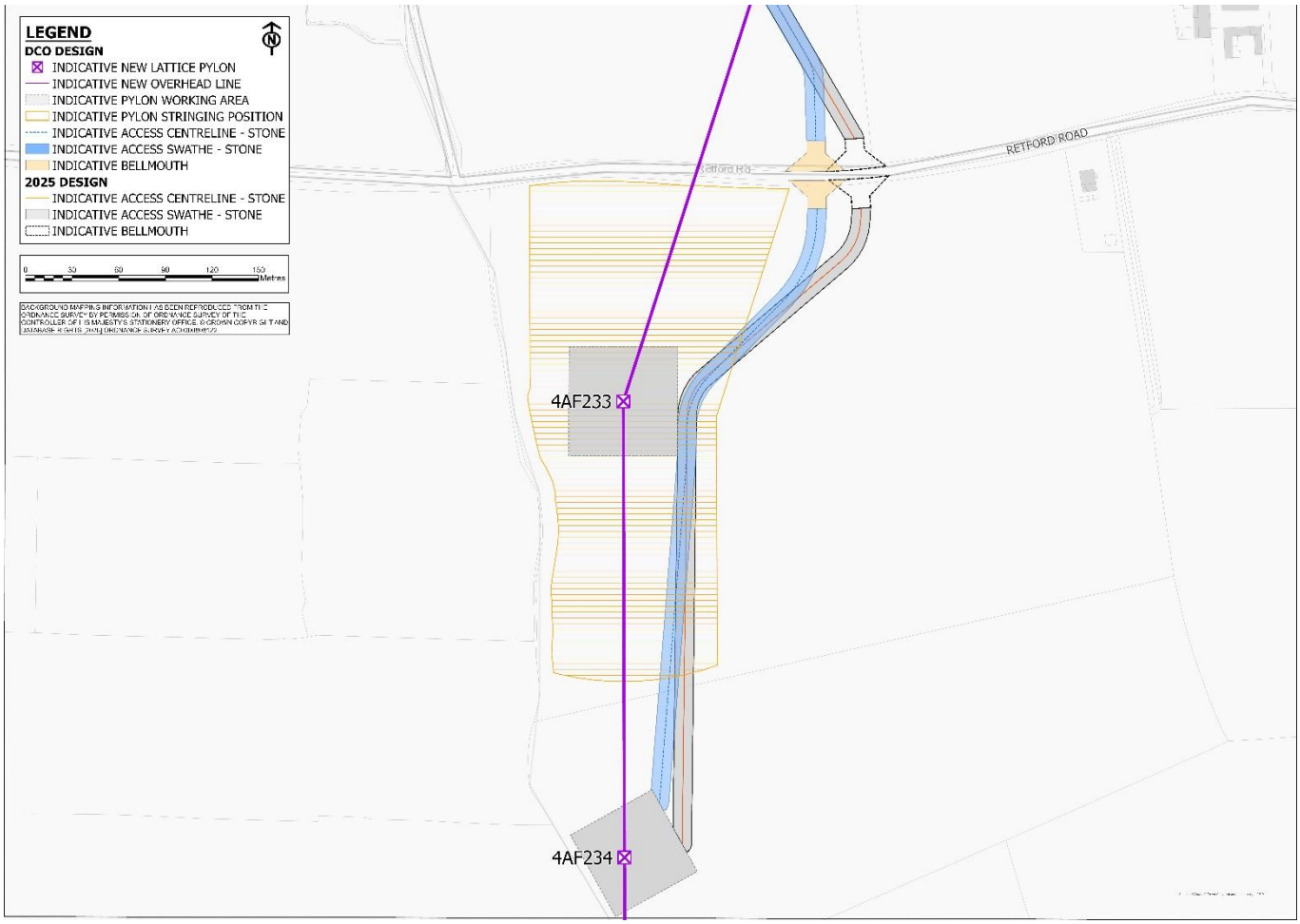


Construction access by Retford Road

6.7.26 The 2025 design routes southwards to the west of South Leverton and at Treswell, the overhead line oversails Retford Road between pylons 4AF232 and 4AF233 (previously pylons 4AF233 and 4AF234). At this point of the 2025 design, the construction haul road and public highway access points were designed to utilise existing gaps in field bordering Retford Road. However, landowner feedback was received outlining their preference for retaining the use of their existing access, requesting the Project uses an alternative construction access. As a result of the landowner feedback, alternative accesses were investigated.

6.7.27 An option was developed that would move the bellmouths and construction access further west when compared to the 2025 design access points. This change would provide a shorter construction access haul road whilst still enabling the access to navigate sloping ground. In addition, the change would result in no material environmental changes compared to the 2025 design. The change to the construction access was therefore incorporated into the Project's design.

Image 6.40 – Construction access by Retford Road



6.8 Route Section F – between Darlton and the proposed High Marnham Substation

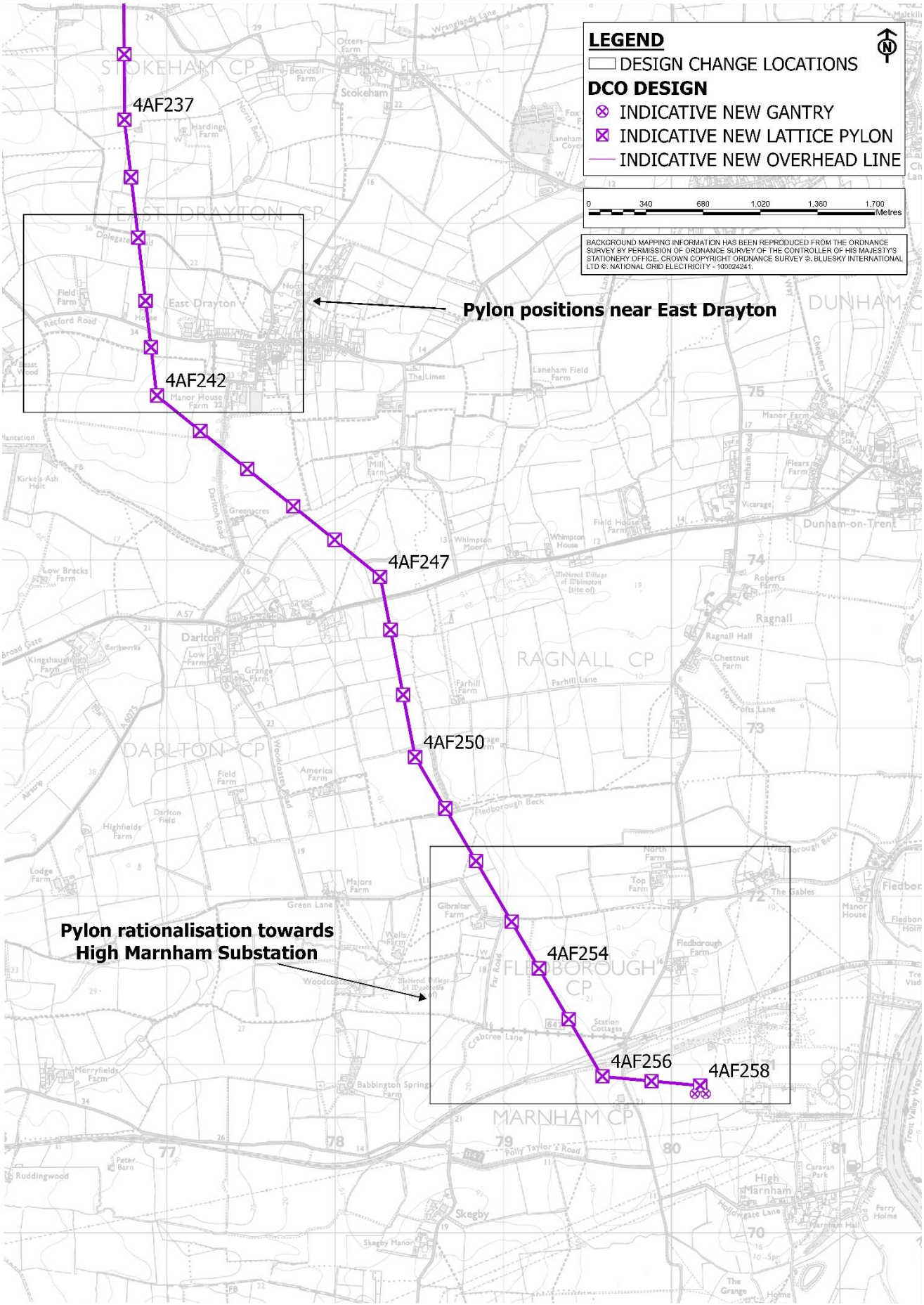
Overview

6.8.1 The proposed overhead line in Route Section F is shown in **Application Document 6.4.F1 Environmental Statement Figure 4.1 Proposed Project Design** (Sheets 33 to 34), and the pylons detailed in **Application Document 6.4.A1 Environmental Statement Appendix 4.1 Indicative Pylon Schedule**.

6.8.2 As part of ongoing design development some pylon numbers have changed. Where a pylon number has been used to describe a change the current Project pylon number has been used and the 2025 design numbering has also been provided where necessary.

6.8.3 From the start of Route Section F at the A57, the proposed overhead line is routed southeast for approximately 3.1 km to the east of Darlton. The route crosses Fledborough Beck, Far Road, the disused railway to west of the Marnham Railway Yard Local Wildlife Site and Fledborough, to Harby Dismantled Railway Local Wildlife Site to pylon 4AF256. From pylon 4AF256, the proposed overhead line is routed east for a further 0.5 km to the proposed High Marnham Substation.

Image 6.41 – Route Section F – Design Change Overview



Summary of Design Development

Pylon positions near East Drayton

6.8.4 The 2025 design continues southwards to the west of East Drayton, oversailing Retford Road. National Grid received feedback from impacted landowners in relation to pylons 4AF239, 4AF240 and 4AF241 (previously pylons 4AF240, 4AF241 and 4AF242). This feedback informed potential changes to the pylons:

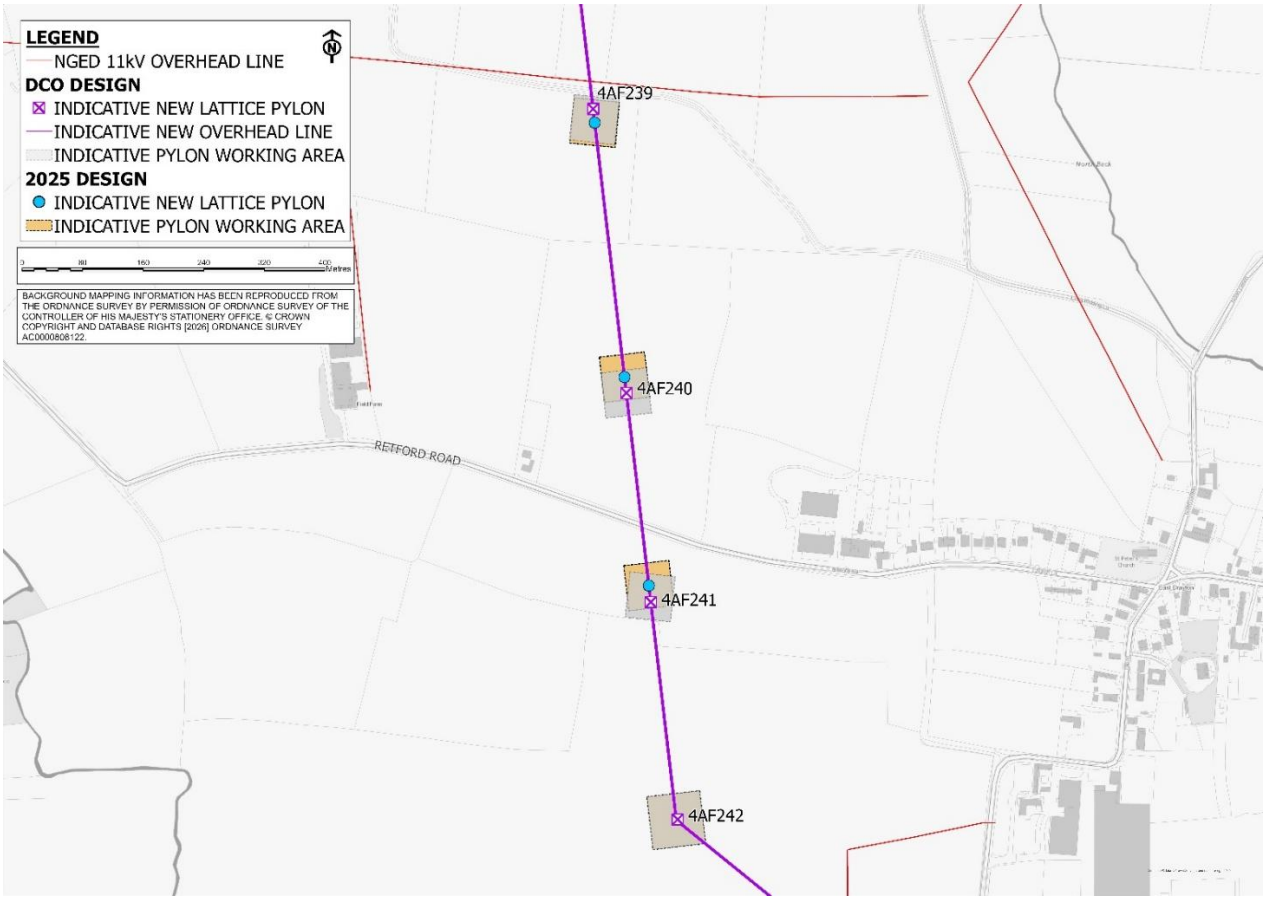
- Pylon 4AF239 to be moved northwards by 18 m, closer to the field boundary;
- Pylon 4AF240 to be moved southwards by 21 m, the distance that would avoid needing for a height increase; and
- Pylon 4AF241 to be moved southwards by 22 m, closer to the field boundary.

6.8.5 The movement of pylon 4AF239 highlighted that the new location would be closer to a National Grid Electricity Distribution asset which is proposed for undergrounding, therefore sufficient stand-off would need to be maintained. The movement of pylon 4AF240 would result in no height increases and the repositioning of pylon 4AF241 would also be feasible.

6.8.6 The movement of pylon 4AF239 would avoid a potential archaeological enclosure identified through geophysical surveys. In addition, the changes to pylons 4AF240 and 4AF241 present no materially different impacts compared to the 2025 design.

6.8.7 National Grid supported the landowners' repositioning requests that would deliver feasible pylon positions and incorporated the changes into the Project design.

Image 6.42 – Pylon positions near East Drayton



Pylon rationalisation towards High Marnham Substation

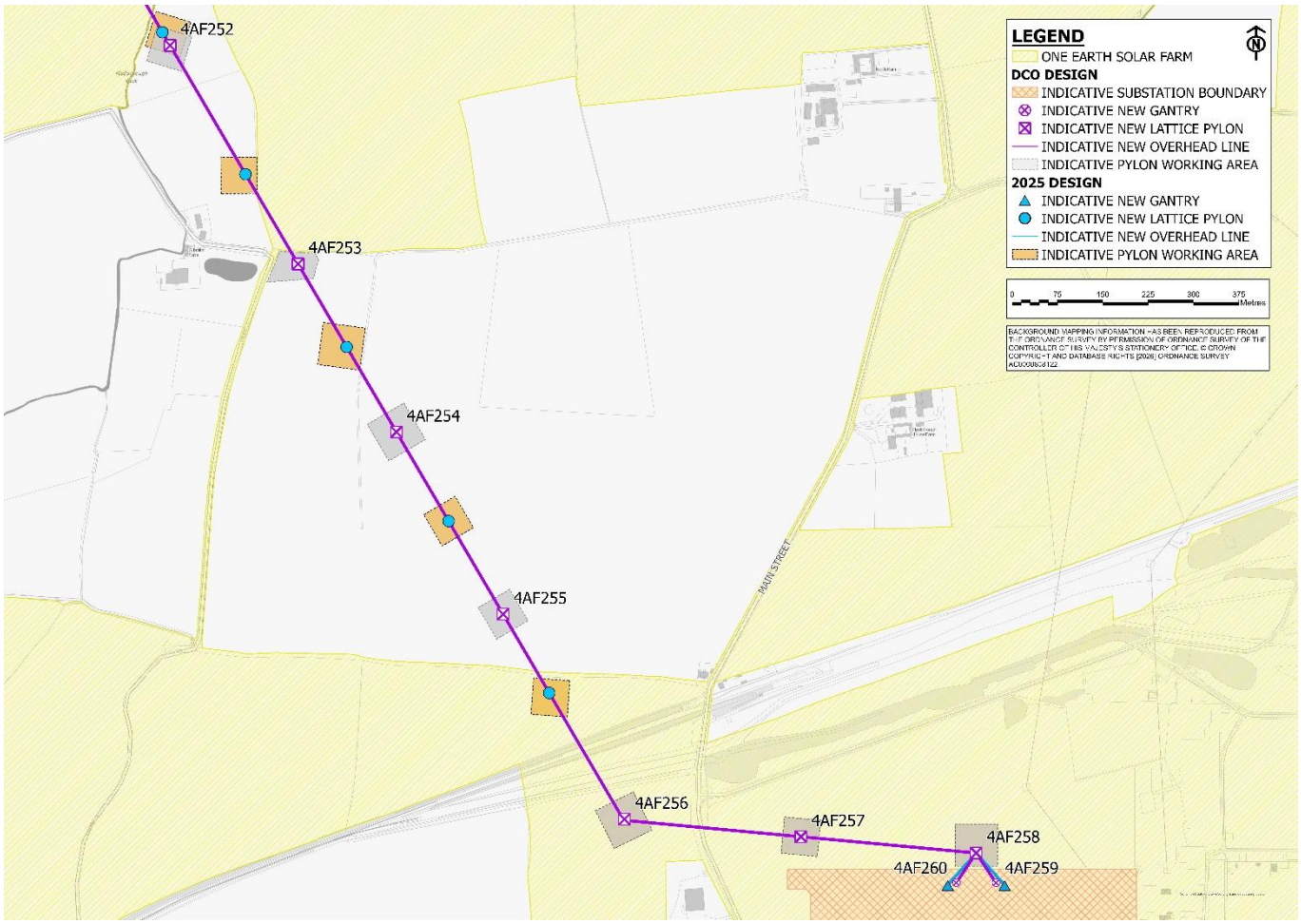
6.8.8 Following statutory consultation, National Grid decided to remove the 400 kV High Marnham Substation and associated works (with the exception of required accesses) from the Project which will instead be consented separately pursuant to a planning application submitted to the Local Planning Authority. Consequently, the Order Limits no longer include land within the Fledborough to Harby Dismantled Railway Local Wildlife Site, the Marnham Railway Yard Local Wildlife Site or Skegby Road Triangle Local Wildlife Site. The 2025 design, after oversailing the A57 to the west of Darlton, continues in a southeasterly direction after tension pylon 4AF250 (previously pylon 4AF251) with a stretch of eight pylons until tension pylon 4AF256 (previously pylon 4AF258), and subsequent gantries 4AF257 and 4AF258 (previously pylon 4AF259 and 4AF260).

6.8.9 An opportunity was identified to rationalise the number of pylons required in this section, reducing it by one compared to the 2025 design. This change would increase the overall span lengths.

6.8.10 The removal of the 2025 design pylon 4AF254 and subsequent repositioning of the remaining pylons would reduce impacts on the One Earth Solar Farm, with whom National Grid has engaged to minimise interactions. This change would also maintain sufficient distance from field boundaries and not impact nearby PRoWs. It is noted that some pylons would need to increase in height given the longer spans, but this impact would be balanced by the reduction in the number of pylons and the Project's interaction with utilities in this area would remain unchanged.

6.8.11 The removal of a pylon would be preferred by the affected landowner. The change would also move the alignment from Flood Zone 3 into Flood Zone 1, reducing the risks to pylon integrity with lower probability of flooding impacts, which is preferred by National Grid. Given the range of advantages, it was concluded that the change would be taken forward as part of the Project.

Image 6.43 – Pylon rationalisation towards High Marnham Substation



7. Temporary Works

7.1 Overview

7.1.1 This chapter sets out National Grid's strategies and considerations concerning the temporary and associated works when constructing the Project.

7.2 Transport Assessment

7.2.1 **Application Document 7.15 Transport Assessment** has been informed by the need to move construction materials such as stone, concrete, steelwork, conductors, cables, equipment and construction personnel. The assessment has taken account of the nature and location of existing transport infrastructure, ports, highway networks, offloading facilities and rail paths. This assessment has been undertaken on the programme presented within **Application Document 6.14 Environmental Statement Chapter 4 Project Description** and shall continue to develop throughout the course of detailed design. Full detail of the proposed Transport Assessment is set out as part of **Application Document 6.14 Environmental Statement Chapter 14 Traffic and Transport**.

7.2.2 **Application Document 7.15 Transport Assessment** establishes the use of Primary Access Routes (PARs) and Secondary Access Routes (SARs) for deliveries and movements to site are set to be fulfilled by HGVs and LGVs. A construction access strategy has been developed to identify and assess PARs and SARs for construction traffic for the Project between the strategic road network and the bellmouth construction access points within the Projects Order Limits. PARs have been identified through a constraints-based assessment having regard to highway classification, network capacity, geometry, safety, existing traffic conditions and environmental considerations with the aim of minimising disruption to local communities and the efficient operation of the highway network where reasonably practicable. have informed the assessments undertaken to inform design. The assessment and identification of the PARs and SARs have resulted in the avoidance of adverse effects as a result of construction traffic and informed the Project's design approach.

7.3 Construction Strategy

Construction Haul Road

7.3.1 National Grid has carried out various assessments to determine the most suitable HGV and LGV routes for the Project. Where local road networks are deemed unfeasible for HGVs to pass, widening or improvements have been put forward. For roads unsuitable for HGVs, access crossing points have been identified to enable a continuation of the construction haul road off the local road network.

7.3.2 National Grid has identified a series of Primary Access Routes connecting to the Strategic Road Network along the Project. These new bellmouths lead off the highway on to the haul road. Further detail on the installation and construction works

for the haul road and its accesses are set out in **Application Document 6.4 Environmental Statement Chapter 4 Description of the Project**.

7.3.3 National Grid has sought to locate bellmouths as close to the proposed works as possible and reduce land disruption. Siting has also been informed by highway safety considerations (for example distance from bends, junctions, and visibility splay requirements) along with environmental considerations (where possible using or widening existing gates or targeting gaps and existing hardstanding in boundary vegetation) and socio-economic effects seeking to reduce effects on other existing (or proposed in planning) land use activities.

Crossing Protection Scaffolding

7.3.4 Temporary scaffold structures and netting would be installed during construction where necessary as a safety measure to protect assets such as roads, railways, navigable watercourses and existing DNO overhead lines. This is set out in **Application Document 7.3 Register of Environmental Actions and Commitments**.

7.3.5 During the construction phase, the netting would be a protective measure in the rare event of the accidental dropping of conductors, earthwire and their associated equipment during conductor stringing. Temporary closures of some crossings may be required during works to install netting and scaffolding, and subsequently remove it once the works are complete.

Conductor Stringing Positions

7.3.6 The conductors would typically be installed in sections between tension pylons, where the overhead line changes direction. A stringing site would be established at one end of the section, for tension pylons, with the conductors running out from a tensioning site at the other end of the section to keep the wires off the ground. The conductors would be delivered on large drums to suit the stringing sections across the Project.

7.3.7 In order to string the conductor, a pilot (light) bond is installed in the stringing section, which is first laid on the ground and then lifted up to each pylon crossarm using rolling-out blocks. This pilot bond is used to pull through heavier bonds until a bond strong enough to pull the main conductor is installed. A winch is located at one end of the stringing section, with a tensioner located at the other end to control the movement, speed and sag of the conductor being installed.

7.3.8 The conductor would then be attached to the strings of insulators hanging from each crossarm within the string section. The winches would pull the conductor through the crossarm on the rolling blocks at an appropriate angle, needing to be sited at a distance away from the tension pylon itself. Once the conductors are installed and connected at the required tension between each pylon, the position of the drums and winches would be reset, moving to the next stringing section along the route. For suspension pylons, insulators are normally installed before the conductor is being pulled through. For tension pylons, insulators are normally installed after the conductor stringing is complete.

7.3.9 This process would continue until the conductors have been installed throughout the Project. Individual conductor lengths would be joined together by clamping a short length of conductor between each section, typically suspended below the crossarms of each tension pylon. Once all conductors are fully strung and clamped, additional fittings, including spacers and vibration dampers, are fitted as required.

Temporary Public Right of Way Management

7.3.10 There are several public rights of way (PRoWs) that have been identified as being impacted during the construction phase of the Project. All designated PRoWs which interact with construction working areas and accesses will be managed using a variety of control mechanisms.

7.3.11 The majority of PRoW closures will be implemented through 'managed access', which will allow users to pass along an affected route under supervision, when and where it is safe to do so. Some PRoWs will need diverting for the duration of construction where they would be unsafe for use due to nature of the active construction works. Other PRoWs will be temporarily closed for shorter durations, and diversions put in place, where feasible to do so. Following completion of the works the PRoW would be reopened and managed as appropriate. Any required diversions will be clearly marked at both ends with signage explaining the diversion and its duration.

7.3.12 The identified PRoWs are set out in:

- **Application Document 2.6 Access Rights of Way and Public Rights of Navigation Plans**
- **Application Document 6.14 Environmental Statement Chapter 14 Traffic and Transport**;
- **Application Document 6.14.F4 Environmental Statement Figure 14.4 Public Rights of Way Impacted During Construction Phase**;
- **Application Document 6.17 Environmental Statement Chapter 17 Socio-economics, Recreation and Tourism**; and
- **Application Document 7.6 Outline Public Right of Way Management Plan**.

Temporary Management of the Road Network

7.3.13 The Project will require the use of temporary traffic management on the road network, throughout the duration of the construction phase. For the majority of the construction works impacting the adopted highway, temporary traffic management will be used to avoid road closures. This management will allow road users to maintain access to affected parts of the network. For more extensive works, these will include the use of temporary traffic lights and shuttle lane running; and for more minor works, may include the use of 'stop-go' boards operated by marshals. However, this will require the temporary closure of some roads, and diversion routes will be provided wherever feasible to do so. There will also be the need to place temporary traffic management in towns and villages located on the Primary Access Route, to allow the safe transit of HGVs. This will include the suspension of parking along some narrow roads, and the use of temporary traffic lights in locations which are particularly narrow or constricted.

7.3.14 The locations of all temporary traffic management, how the environment and transport impacts have been assessed, and further details on how this will be managed and communicated to stakeholders can be found in the following plans and application documents:

- **Application Document 2.5 Traffic Regulation Orders Plans**;
- **Application Document 6.14 Environmental Statement Chapter 14 Traffic and Transport**;
- **Application Document 7.4 Outline Construction Traffic Management Plan**; and
- **Application Document 7.15 Transport Assessment**.

7.4 Temporary Works Compounds

7.4.1 Temporary works compounds would be required to support the construction phase. The siting of the temporary works compounds has been informed by the location of Project elements and the function that each compound would provide.

7.4.2 The compounds have been strategically located across the Project based on the length of the route and its geographical constraints, whilst taking into consideration the environmental and socio-economic constraints of the area. Technical needs, including outfall points and electricity supply, have also been considered for each location. The compounds have been sited close to the main access points and Primary Access Routes where possible to reduce travel distances for efficiency and construction effects.

7.4.3 The temporary works compounds would vary in size depending on their purpose. Indicative temporary compound layouts are shown in **Application Document 2.12 Typical Design Drawings**.

7.5 Work by Third Parties

7.5.1 National Grid is aware of DNO utilities and customer connections impacted by the Project that will require future works; these projects are considered within **Application Document 6.21 Environmental Statement Chapter 21 Inter-project Cumulative Effects** and **Application Document 2.4 Works Plans**.

8. Next Steps

8.1 Introduction

8.1.1 As earlier chapters have discussed, the Project has evolved as a result of feedback received during statutory consultation together with further environmental, socio-economic and technical considerations, which have informed ongoing design refinement. In combination, this work has led to the development of this application.

8.2 Mitigation Measures

8.2.1 As discussed throughout this report, there will be a need for some mitigation measures to be incorporated into the Project to reduce its potential effects. These mitigation measures have been informed by a series of assessments, field surveys and feedback. These measures can be found in **Application Documents 6.1 to 6.22 Environmental Statement** (Volume 6 of the application for development consent).

8.3 The DCO Process and Timeline

8.3.1 This report has been published as part of the DCO submission to the Planning Inspectorate who will assess the application with a statutory determination period of 28 days. If accepted, the Pre-Examination stage will commence. The Project's preliminary design will continue to be developed into detailed design throughout the next stages of the DCO process. National Grid will continue to engage with the relevant local planning authorities on detailed design, through the discharge of requirements process, to secure their approval.

Bibliography

Department for Energy Security and Net Zero. (2025). National Policy Statement for Electricity Networks Infrastructure (EN-5). Retrieved from GOV.UK: https://assets.publishing.service.gov.uk/media/695d12e1b5c46330350ed9a1/national-policy-statement-for-electricity-networks-infrastructure-en-5-web-accessible.pdf

Department for Energy Security and Net Zero. (2025). National Policy Statement for Renewable Energy Infrastructure (EN-3). Retrieved from GOV.UK: https://assets.publishing.service.gov.uk/media/695d1368b5c46330350ed9a2/national-policy-statement-for-renewable-energy-infrastructure-en-3-web-accessible.pdf

Department for Energy Security and Net Zero. (2025). Overarching National Policy Statement for Energy (EN-1). Retrieved from GOV.UK: https://assets.publishing.service.gov.uk/media/695d1015f41883f4e50ed9ab/overarching-national-policy-statement-for-energy-en-1-web-accessible.pdf

HM Government. (1989). Electricity Act 1989. Retrieved from legislation.gov.uk: https://www.legislation.gov.uk/ukpga/1989/29/contents

HM Government. (2008). Planning Act 2008. Retrieved from legislation.gov.uk: https://www.legislation.gov.uk/ukpga/2008/29/contents

HM Government. (2013). The Planning Act 2008 (Nationally Significant Infrastructure Projects) (Electric Lines) Order 2013. Retrieved from legislation.gov.uk: https://www.legislation.gov.uk/uksi/2013/1479/contents/made

HM Government. (2017). The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. Retrieved from legislation.gov.uk: https://www.legislation.gov.uk/uksi/2017/572/contents

HM Government. (2025). Planning and Infrastructure Act 2025. Retrieved from legislation.gov.uk: https://www.legislation.gov.uk/ukpga/2025/34/contents

Ministry of Housing. Communities & Local Government. (2024). National Planning Policy Framework. Retrieved from https://www.gov.uk/government/publications/national-planning-policy-framework--2

Planning Inspectorate. (2024). Nationally Significant Infrastructure Projects: Advice on Good Design. Retrieved from GOV.UK: https://www.gov.uk/guidance/nationally-significant-infrastructure-projects-advice-on-good-design

Planning Inspectorate. (2025). Nationally Significant Infrastructure Projects: Advice on Preparing Applications for Linear Projects. Retrieved from GOV.UK: https://www.gov.uk/guidance/nationally-significant-infrastructure-projects-advice-on-preparing-applications-for-linear-projects

Appendix A
Aviation Assessment

nationalgrid

The Great Grid Upgrade

North Humber to High Marnham

NHHM-NG-CNS-REP-0010

North Humber to High Marnham

Volume 5: Reports and Statements

Document 5.9 Design Development Report - Aviation Assessment

Final Issue A

October 2026

Planning Inspectorate Reference: EN020034

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

nationalgrid

Contents

Executive Summary 1

1. Introduction 2

2. Summary of UK Policy on Safeguarding 4

2.1 Regulatory and Guidance documents 4

2.2 National Planning Policy 5

3. Risk Assessment Methodology 8

4. Project Engagement and Consultation 16

5. Risk Assessments 19

5.1 Mount Airy 19

5.2 West Burton 22

5.3 Forwood Farm 25

5.4 Grove Farm 28

5.5 Headon Airfield 31

5.6 Darlton Gliding Club 34

5.7 Haxey 38

5.8 Willow Farm 41

6. Other operational risks 44

Image 3.1 – Summary of methodology applied 8
Image 3.2 – Obstacle Limitation Surfaces (OLS) 9
Image 3.3 – Cross section showing pylon below OLS 10
Image 3.4 – Cross section showing pylon penetrating the OLS 10
Image 3.5 – Standard circuit pattern alignment 11
Image 3.6 – Circuit pattern vertical deviation limits 11
Image 3.7 – Circuit pattern horizontal deviation limits of aircraft 12
Image 3.8 – Cross section showing indicative distance to aircraft in circuit pattern 13
Image 3.9 – Annotated example of modelled surfaces 14
Image 5.1 – Mount Airy Risk Assessment Results 21
Image 5.2 – West Burton Risk Assessment Results 24
Image 5.3 – Forwood Farm Risk Assessment Results 27
Image 5.4 – Grove Farm Risk Assessment Results 30
Image 5.5 – Headon Aerodrome Risk Assessment Results 33
Image 5.6 – Example of an aerotow launch 36
Image 5.7 – Darlton Gliding Club Risk Assessment Results (Powered Aircraft Circuits) 37
Image 5.8 – Haxey Risk Assessment Results 40
Image 5.9 – Willow Farm Risk Assessment Results 43

Image B.1 – Mount Airy – modelled circuit pattern and OLS B-1
Image B.2 – Mount Airy risk assessment – fixed wing aircraft circuit south (1,000 ft) B-2
Image B.3 – Mount Airy risk assessment – microlight aircraft circuit south (800 ft) B-3

Image B.4 – Mount Airy risk assessment – fixed wing aircraft circuit north (1,000 ft) B-4
Image B.5 – West Burton – modelled circuit pattern and OLS B-5
Image B.6 – West Burton risk assessment – standard circuit (1,000 ft) B-6
Image B.7 – Forwood Farm – modelled circuit pattern and OLS B-7
Image B.8 – Forwood Farm risk assessment (500 ft low-level easterly circuits) B-8
Image B.9 – Forwood Farm risk assessment (1,000 ft standard easterly circuits) B-9
Image B.10 – Grove Farm – modelled circuit pattern and OLS B-10
Image B.11 – Grove Farm risk assessment standard circuit (1,000 ft) B-11
Image B.12 – Headon Airfield – modelled circuit pattern and OLS B-12
Image B.13 – Headon Airfield risk assessment (500 ft low-level circuits runway 05/23) B-13
Image B.14 – Headon Airfield risk assessment (500 ft low-level circuits runway 14/32) B-14
Image B.15 – Headon Airfield risk assessment (800 ft standard circuits runway 05/23) B-15
Image B.16 – Headon Airfield risk assessment (800 ft standard circuits runway 14/32) B-16
Image B.17 – Darlton Gliding Club – modelled powered aircraft circuit pattern (north and south) and OLS B-17
Image B.18 – Darlton Gliding Club risk assessment – powered aircraft circuit pattern (north) B-18
Image B.19 – Darlton Gliding Club risk assessment – powered aircraft circuit pattern (south) B-19
Image B.20 – Haxey – modelled circuit pattern and OLS B-20
Image B.21 – Haxey risk assessment B-21
Image B.22 – Willow Farm– modelled circuit pattern and OLS B-22
Image B.23 – Willow Farm risk assessment B-23
Image C.1 – Retford/Gamston – OLS C-2
Image C.2 – Humberside – OLS C-3
Image C.3 – Sandtoft – OLS C-4
Image C.4 – Doncaster Sheffield Airport - OLS C-5
Image D.1 – Number of engine failures per manufacturer D-2
Image D.2 – Rate of engine failures per manufacturer D-3

Annex A Airfield Meeting Summaries
Annex B Risk Assessment
Annex C Assessment of Humberside International, Doncaster Sheffield and Retford/Gamston and Sandtoft aerodromes
Annex D Assessment of Engine Failure Rates
Annex E Historical Examples of Incidents / Accidents Between Aircraft and Power Lines in the UK

Executive Summary

This report details the aviation assessment that has been carried out by WSP on behalf of National Grid in relation to eight unlicenced aerodromes along the route of the proposed North Humber to High Marnham overhead power transmission line.

National Grid launched a non-statutory consultation in 2023 which also marked the beginning of engagement with local aviation interests regarding the early-stage proposals. Engagement has continued with aviation interests throughout development of the proposals. WSP were appointed by National Grid in January 2025 to provide an assessment of the potential impact on operations at each of the following aerodromes, as well as suggesting potential mitigation measures to be considered.

Aerodromes Assessed

- Mount Airy;
- West Burton;
- Forwood Farm;
- Grove Farm;
- Headon Airfield;
- Darlton Gliding Club;
- Haxey; and
- Willow Farm.

This report provides a summary of UK policy on aviation safeguarding and outlines the risk assessment methodology applied. The risk assessment for each of the aerodromes is then set out, alongside the mitigation measures considered. It is recommended this report is read in full to provide the necessary context.

UK Civil Aviation Authority (CAA) guidance and regulations have been applied where available, along with relevant UK national policy for safeguarding of general aviation.

All eight aerodromes considered in this assessment are unlicensed. This means they do not hold an official operating licence from the CAA and therefore operate without the regulatory oversight that licenced aerodromes hold. With regards to safeguarding, unlicensed aerodromes are not officially safeguarded and there are no regulatory protections in place. Instead, the aerodrome operator is responsible for ensuring that safe conditions exist at the site to allow safe operations to take place. National Grid has sought to engage with all eight aerodromes and has been in contact with aerodrome operators through in-person and virtual meetings, email and telephone conversations since 2023. National Grid has considered feedback received from aerodromes at appropriate stages of the Project's development and has sought to minimise potential impacts to aerodromes where possible. A summary of engagement is set out in Annex A with engagement continuing with all aerodromes to date.

1. Introduction

1.1.1 This report sets out the aviation assessment that has been carried out by National Grid to evaluate the risk to operations at eight aerodromes along the route of the proposed North Humber to High Marnham overhead power transmission line.

1.1.2 National Grid appointed WSP in January 2025 to provide an assessment of the potential impact on operations at each of the listed aerodromes, as well as suggesting mitigations to reduce these risks.

1.1.3 Due to the lack of a defined industry standard method for evaluating and mitigating the risks of obstacles near unlicensed aerodromes, WSP have developed a methodology to assess the potential impact of the overhead line at the aerodromes and proposed potential mitigations for National Grid to consider where the assessment concludes there would be an impact on aerodrome operations. This methodology is outlined in Section 3 of this report.

1.1.4 WSP have also attended and supported National Grid in consultations with the aerodrome owners/operators to assess, discuss and agree where modifications to the operation at each aerodrome could be implemented to provide suitable mitigations if the proposed overhead line cannot be re-routed.

1.1.5 National Grid has reviewed the findings of the aviation assessment and considered each potential mitigation. Where potential mitigations are suggested for National Grid to consider a brief explanation is provided as to how this has been considered in Section 4 of this report. In developing the Project and identifying the proposed alignment and considering alternative alignments received during consultation, National Grid has had to consider the optimum balance between many environmental, socio-economic, technical and cost considerations. More context on the development of the proposed alignment can be found in Application Document **5.9 Design Development Report**.

- Section 2 of this report provides a summary of UK policy on safeguarding.
- Section 3 provides an overview of engagement and engagement with the aerodromes.
- Section 4 outlines the risk assessment methodology applied.
- Section 5 contains the risk assessment and potential mitigations considered for each of the individual aerodromes.
- Section 6 outlines other operational risks to aerodromes from development close to aerodromes.
- Annex A details the on-going engagement that National Grid has had with aerodromes since the start of non-statutory consultation in 2023.
- Annex B summarises the individual risk assessments carried out for each of the eight aerodromes.

- Annex C summarises the high-level assessment carried out on, Humberside International Airport, Doncaster Sheffield Airport, Retford/Gamston aerodrome and Sandtoft aerodrome.
- Annex D summarises data available regarding engine failure rates in general aviation aircraft.
- Annex E sets out historical examples of incidents / accidents between aircraft and power lines in the UK.

2. Summary of UK Policy on Safeguarding

2.1 Regulatory and Guidance documents

2.1.1 The following regulatory and guidance documents have been considered as part of this study:

- International Civil Aviation Organization (ICAO) Annex 14 Volume 1 – Aerodrome Design and Operations and Annex 15 - Aeronautical Information Services;
- The Air Navigation Order 2016;
- UK Regulation (EU) 139/2014 Aerodromes;
- UK Regulation (EU) 965/2012 Air Operations;
- CAP 168 Licensing of Aerodromes – CAA Policy Document;
- CAP 738 Safeguarding of Aerodromes – CAA Policy Document;
- CAP 785B Implementation and Safeguarding of Instrument Flight Procedures in the UK – CAA Policy Document;
- CAP 793 Safe Operating Practices at Unlicensed Aerodromes – CAA Policy Document;
- CAP 1264 Standards for Helicopter Landing Areas at Hospitals – CAA Policy Document;
- Planning Act 2008;
- Overarching National Policy Statement for Energy – NPS EN1;
- National Policy Statement for Electricity Networks Infrastructure – NPS EN-5;
- National Planning Policy Framework (latest release August 2026); and
- Town and Country Planning (safeguarded aerodromes, technical sites and military explosives storage areas) Direction 2002.

2.1.2 The UK government's overall policy on the aviation sector is outlined in the strategy document Aviation 2050 – the Future of UK Aviation, published by the Department for Transport in 2018. For the general aviation sector, the relevant policy documents are the General Aviation Strategy from 2015 and the General Aviation Roadmap from 2021.

2.1.3 These documents emphasise the importance of protecting general aviation aerodromes from unnecessary development that could affect their operations. To support general aviation, the government created an Airfields Advisory Team (AAT) within the CAA which has since been dissolved. The AAT did not have a formal regulatory role; it advocated for the interests of general aviation aerodromes in the planning process when they are affected by nearby development. This role is now undertaken by the General Aviation Awareness Council (GAAC) which offers confidential advice and support to general aviation aerodromes throughout the UK facing planning or property related issues.

2.1.4 It is important to recognise that UK aerodromes can be either licensed by the CAA or unlicensed. A CAA licence is mandatory for aerodromes that provide commercial transport operations, and the aerodrome must go through a rigorous inspection to gain licensed status and be allowed to operate commercial transport operations. Licensed aerodromes must adhere to specific physical and operational standards as outlined in International Civil Aviation Organisation (ICAO) Annex 14 and endorsed by the CAA in CAP 168 Licensing of Aerodromes. These standards include safeguarding requirements, such as maintaining obstacle-free airspace around runways to protect aircraft during the take-off and landing phases of flight.

2.1.5 None of the eight aerodromes assessed in this study, and documented in this report, are licensed, and due to their size and the nature of their operations, it is highly unlikely that they will be licensed in the future.

2.1.6 For unlicensed aerodromes, there are no official Obstacle Limitation Surfaces (OLS) or safeguarding procedures. OLS are imaginary planes defined in 3D around an aerodrome to protect aircraft during flight. Aerodrome operators must ensure safe operations exist at the aerodrome, and pilots must ensure that conditions are suitable for the safe execution of a flight. Guidance on this is provided by the CAA in CAP 793 Safe Operating Practices at Unlicensed Aerodromes. While there are no set standards, aerodrome owners should ensure that necessary flight procedures and details of nearby obstacles are shown in relevant aeronautical guides, charts and on the aerodrome's website. Aerodromes can also opt to require Prior Permission Required (PPR) which means that pilots must call ahead to receive a safety briefing and gain permission to land before approaching and landing at the aerodrome. It should be noted that for general aviation operations in the UK the pilot-in-command holds overall responsibility for the safety of the flight.

2.1.7 Annex 15 (Aeronautical Information Services) to the International Convention on Civil Aviation defines obstacles as:

All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that:

- are located on an area intended for the surface movement of aircraft; or
- extend above a defined surface intended to protect aircraft in flight; or
- stand outside those defined surfaces and that have been assessed as being a hazard to air navigation."

2.2 National Planning Policy

Overarching National Policy Statement for Energy (EN-1)

2.2.1 In addition to the above aviation regulations and guidance it should be noted that the current National Policy Statement (NPS) for Energy (EN-1) was designated by the Department of Energy Security and Net Zero on 6 January 2026.

2.2.2 Section 5.5 of NPS EN-1 covers civil and military aviation and defence interests. It identifies that both military and civilian aerodromes as well as aviation technical sites, meteorological radars and other types of defence interests can be affected by new energy development. It states at paragraph 5.5.2 that '*Collaboration and co-existence between aviation, defence and energy industry stakeholders should be strived for to ensure scenarios such that neither is unduly compromised.*'

2.2.3 NPS EN-1 also sets out at paragraph 5.5.7 that '*It is essential that new energy infrastructure is developed collaboratively alongside aerodromes, aircraft, manned and unmanned air systems and airspace so that safety, operations and capabilities are not adversely affected by new energy infrastructure. Likewise, it is essential that aerodromes, aircraft, air systems and airspace operators work collaboratively with energy infrastructure developers essential for net zero. Aerodromes can have important economic and social benefits, particularly at the regional and local level, but their needs must be balanced with the urgent need for new energy developments, which bring about a wide range of social, economic and environmental benefits.*'

2.2.4 NPS EN-1 acknowledges at paragraphs 5.5.8 to 5.5.9 that civilian leisure and military aircraft may often fly outside of 'controlled air space'. The approaches and flight patterns to aerodromes are not necessarily routine and can be irregular owing to a variety of factors including the performance characteristics of the aircraft concerned and the prevailing meteorological conditions.

2.2.5 NPS EN-1 identifies that *'new energy infrastructure may cause obstructions in MOD low flying areas.* It identifies that a balance must be struck between defence and energy needs in these areas.

2.2.6 With regard to safeguarding, NPS EN-1 states at paragraphs 5.5.11 and 5.5.12 that '*certain civil aerodromes, and aviation technical sites, selected on the basis of their importance to the national air transport system, are officially safeguarded in order to ensure that their safety and operation are not compromised by new development. A similar official safeguarding system applies to all military aerodromes, defence surveillance sites, and other defence assets.*'

2.2.7 Paragraph 5.5.19 of NPS EN-1 states that '*the CAA makes clear that the responsibility for the safeguarding of General Aviation aerodromes lies with the aerodrome operator.*'

2.2.8 Paragraph 5.5.17 of NPS EN-1 states that *'The DfT/ODPM Circular 01/2003 and CAA guidance also recommends that the operators of aerodromes which are not officially safeguarded should take steps to protect their aerodrome from the possible effects of development by establishing an agreed consultation procedure between themselves and the LPAs.'*

2.2.9 Paragraph 5.5.53 of NPS EN-1 identifies that the Secretary of State should be satisfied that the proposal has been designed, where possible, to minimise adverse impacts on the operation and safety of aerodromes and goes on to state that '*it is incumbent on Operators of aerodromes to regularly review the possibility of agreeing to make reasonable changes to operational procedures'.*

2.2.10 Paragraph 5.5.53 of NPS EN-1 states that '*When assessing the necessity, acceptability, and reasonableness of operational changes to aerodromes, the Secretary of State should be satisfied that they have the necessary information regarding the operational procedures along with any demonstrable risks or harm of such changes, taking into account the cases put forward by all parties. When making such a judgement in the case of military aerodromes, the Secretary of State should have regard to interests of defence and national security*'.

National Policy Statement for Electricity Networks Infrastructure (EN-5)

2.2.11 In addition to the impacts identified within EN-1, section 2 of EN-5 provides policy on additional impacts to be considered when examining impacts of electricity network infrastructure. Overhead lines and underground cables associated with the transmission of electricity can produce electric and magnetic fields (EMF).

2.2.12 Paragraph 2.11.14 states that, *in order to avoid unacceptable adverse impacts of EMFs from electricity network infrastructure on communication, navigation and surveillance infrastructure, the Secretary of State will take account of statutory technical safeguarding zones defined in accordance with Planning Circular 01/03, or any successor, when considering recommendations for DCO applications. Further detail on this issue is also referenced in Section 5.5 of EN-1*. The Circular describes arrangements for safeguarding, as well as requirements for consultation with the SoS for Defence and the CAA in relation to applications for overhead lines, and the listing of officially safeguarded civil aerodromes.

National Planning Policy Framework (NPPF)

2.2.13 Policy TR1 of the NPPF addresses the promotion of sustainable transport and TR1 (e) includes reference to general aviation airfields and the importance of maintaining a national network of general aviation airfields. Aviation airfields are defined in the NPPF as licensed or unlicensed aerodromes with hard or grass runways, often with extensive areas of open land related to aviation activity.

Planning Practice Guidance (PPG)

2.2.14 The significant contribution of aviation to economic growth is recognised in paragraph 12 of the PPG entitled ‘Transport evidence bases in plan making and decision taking’ (Ministry of Housing, Communities and Local Government, 2015). This includes the contribution of small and medium sized airports and airfields (aerodromes). The guidance advises Local Planning Authorities (LPAs) to have regard to the extent to which an aerodromes contributes to connectivity as part of a network, including beyond an LPA’s own boundaries, as well as to the Aviation Policy Framework (Department for Transport, 2013), which sets out government policy to allow aviation to continue making a contribution to economic growth.

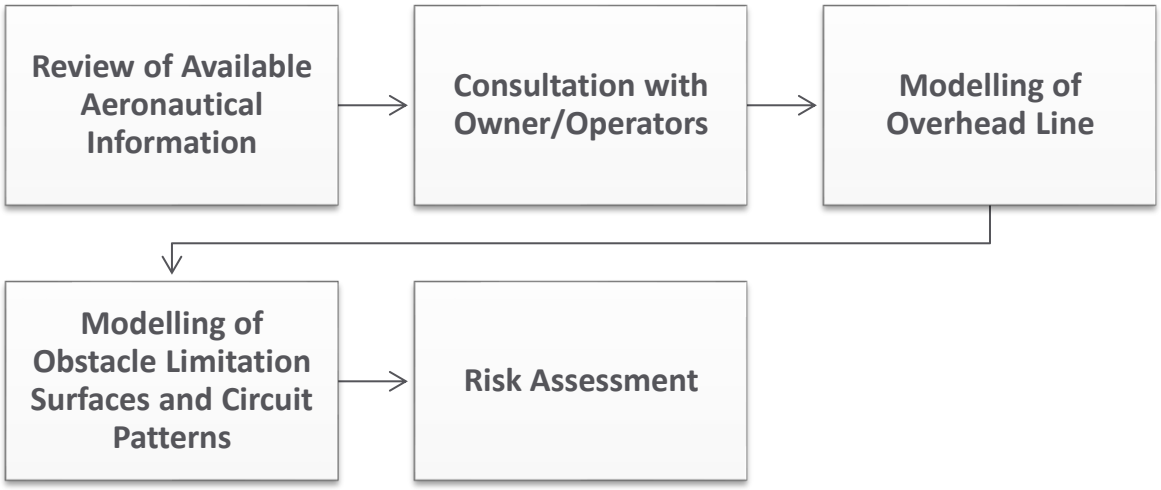
3. Risk Assessment Methodology

3.1.1 This section outlines the methodology applied to assess the risk of the proposed development to each of the aerodromes.

Five step risk assessment methodology

3.1.2 The methodology is summarised in Image 3.1 and the following five steps.

Image 3.1 – Summary of methodology applied



1) Review of Available Aeronautical Information

3.1.3 Relevant aeronautical charts, guides, and other documentation were reviewed to understand the operational environment of each aerodrome. These sources included Pooleys Flight Guide, UK airspace Visual Flight Rules (VFR) flight charts and the aerodromes' websites, where available.

2) Consultation with Owner/Operators

3.1.4 WSP and National Grid engaged with aerodrome owners and operators to gather information about the physical and operational characteristics of each aerodrome. Information gathered during meetings included the type of aircraft, frequency of movements, arrival and departure routes, circuit pattern alignment and height, presence of existing obstacles and whether the aerodrome provided pilot training. The proposed alignment of the overhead line was also discussed with the operators and their feedback recorded.

3) Modelling of Overhead Line

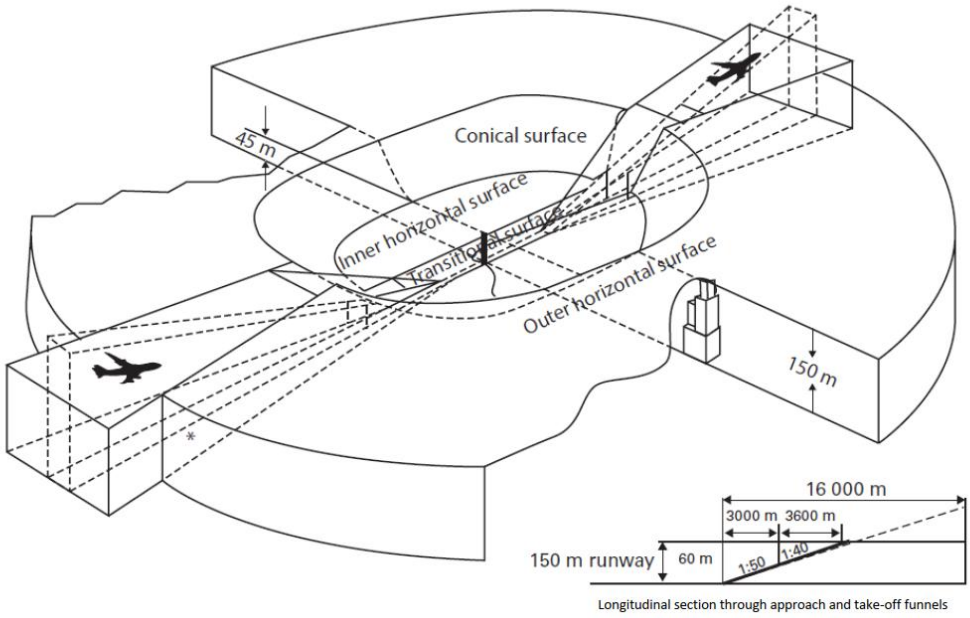
3.1.5 The locations of indicative proposed pylons are set out in **Application Document 4.1 - Indicative Pylon Schedule**, along with the vertical Limits of Deviation for the Overhead Line (LoD-OHL). For the purposes of this assessment the most impactful LoD-OHL were used to ensure a conservative case was modelled. The most

impactful LoD-OHL were those which positioned the pylons in closest proximity to the aerodrome circuit pattern, and therefore aircraft in flight.

4) Modelling of OLS and Circuit Patterns

3.1.6 Following guidance in CAA document CAP 793 Safe Operating Practices at Unlicensed Aerodromes, OLS were developed for each aerodrome. These are imaginary planes defined in 3D around an aerodrome to protect aircraft during flight. They are mandatory for licensed aerodromes and used as guidance only for unlicensed aerodromes. An illustration of a typical OLS can be seen in Image 3.2.

Image 3.2 – Obstacle Limitation Surfaces (OLS)



3.1.7 The proposed overhead lines were then modelled in a 3D digital environment and assessed against the OLS to identify any infringements. Image 3.3 and Image 3.4 show an indicative cross section of the OLS in relation to a pylon. Image 3.3 shows a pylon which does not infringe on the OLS, whilst Image 3.4 shows an example of a pylon penetrating the OLS.

Image 3.3 – Cross section showing pylon below OLS

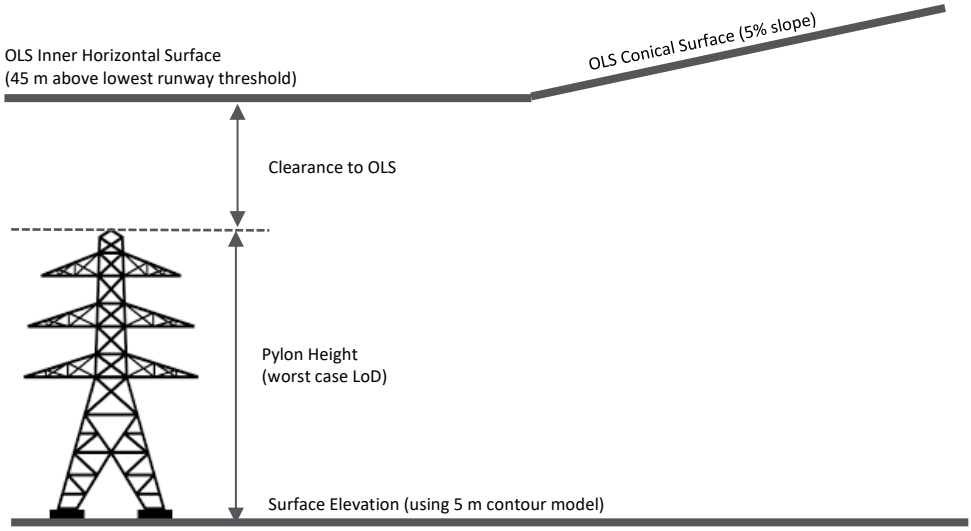
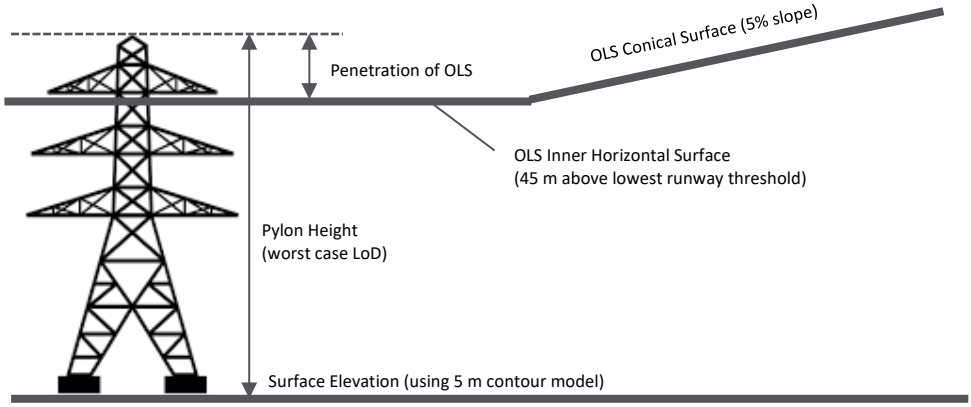


Image 3.4 – Cross section showing pylon penetrating the OLS



3.1.8 The OLS was used as a way to determine whether further, more detailed assessment was required for that particular pylon. Where the OLS was identified as infringed/ penetrated, or the OHL passed below the OLS footprint, those aerodromes were taken forward for further assessment.

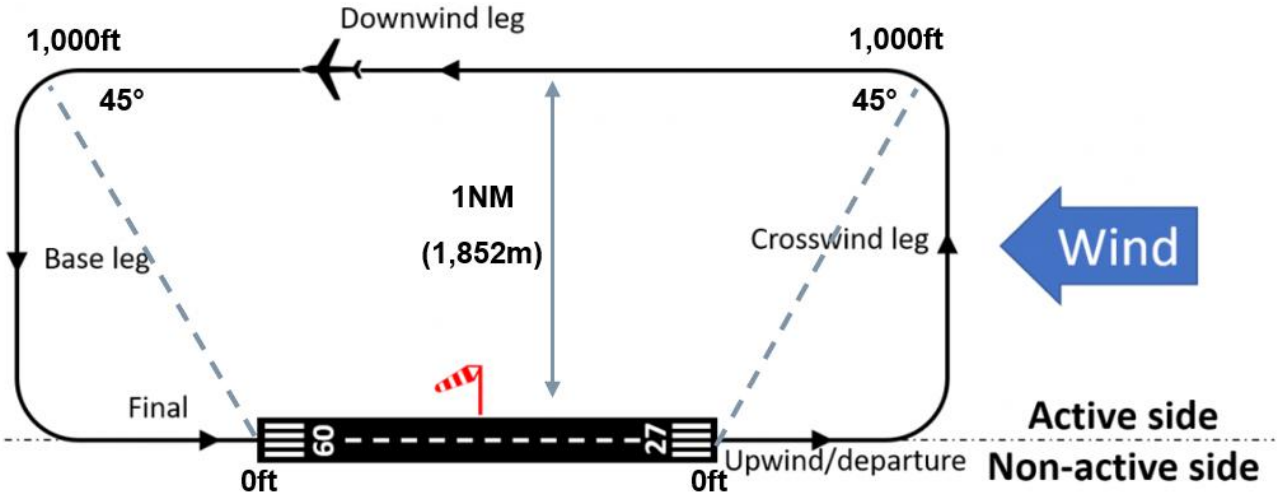
3.1.9 In addition to the OLS the circuit pattern at each aerodrome was modelled in 3D. A circuit pattern, also known as an aerodrome traffic pattern, is a standard path followed by aircraft when taking off or landing while maintaining visual contact with the aerodrome. This pattern helps coordinate air traffic and ensures safety by providing a predictable route for pilots to follow. It is the 3D volume of airspace which contains the highest density of aircraft movements around an aerodrome, as well as the segment of flight where aircraft are at their lowest altitude/height.

3.1.10 The circuit patterns were modelled in 3D using AutoCAD software using the following methodology.

Horizontal and vertical alignment of aircraft in circuit

3.1.11 Where available, this information was provided by the aerodrome operator. Where this was not available then a standard circuit pattern was defined as shown in Image 3.5.

Image 3.5 – Standard circuit pattern alignment



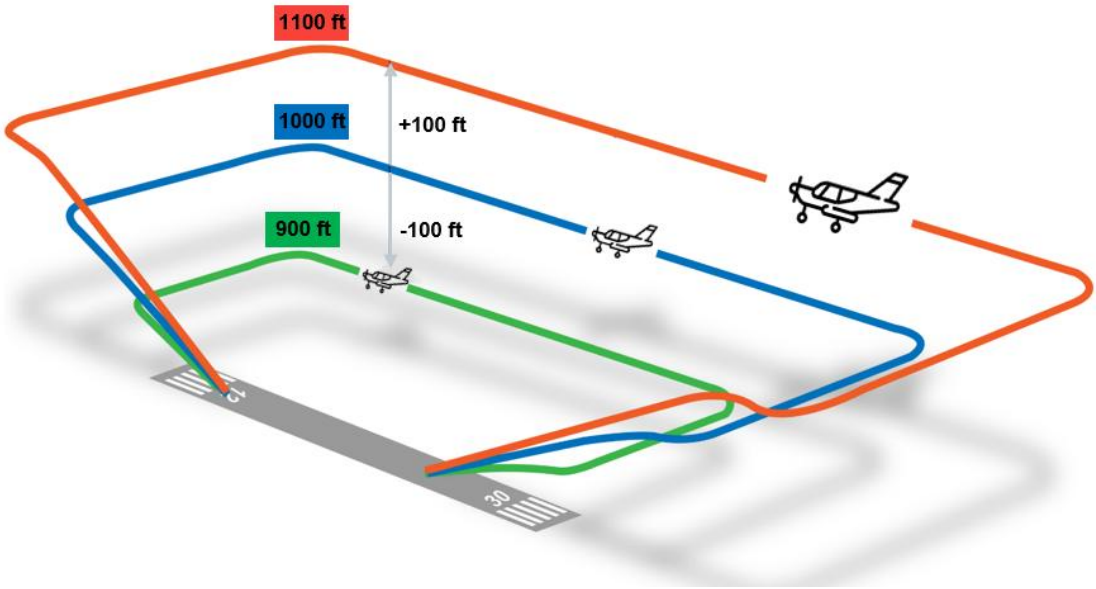
3.1.12 It was assumed that the aircraft uses the full length of the runway and climbs at a constant rate to a circuit height of 1,000 ft above ground level (taken as the height above the lowest threshold) by the time it turns onto the downwind leg. It then continues at this height until the start of the turn onto base leg where it begins a continuous descent until touch down at the start of the runway.

3.1.13 Due to there being multiple variations to the exact route an aircraft takes based on wind conditions, pilot experience, human factors and aircraft performance, a Limit of Deviation for the Aircraft (LoD-Aircraft) was applied as follows.

Vertical deviation limits of aircraft

3.1.14 The UK CAA Private Pilot Licence (PPL) test requires pilots to fly within ±100 ft of their target altitude. A 100 ft vertical deviation was therefore applied to the circuit. This is illustrated in Image 3.6. In order to model the most restrictive case the −100 ft deviation was used in the assessment. This is represented by the green line in Image 3.6.

Image 3.6 – Circuit pattern vertical deviation limits



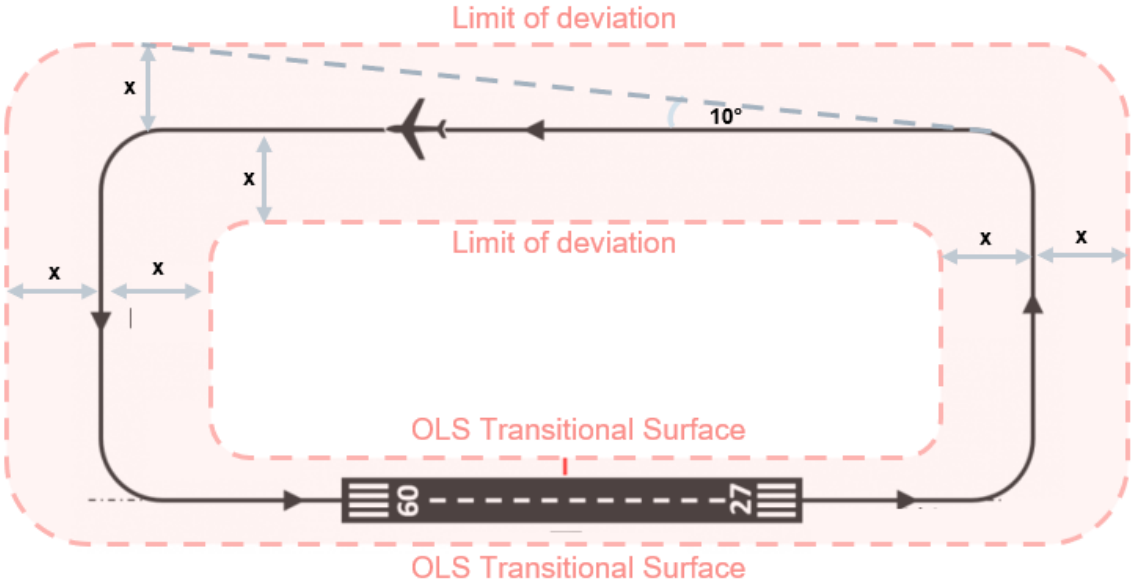
Horizontal deviation limits of aircraft

3.1.15 The UK CAA PPL test requires pilots to fly within ±10° of their target heading/track. The maximum deviated distance off-track was therefore calculated based on the lateral deviation caused by a 10° variation to heading whilst flying the downwind leg. This distance was applied around each leg of the circuit as shown in Image 3.7. The only exception to this was on the take off and final approach legs where the limit of deviation was aligned with the runway's transitional surface.

3.1.16 The following assumptions were made:

- As the circuits are flown visually it was assumed that the pilot corrects any track errors during the turn onto each new leg. For this reason, a 10° error was not applied cumulatively around the circuit.
- The largest deviation of the longest leg has been applied uniformly around the circuit for simplicity and to model a conservative approach.

Image 3.7 – Circuit pattern horizontal deviation limits of aircraft



3.1.17 The proposed overhead lines were then modelled in a 3D digital environment and assessed against the circuit pattern to identify the separation between the proposed obstacles and the LoD-Aircraft. The outermost extent of the pylons and conductors under worst case swing conditions could be located laterally ±50m from the proposed centreline within a 100m corridor. For the purposes of the assessment, the pylons have been located to position them as close to the circuit pattern as possible, whilst remaining within this corridor.

3.1.18 There is no prescribed regulatory minimum separation between an aircraft and obstacles during take-off and landing, the UK Rules of the Air (SERA), UK Regulation (EU) No. 923/2012 stipulates in Section 5, SERA.5005 Visual flight rules, that

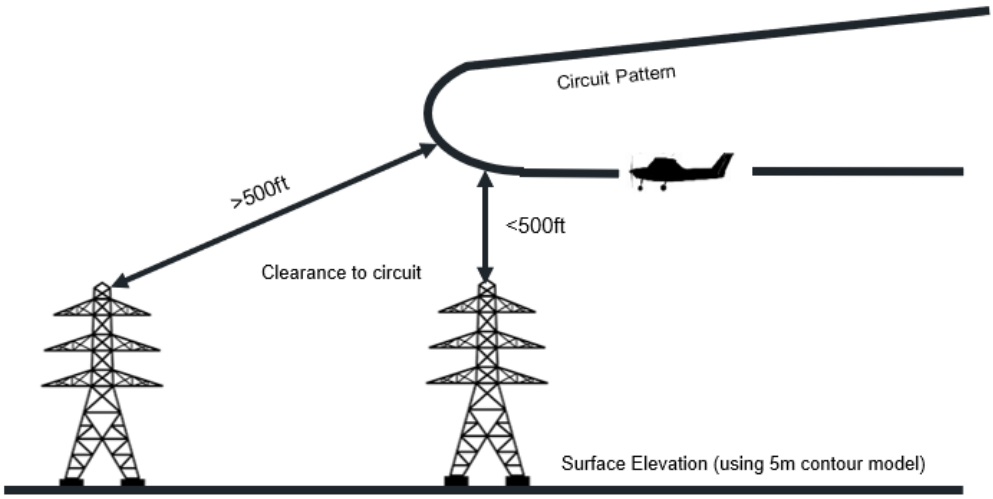
'Except when necessary for take-off or landing, or except by permission from the competent authority, a VFR flight shall not be flown:

(1) over the congested areas of cities, towns or settlements or over an open-air assembly of persons at a height less than 300 m (1000 ft) above the highest obstacle within a radius of 600 m from the aircraft;

(2) elsewhere than as specified in (1), at a height less than 150 m (500 ft) above the ground or water, or 150 m (500 ft) above the highest obstacle within a radius of 150 m (500 ft) from the aircraft.'

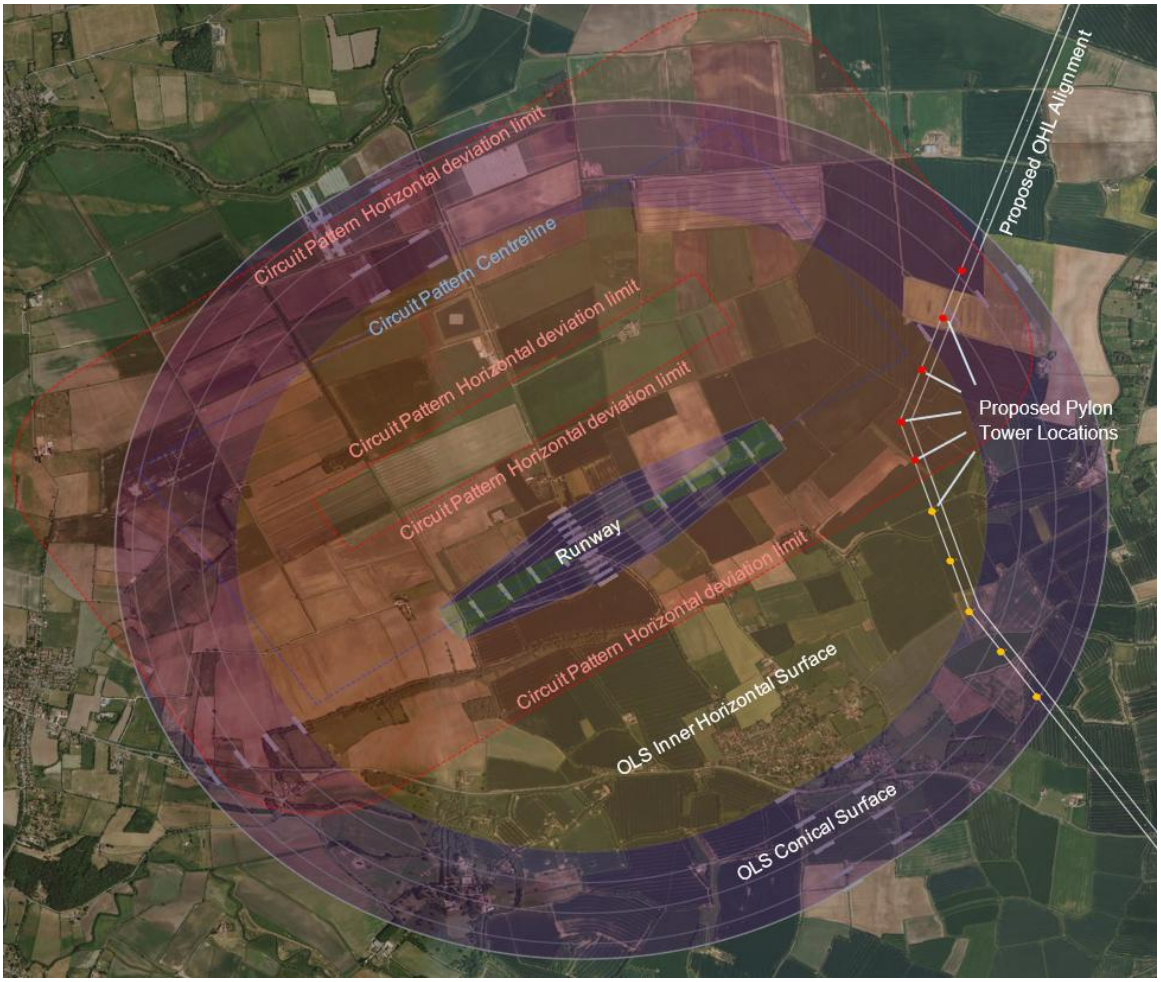
3.1.19 Despite the UK Rules of the Air precluding aircraft from abiding by this during take-off and landing it can be applied as a standard to abide by in the vicinity of an aerodrome when aircraft are not actively descending during landing or climbing during take-off. Therefore, any clearance of less than 500 ft between aircraft and the proposed overhead line has been deemed to conflict with the legislation within The Air Navigation Order 2016 and has been flagged as a high risk. This is represented schematically in Image 3.8.

Image 3.8 – Cross section showing indicative distance to aircraft in circuit pattern



3.1.20 An annotated example of the modelled surfaces shown in the risk assessment section of this report is provided in Image 3.9.

Image 3.9 – Annotated example of modelled surfaces



5) Risk Assessment:

3.1.21 With the above information available, an assessment was undertaken for each section of the proposed overhead line adjacent to each of the aerodromes to determine the level of risk that each object posed to an aircraft in flight. Due to the lack of empirical data such as historical aircraft flight paths or defined arrival and departure procedures, such as those used at larger commercial airports, it is not possible to quantify numerically the likelihood of a risk occurring. The methodology used has therefore assessed the location of the obstacle in relation to both the OLS and the prescribed circuit pattern at the aerodrome. This is because the greatest risk of a collision between an aircraft and the overhead line is during the take-off and landing phases of flight and the greatest density of aircraft movements around an aerodrome is contained within the circuit pattern.

3.1.22 A **high** risk has been deemed to exist where there is less than 500ft clearance to aircraft in the circuit, regardless of whether the proposed OHL infringes on the obstacle limitation surfaces.

3.1.23 A **medium** risk has been deemed to exist where the proposed overhead line infringes on the OLS but where there is greater than 500 ft clearance to aircraft in the circuit.

3.1.24 A **low** risk has been deemed to exist where the proposed overhead line does not infringe on the OLS and where there is also greater than 500 ft clearance to aircraft in the circuit.

3.1.25 The criteria described above have been summarised in the table below.

OLS infringement	Less than 500 ft clearance to circuit	Risk level	Definition
Yes	Yes	High	High risk requiring mitigations such as relocation of obstacles, modification to operations or discontinuing operations at the aerodrome.
No	Yes		
Yes	No	Medium	Medium risk requiring mitigations such as ensuring new obstacles are marked on aeronautical charts and visiting pilots are made aware of the presence of obstacles.
No	No	Low	Low risk requiring little to no mitigations. It is still recommended that new obstacles are marked on aeronautical charts and visiting pilots are made aware of the presence of obstacles.

3.1.26 For each aerodrome the above approach was applied to determine the level of risk and potential mitigation measures, including adjustments to the height and location of pylons, changes to circuit patterns, and marking of obstacles on aeronautical charts.

3.1.27 In addition to the potential mitigation measures specific to each aerodrome the below general mitigations should be applied:

- The developer must inform the aerodrome operator of any proposed permanent or temporary obstacles. The aerodrome operator is then responsible for notifying the CAA via the online Airspace Coordination and Obstacle Management Service (ACOMS). All notifications should be made at least 8 weeks (40 working days) before commencement of the work. Further information and guidance can be found on the CAA's Event and Obstacle Notification webpage.
- During construction, cranes erected in the vicinity of an aerodrome are considered temporary obstacles. The CAA states that "The hirer of the crane (principal or other contractor) is responsible for notifying relevant aerodromes and the lighting of the crane. Crane suppliers should ensure that hirers are aware of this."
  - If the crane is in the vicinity of an aerodrome and 100m or higher above ground level, both the aerodrome and the CAA need to be notified
  - If the crane is in the vicinity of an aerodrome and 100m or higher above ground level and in situ for more than 90 days, the aerodrome, the CAA and the Defence Geographic Centre (DGC) need to be notified.
  - More information and guidance can be found on the CAA's Event and Obstacle Notification - Crane Notification webpage.
- The aerodrome operator should ensure that visiting pilots are made aware of the presence of obstacles when requesting prior permission to land.

4. Project Engagement and Consultation

Overview of engagement and consultation with aerodromes

4.1.1 Engagement with aerodromes commenced during non-statutory consultation in 2023 on the proposed emerging preferred corridor for the Project. A summary of engagement with all eight aerodromes is set out in Annex A . Engagement has continued throughout development of the Project, during a localised non-statutory consultation between South Wheatley and High Marnham in 2024 and statutory consultation in 2025. Feedback received on the emerging preferred corridor as presented in both the non-statutory consultation 2023 and localised non-statutory consultation 2024 was considered in developing a proposed alignment for statutory consultation in 2025. All feedback received in response to statutory consultation in 2025, together with the additional engagement with aerodromes and the findings of the aviation assessment was reviewed and considered as the proposals were further refined.

Localised non-statutory consultation feedback 2024

4.1.2 In 2024, National Grid, taking account of non-statutory consultation feedback and backcheck of the 2023 Corridor Preliminary Routing and Siting Study (CPRSS), considered a potential alternative corridor for a section of the project between South Wheatley and High Marnham. Feedback received during non-statutory consultation in 2023 suggested that the overhead line should be routed closer to existing overhead lines as this route would be closer to existing transmission infrastructure, would minimise potential safety and operational impacts for unlicenced aerodromes and would reduce impacts on heritage and ecological assets.

4.1.3 This identified alternative is referred to as the ‘eastern corridor’ and was subject to localised non-statutory consultation in 2024. The ‘eastern corridor’ is relevant to Grove Farm, Headon and Forwood Farm aerodromes and Darlton Gliding Club in that it would have moved the proposed overhead line a significant distance to the east of all four to the north and east of North Leverton, east of Rampton and west of Dunham-on Trent and Laneham to the proposed substation at High Marnham., meaning that potential safety and operational impacts on the aerodromes would be minimised.

4.1.4 Following a review of feedback received and further technical assessment of the ‘eastern corridor’ a decision was made for the route to be located within the original ‘western’ corridor’ as the review concluded that, when balancing the technical, environmental, socio-economic and cost considerations, the emerging preferred corridor as presented in 2023 would best meet National Grid’s duties and obligations and the ‘eastern corridor’ was not progressed further as reported in **Application Document 7.20 2025 - Design Development Report** which was prepared for statutory consultation. The aerodrome owners were informed of this decision at a meeting held in February 2025.

Statutory Consultation feedback 2025

4.1.5 The owners of four aerodromes located at the southern end of the Project submitted feedback to the Project's Statutory Consultation held between March and April 2025. Two separate submissions requested a change in alignment of the overhead line.

4.1.6 The first feedback response requested a change to the route between pylons 4AF229 and 4AF248 to move the overhead line eastwards towards the villages of Treswell and Woodbeck.

4.1.7 The Project reviewed and considered these suggested changes to the design. The first requested change would have required a greater re-alignment than requested from pylon 4AF226 to 4AF234 within the realignment because of the wider routeing implications but was not considered a suitable change due to constraints which would have moved an angle pylon closer to South Leverton resulting in a greater visual impact upon that settlement. The change would also have required an increase in pylon heights across the section of re-alignment, again resulting in greater landscape and visual impacts and increased the overhead line's prominence in views to the south from North Leverton Windmill. Furthermore, it would have required an additional interaction with West End Solar Farm.

4.1.8 The second feedback response requested a change to the route of the overhead line by presenting two proposed options. Option 1 would amend the alignment from 4AF221 to 4AF258 to move the overhead line into the previously considered 'eastern corridor' and Option 2 would change the route of the overhead line from 4AF225 to 4AF246 by routeing south then south- eastwards from pylon 4AF225 to the east of Woodbeck and the north and east of Stokeham, before routeing south to re-join the alignment east of East Drayton.

4.1.9 Both suggested options from the second request for re-alignment were not considered suitable as Option 1 would result in the villages of Ragnall, Laneham and Rampton and their historic buildings being surrounded or enclosed on two sides by overhead lines. For Option 2, the villages of Laneham and Rampton and their historic buildings would be surrounded on two sides by overhead lines and the proposed overhead line would be closer to the scheduled monument at Whimpton Moor. Option 1 and 2 would increase setting effects on North Leverton Windmill and increased the number of pylons that are in fluvial flood risk zones 2 and 3 and have a greater number of interactions with the One Earth Solar Farm.

4.1.10 As part of a meeting with aerodrome owners and operators at the southern end of the route which took place during Statutory Consultation, National Grid discussed with owners and operators the use of low height pylons to increase clearance distances between pylons and circuit patterns. The use of low height towers may require the introduction of additional pylons because the standard span length between pylons is shorter which would increase the number of obstacles present for pilots. In addition, the maximum angle of deviation for a low height pylon is 30°, as opposed to 55° and 90° available for the currently proposed pylon types. This would mean that to achieve the same angle of deviation several consecutive low height tension pylons would be required. This would have wider implications on the overall land take required for the project and therefore a greater impact upon landowners and would also have greater landscape and visual impacts due to the wider appearance of low height towers and the potential need for additional pylons.

Defence Assets

4.1.11 Consultation with the MOD Defence Infrastructure Organisation (DIO) confirmed that the proposed development area of the Project occupies the statutory safeguarding zones that surround the East 1 Wide Area Multilateration (WAM) Network which contributes to aviation safety by feeding into the air traffic management system in eastern England. The proposed development area is also within Military Low Flying Area's (LFA) 06 and 11.

4.1.12 National Grid has engaged with the MOD DIO by providing detailed project design information including updates to overhead line alignments and indicative tower heights which allowed for the MOD DIO to assess the potential impacts on the identified assets.

4.1.13 With respect of the interactions of the Project with the Clarborough to Belmont and the Clarborough to Waddington WAM Microwave Links, engagement with the MOD DIO and assessment by National Grid is on-going to understand the potential Project impacts on the military communications infrastructure which will be informed through the provision of detailed Project design information. To ensure the proposed overhead line does not physically affect the WAM networks the MOD DIO has requested requirements to be include within the draft Development Consent Order. The inclusion of such requirements within the DCO is subject to on-going assessment work by National Grid.

4.1.14 In relation to the impact of the Project on Military Low Flying Areas 06 and 11 the MOD DIO has requested that the Project provide information on the construction of new pylons and any removal or modifications to the siting of existing pylons so aviation chart data can be updated. In addition, the Project will provide MOD DIO with information about where crane deployments will occur to maintain the safety of military aircraft engaging in low flying training activities as requested by the MOD DIO who have requested that requirements be included within the draft Development Consent Order to secure this.

Meteorological Assets

4.1.15 National Grid identified that part of the proposed alignment of the Project south of Gainsborough was within the statutory safeguarding zone of the Ingham Meteorological Technical Site, a C-band weather radar station operated by the Met Office, part of the UK rain radar network.

4.1.16 National Grid has engaged with the Met Office by providing detailed project design information including indicative pylon heights which allowed for assessment of impacts on the identified meteorological asset.

4.1.17 The Met Office has confirmed that proposed pylons would be between 18-53 km from the weather radar at Ingham. The Met Office identified that whilst there is potential that the pylons would be detected by the radar, any impact on services such as weather forecasts and warnings derived from the radar data would be limited. The Met Office confirmed that they had no comments on the proposal and do not need to be consulted further.

5. Risk Assessments

5.1 Mount Airy

Aerodrome Characteristics and Operations



5.1.1 Mount Airy is an owner operated aerodrome located approximately 2 km to the east of the village of South Cave in East Yorkshire. Representatives from National Grid and WSP met with the aerodrome owner on 14 March 2025 as part of the statutory consultation process to discuss the Project, as well as to confirm any changes at the aerodrome since the meeting held with the aerodrome owner on 12 September 2023 following close of non-statutory consultation. National Grid and WSP met the aerodrome owner on 4 November 2025 and 16 September 2026 to provide an update on the project and to discuss potential mitigation methods. This section outlines the characteristics of the aerodrome and provides an overview of the operations.

5.1.2 Mount Airy is an unlicensed aerodrome with a single 732 m grass runway, and approximately 12–13 resident flyers who own 11 hangars (with plans to build a further six) to store a mixture of microlight and fixed wing aircraft. No pilot instructing takes place, and PPR is required for all non-resident flyers prior to landing. This is to allow the aerodrome operator to ensure a safety briefing is provided to anyone intending to land who is not familiar with the aerodrome and its associated operations and hazards.

5.1.3 The aerodrome is located on relatively high ground compared to the surrounding landscape and as such experience's high winds as well as occasional low visibility due to fog. It is located in uncontrolled airspace and has a few obstacles of note in the vicinity. These include the existing National Grid 400 kV 4ZQ overhead line that runs parallel to the runway approximately 800 m to the south, as well as a radio mast

tower which is located 1.25 km to the northeast of the aerodrome and on the final approach path to Runway 25, and departure path of Runway 07.

5.1.4 During a consultation meeting with the owner on 14 March 2025, it was confirmed that the aerodrome does not experience any issues with the existing obstacles. It should be noted that the radio mast tower is lit with a red beacon, but the existing overhead line pylons are not marked or lit.

5.1.5 Information on the circuit patterns was shared by the aerodrome owner. For noise abatement reasons circuits are flown predominantly to the south of the runway to avoid overflying South Cave village; however, during the meeting on 14 March 2025 and the subsequent meeting on 4 November 2025, the aerodrome owner confirmed that pilots do have the option of flying circuits to the north when landing on Runway 25 and can do so without overflying South Cave. Subsequently during a consultation meeting on the 16 September 2026 the aerodrome owner stated that northerly circuits could not be flown on a regular basis for the aforementioned noise abatement reasons. Fixed wing aircraft circuits are flown at 1,000 ft above the aerodrome with an overhead join stipulated at 1,500 ft. Microlight circuits are flown at 800 ft above the aerodrome. It should be noted that aircraft currently overfly the existing overhead cables to the south of the aerodrome, as well as the existing radio mast on the approach to Runway 25.

5.1.6 During the meeting on 4 November 2025 the aerodrome operator also confirmed that the aerodrome does not have its own radio frequency but both pilots and the aerodrome operator use the national safety com radio frequency to communicate with each other (both pilot to pilot, and pilot to operator) to inform one another of their position. There are also three to four aerodromes in close proximity to Mount Airy which pilots can use as diversion aerodromes if the weather conditions prevent pilots from landing at Mount Airy safely.

Potential Mitigation Measures Considered

5.1.7 Due to the presence of the existing overhead line and associated pylons, and that the current proposals are to ‘close parallel’ the existing line and the owner has not reported any problems with current operations, it was not considered necessary to consider lateral realignments of the overhead line.

5.1.8 Due to their penetration of the OLS and proximity to the circuit National Grid assessed the feasibility of reducing the height of pylons 4AF30 to 4AF36 as much as practically possible to match the overall height of the existing adjacent pylons, with priority given to 4AF32 to 4AF36 as these pylons presented a high risk due to their proximity to the circuit.

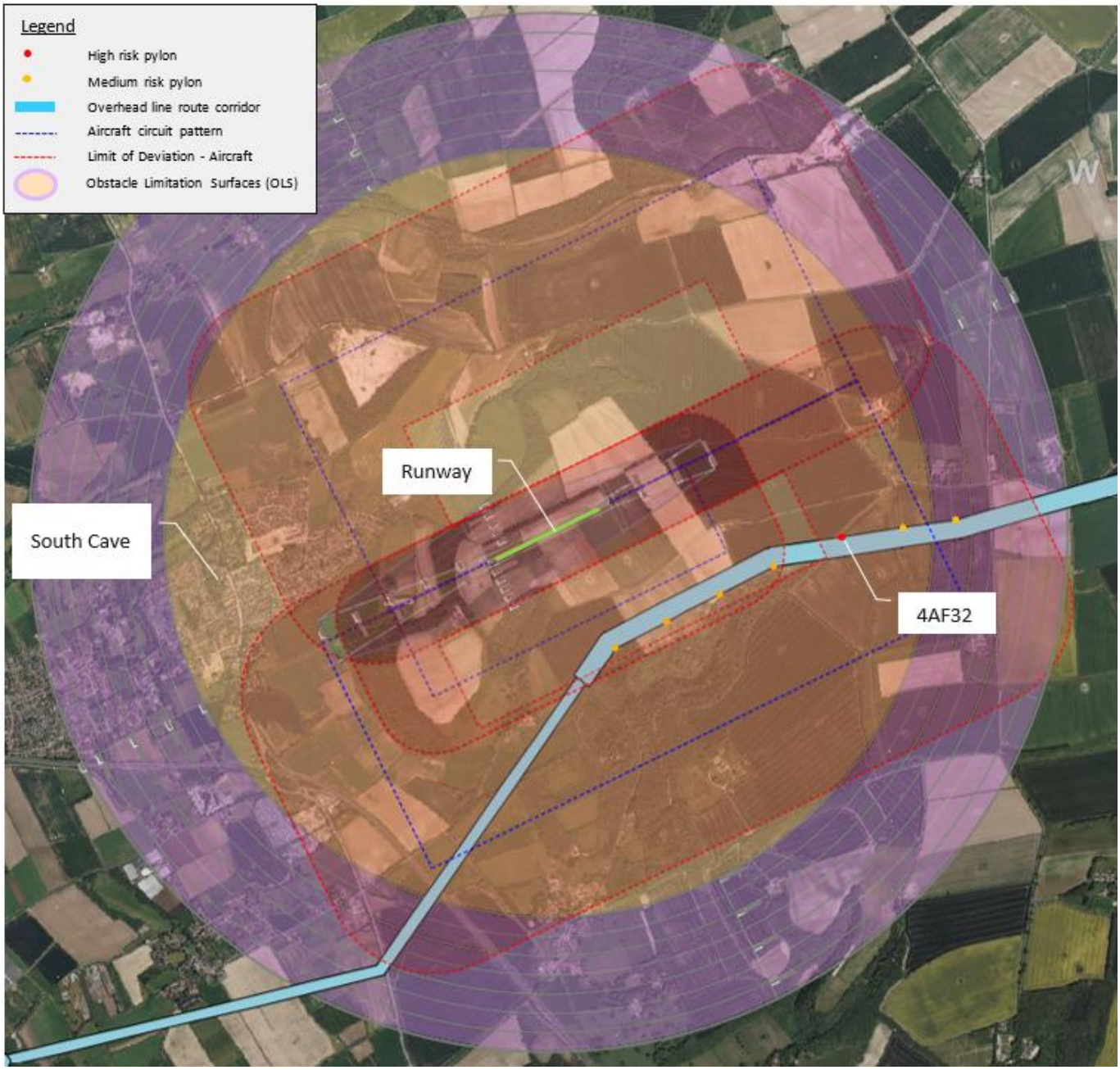
5.1.9 Refinement of the project design had led to a reduction in the heights of pylons 4AF31 to 4AF36. This reclassified the risk of pylons 4AF33 to 4AF36 from high to medium, leaving only pylon 4AF32 remaining as high risk. It should be noted however that this could be considered as a boundary case between high and medium risk, as the height difference between the two risk categories is only 8ft (2.4m) if the maximum vertical limit of deviation for this pylon is implemented. National Grid has assessed further reducing the height of pylon 4AF32 however this is not possible due to the need to maintain sufficient electrical clearance to allow for future installation of live line scaffold.

5.1.10 To reduce the residual risk from high to medium the aerodrome owner should modify the southerly fixed wing circuit pattern to extend the downwind leg to the northeast to

increase the distance to pylon 4AF32. For flights operating from Runway 25, an additional mitigation would be to fly circuits to the north. Given the predominant south westerly wind direction in the UK this will be the most actively used runway and in doing so would further reduce any risk associated with the overhead line. Despite the aerodrome owner conforming that pilots do sometimes fly a northerly circuit they would not be able to implement it as a standard procedure due to noise abatement impact on the village of South Cave.

5.1.11 The full set of risk assessment results for Mount Airy can be found in Annex B with a summary shown in Image 5.1. The assessment shows the residual risks with the National Grid mitigations implemented.

Image 5.1 – Mount Airy Risk Assessment Results



5.2 West Burton

Aerodrome Characteristics and Operations



5.2.1 West Burton is an owner operated aerodrome located approximately 1.5 km to the east of South Wheatley in Nottinghamshire. Representatives from National Grid and WSP met with the aerodrome owner on 18 February 2025 as part of the statutory consultation process to discuss the Project, as well as to confirm any changes at the aerodrome since the meeting held during non-statutory consultation with the operators of a number of aerodromes including West Burton on 18 July 2023. This section outlines the characteristics of the aerodrome and provides an overview of the operations.

5.2.2 West Burton is an unlicensed aerodrome with a single 350 m grass runway, and a single resident flyer who owns a microlight and an associated temporary hangar. No instructing takes place, and there are no plans to expand.

5.2.3 The aerodrome is located in uncontrolled airspace and has significant obstacles in its vicinity. These are the West Burton power station towers which are approximately 800 m to the east of the aerodrome and extend up to 210 m Above Ordnance Datum (AoD) (198 m above the aerodrome).

5.2.4 Circuits are flown predominantly to the west to avoid conflict with the power station, and in the absence of any information on circuit height it is assumed these would be flown at the standard 1,000 ft above the aerodrome.

5.2.5 National Grid understand that the land upon which the aerodrome is located has been recently sold. National Grid is not yet aware of whether the airfield will continue to operate under the new owner so it has continued to be included within this assessment until such time that future use of the land is clarified.

Potential Mitigation Measures Considered

5.2.6 Since the overhead line and associated pylons cross the runway, with one of the pylons located on the runaway itself, pylons 4AF205 to 4AF207 pose an unacceptably high risk, and as such flight operations would need to cease.

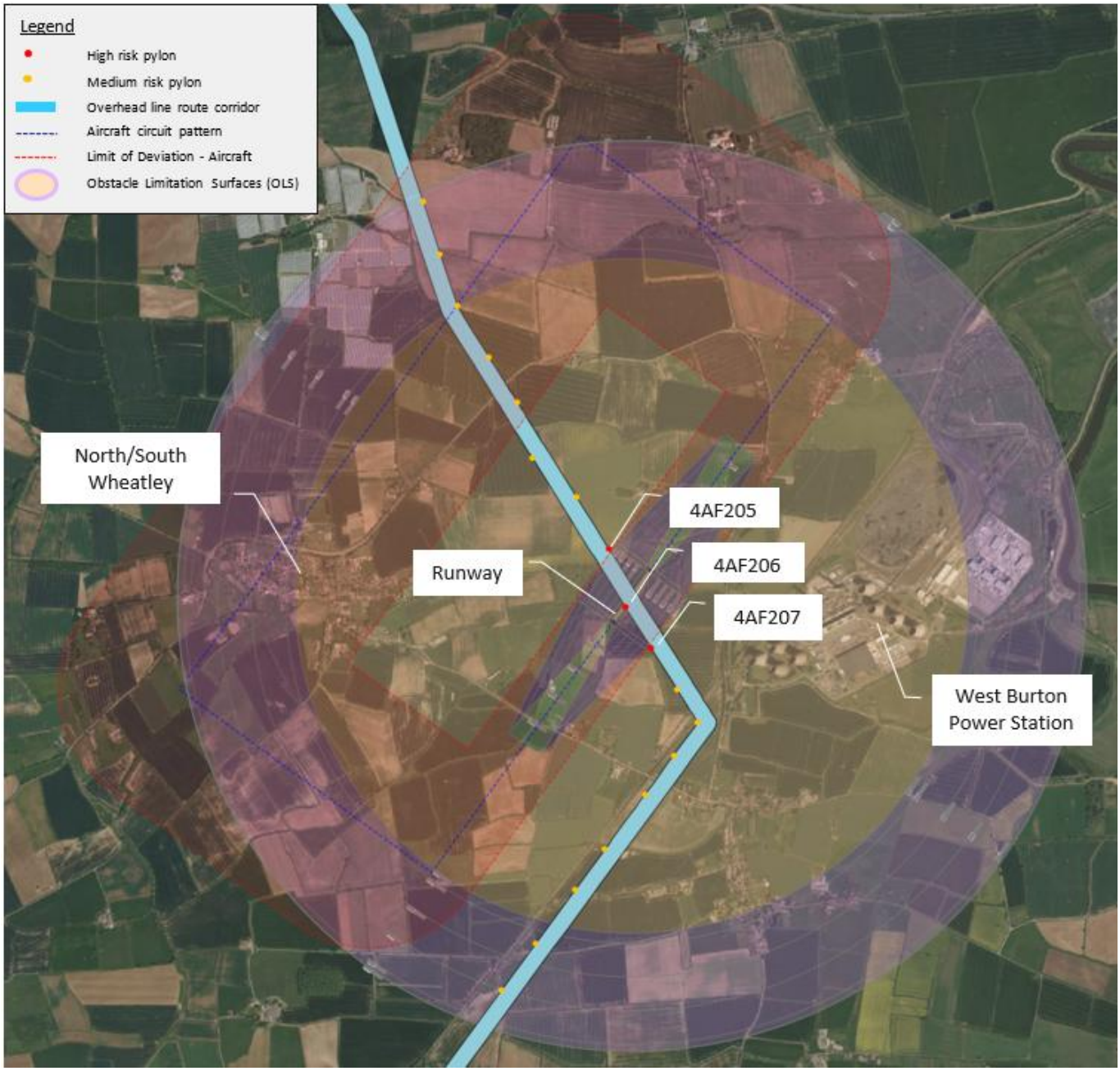
5.2.7 National Grid assessed the feasibility of relocating pylons 4AF205 to 4AF207 to achieve a minimum 500 ft clearance to the circuit. This would require a significant re-alignment to the west or the northeast.

5.2.8 As described in **Application Document 7.20 2025 - Design Development Report** at Statutory Consultation in 2025, the alignment of the Project in this section of the route close to South Wheatley and West Burton had already been moved eastwards outside of the graduated swathe presented at non-statutory consultation in 2023 in order to avoid interactions with the consented Wood Lane Solar Farm, an existing 132 kV overhead line section and to allow a more preferable crossing of the Sheffield to Lincoln railway line. The revised alignment also located the overhead line further away from South Wheatley which minimises the effects on the Remains of the Church of St Helens, a Grade I listed building. An alignment on land to the north-east of the current alignment would introduce interactions with West Burton Power Station, the proposed Steeple Renewable Solar Farm and a number of third-party utilities. A re-alignment of the overhead line to the west would route the overhead line within the graduated swathe which had already been discounted for the reasons stated above.

5.2.9 The re-alignment of the overhead line to achieve a minimum 500 ft clearance to the circuit was not considered to be possible and as a result, it is considered that safe operations for powered aircraft cannot continue at the aerodrome. The owner of the aerodrome was informed of this outcome in the meeting held on 18 February 2025.

5.2.10 The full set of risk assessment results for West Burton can be found in Annex B with a summary shown in Image 5.2.

Image 5.2 – West Burton Risk Assessment Results



5.3 Forwood Farm

Aerodrome Characteristics and Operations



5.3.1 Forwood Farm is an owner operated aerodrome located approximately 2 km to the west of Treswell village in Nottinghamshire. Representatives from National Grid and WSP met with the aerodrome owner on 27 February 2025 as part of the statutory consultation process to discuss the Project as well as to confirm any changes at the aerodrome since the non-statutory consultation meeting on 18 July 2023. Further meetings were held on 23 September 2025 and 7 October 2026 to provide an update on the Project and to discuss potential mitigation methods. This section outlines the characteristics of the aerodrome and provides an overview of the operations.

5.3.2 Forwood Farm is an unlicensed aerodrome with a single 550 m grass runway orientated 02/20. It has 16 aircraft permanently based at the site, including a Wilga, three Tiger Moths, two Sports Cruisers, a Eurostar, Rallye and a Kit Fox. There are two flying instructors based at the aerodrome teaching the National Private Pilot Licence (NPPL) syllabus. The aerodrome operates during daylight hours only and PPR is required for all non-resident flyers prior to landing. This is to allow the aerodrome operator to ensure a safety briefing is provided to anyone intending to land who is not familiar with the aerodrome and its associated operations and hazards.

5.3.3 The circuit pattens for landing in both directions were provided by the aerodrome owner. The aerodrome owner also confirmed that the majority of circuit patterns are flown to the east of the runway. This practice is primarily influenced by two factors: the prevailing wind direction, which favours easterly circuits for optimal take-off and landing performance, and the presence of woodland to the west.

5.3.4 When approaching the circuit from the north, and therefore landing on Runway 02, a shorter and lower base leg is flown to maintain adequate lateral and vertical separation from the established circuit patterns of the microlight operations at Headon aerodrome, operated by Microflight Aviation.

5.3.5 When approaching the circuit from the south and therefore landing on Runway 20 a standard 1,000 ft circuit is flown.

5.3.6 It has not been confirmed by the aerodrome owner, but it is assumed that low-level circuits are flown occasionally for training purposes due to the presence of NPPL instructing at the site.

Potential Mitigation Measures Considered

5.3.7 Due to the proximity of the proposed overhead line, it was concluded via assessment that pylons 4AF223 to 4AF238 posed a high risk to operations at the aerodrome.

5.3.8 Assessment of a wider re-alignment of the Project in this area received as feedback during Statutory Consultation which is relevant to Forwood Farm is set out in paragraphs 4.1.5 to 4.1.9 and includes the pylons which are assessed as posing a high risk to operations at the aerodrome. Relevant to the assessment of impacts is the feasibility of realigning the OHL, and in particular, pylons 4AF223 to 4AF238 to the east of Treswell village and Rampton Hospital to achieve a minimum 500 ft clearance to the circuit.

5.3.9 This amendment was not considered to be suitable due to the need to re-position angle pylon 4AF224 in closer proximity to the village of South Leverton resulting in a greater visual impact upon that settlement. The change would also have required an increase in pylon heights across the section of re-alignment, again resulting in greater landscape and visual impacts and increased the overhead line's prominence in views to the south from North Leverton Windmill.

5.3.10 National Grid and WSP met with the aerodrome owner on the 23 September 2025 and discussed the potential for routing alterations to modify the circuit pattern to be flown to the west instead of to the east.

5.3.11 Forwood Farm aerodrome raised concerns about overflying the woodland area to the west of the runway by trainee pilots and potential for aerodynamic turbulence. This can be mitigated by flying a slightly wider circuit to the west to avoid overflying the woodland area. Standard circuit patterns for light aircraft vary between 0.5 nautical miles (NM) and 1 NM from the runway centreline and so it is considered reasonable to fly a circuit which avoids overflying the woodland.

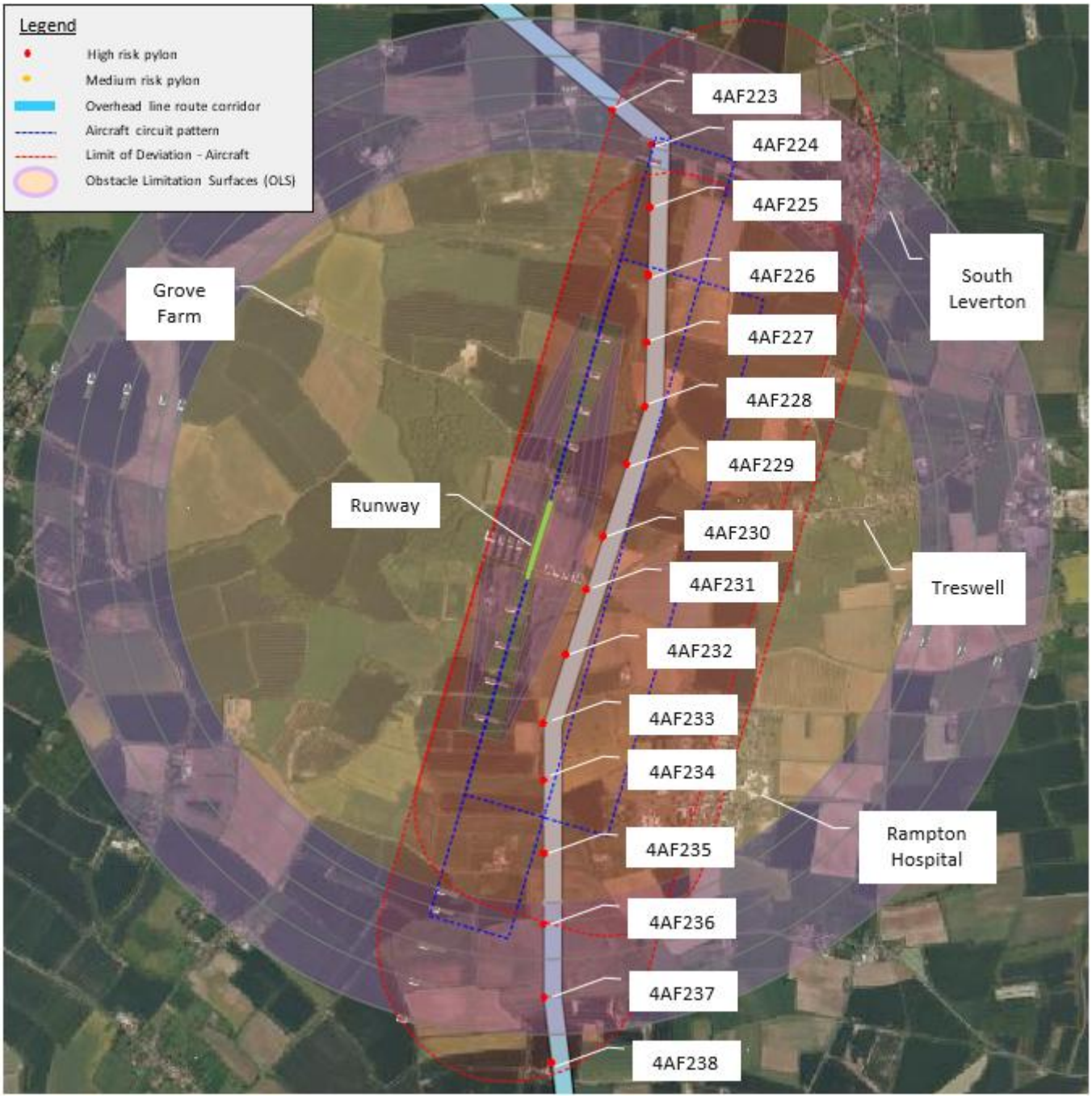
5.3.12 The aerodrome also raised concerns about a westerly circuit introducing conflict with aircraft operating at the nearby Grove Farm aerodrome. It should be noted, however, that with the current alignment of the overhead line the recommendation is to cease operations at Grove Farm, therefore removing this conflict. If there remains a situation where Grove Farm continues operating then it should be noted that the current circuit patterns at both aerodromes are already in conflict with each other, and given the low number of aircraft movements at Grove Farm, it is considered reasonable that the two aerodromes should be able to continue to coordinate operations with each other, as they currently do so, subject to both aerodromes agreement on how they will manage this risk. This was discussed with the Forwood Farm owner and operator on 23 September 2025. They confirmed that they already coordinate operations with Grove Farm and operate on a single VHF radio frequency. The full set of risk assessment results for Forwood Farm can be found in Annex B with a summary shown in Image 5.3.

5.3.13 Whilst it is not considered that the concerns raised by the aerodrome in respect of a westerly circuit are valid as a wider westerly circuit could be flown to avoid overflying the woodland and coordination of movements with Grove Farm aerodrome are already undertaken, further detailed assessment of a standard westerly circuit has concluded that this alternative circuit cannot provide the required 500 ft clearance to the proposed overhead line and therefore does not offer a viable potential mitigation.

5.3.14 The overall conclusions of the assessment are therefore that pylons 4AF223 to 4AF238 pose a high risk to operations at the aerodrome for the current circuit pattern flown to the east. No operational mitigations are considered to be achievable to provide 500 ft clearance from the overhead line and it is considered that safe operations cannot continue at the aerodrome.

5.3.15 Ongoing discussions are being undertaken with the aerodrome to understand whether any further operational mitigations could be applied.

Image 5.3 – Forwood Farm Risk Assessment Results



5.4 Grove Farm

Aerodrome Characteristics and Operations



5.4.1 Grove Farm is an owner operated aerodrome located approximately 3 km to the northwest of Treswell village in Nottinghamshire. Representatives from National Grid and WSP met with the aerodrome owner on 27 February 2025 as part of the statutory consultation process and 23 September 2025 to discuss the Project as well as to confirm any changes at the aerodrome since the non-statutory consultation meeting on 18 July 2023. This section outlines the characteristics of the aerodrome and provides an overview of the operations.

5.4.2 Grove Farm is an unlicensed aerodrome with a single 443 m grass runway orientated 11/29. It has a single aircraft based on site and occasionally host fly-ins of up to 18 aircraft including RV6s, Robin and Cessna 120 aircraft.

5.4.3 The aerodrome operates during daylight hours and PPR is required for all non-resident flyers prior to landing. This is to allow the aerodrome operator to ensure a safety briefing is provided to anyone intending to land who is not familiar with the aerodrome and its associated operations and hazards. Movement numbers at the aerodrome appear to be low and no flight training takes place. This means that in general the pilots operating from Grove Farm will have a reasonable level of experience and will not be flying continuous circuits in the same way that pilots undergoing training would do so.

5.4.4 It is located in uncontrolled airspace and circuits are flown to the north of the runway at 1,000 ft in order to minimise conflict with aircraft operating at Forwood Farm aerodrome, which is located 1.5 km to the southeast, as well as avoiding overflying the woodland to the southeast of the aerodrome.

5.4.5 Circuit pattens for landing in both directions were provided by the aerodrome owner.

Potential Mitigation Measures Considered

5.4.6 Due to the proximity of the proposed overhead line, it was concluded via assessment that pylons 4AF223 to 4AF229 posed a high risk to operations at the aerodrome.

5.4.7 National Grid assessed the feasibility of either reducing the height or relocating pylons 4AF223 to 4AF229 to provide the required 500 ft clearance to the circuit. This would require a realignment to the east of North and South Leverton and Treswell villages.

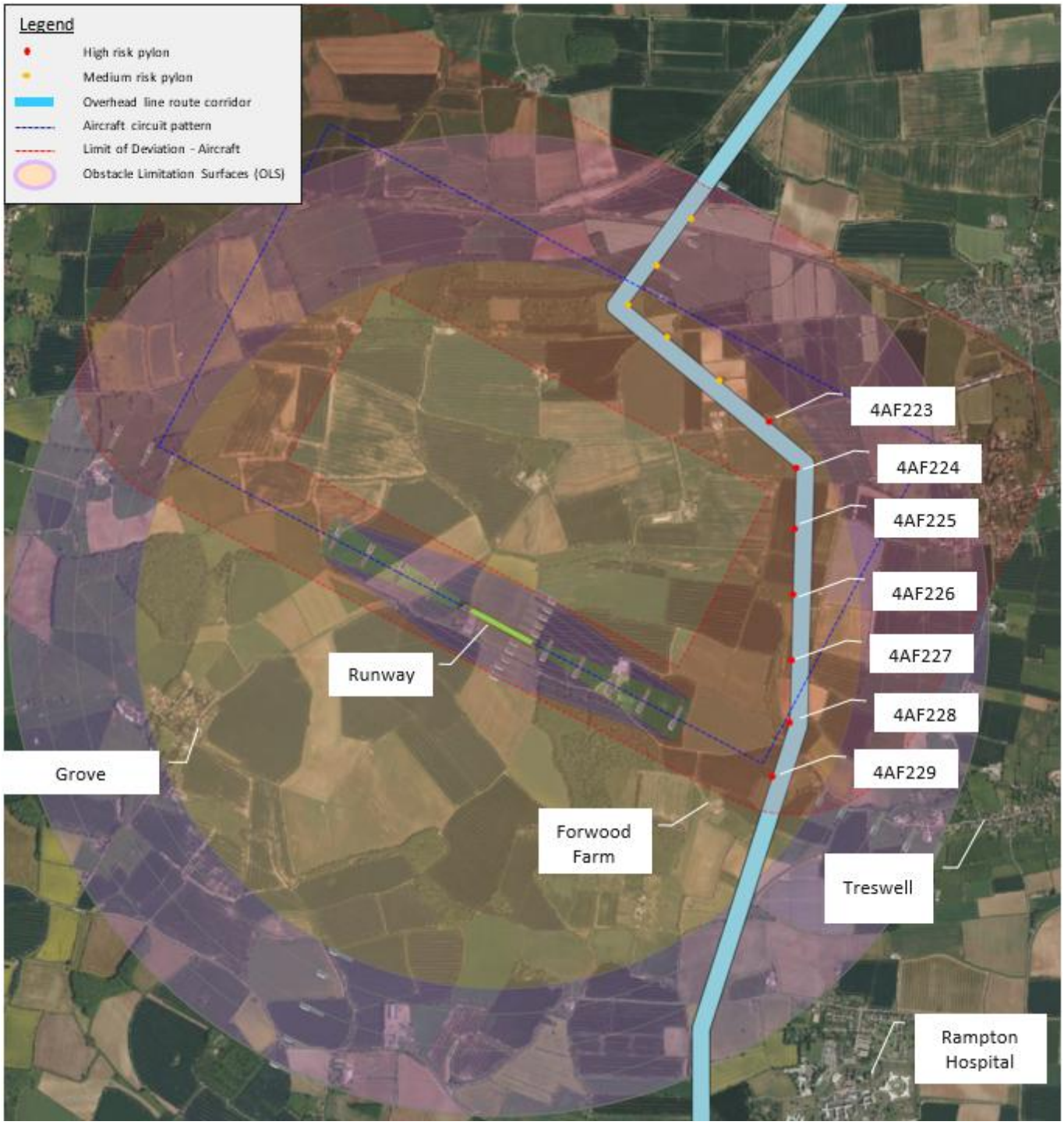
5.4.8 National Grid assessed alternative heights and routeing to achieve the required 500ft clearance but concluded that these were not feasible. As the design of the Project has evolved the indicative heights of individual pylons have been reduced in the section of the overhead line however these reductions have not been sufficient to change the outcome of the assessment. The assessment of alternative routing is set out in paragraphs 4.1.5 to 4.1.9. Due to the location of the proposed pylons, it is also not possible to safely modify the flight circuit to mitigate the risk. The use of low height pylons is considered in paragraph 4.1.10.

5.4.9 A potential mitigation to re-orientate the runway to a north–south direction was discussed with the aerodrome owner on 23 September 2025. Following a site walkover with the owner, however, it was agreed that this was not possible due to the topography of the surrounding land.

5.4.10 As a result, it is considered that safe operations cannot continue at the aerodrome.

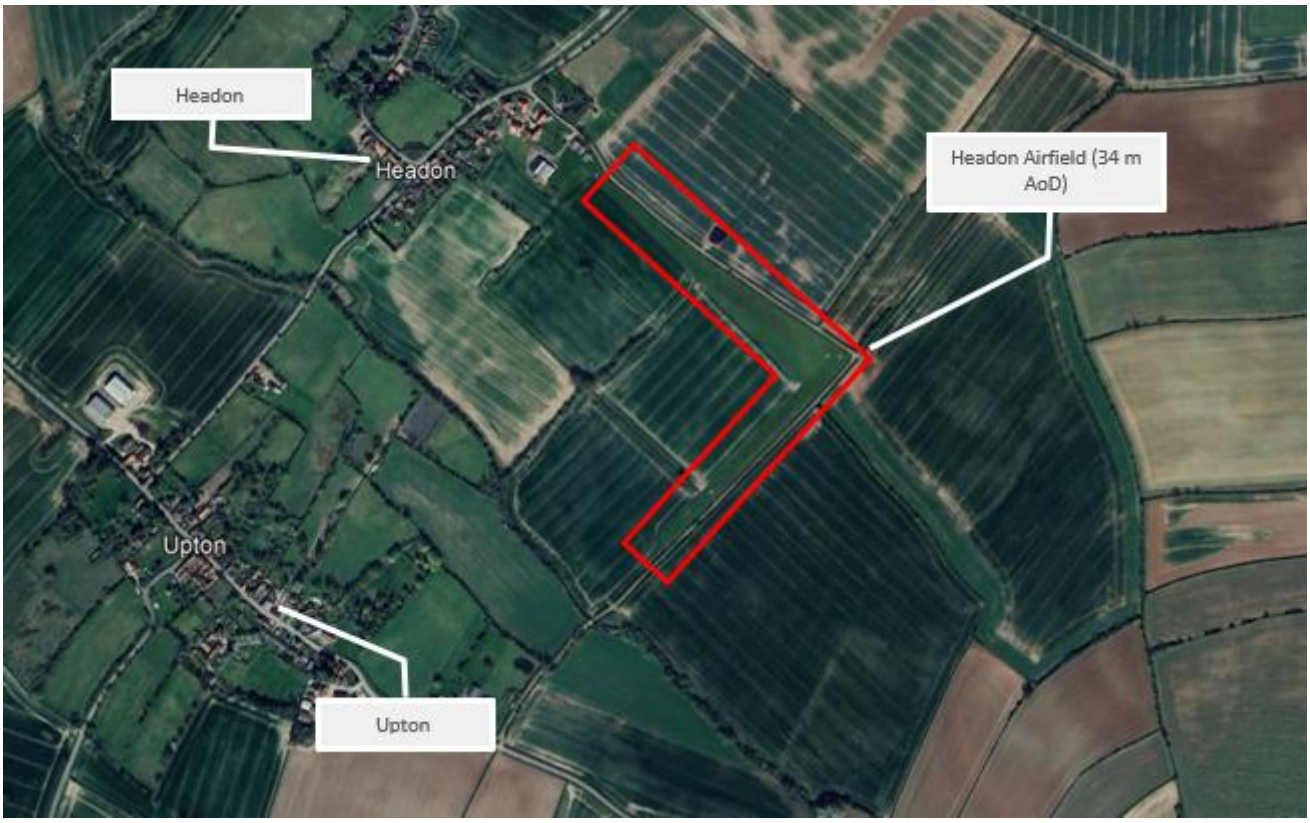
5.4.11 The full set of risk assessment results for Grove Farm can be found in Annex B with a summary shown in Image 5.4.

Image 5.4 – Grove Farm Risk Assessment Results



5.5 Headon Airfield

Aerodrome Characteristics and Operations



5.5.1 Headon Airfield is an owner operated aerodrome located in the village of Headon in Nottinghamshire. Representatives from National Grid and WSP met with the aerodrome owner on 27 February 2025 as part of the statutory consultation process and 24 September 2025 and 15 September 2026 to discuss the Project as well as to confirm any changes at the aerodrome since the non-statutory consultation meeting held on 18 July 2023. This section outlines the characteristics of the aerodrome and provides an overview of the operations.

5.5.2 Headon Airfield is an unlicensed aerodrome with two grass runways at right angles to each other, one orientated 05/23 with a length of 385 m, and a second orientated 14/32 with a length of 485 m. It is a relatively active aerodrome with 300 to 400 movements per year, and around 25 aircraft based at the site, with a new hangar currently under construction. Aircraft range from flexi and fixed wing microlights to single engine piston fixed wing, with most operations being microlights due to the presence of the Microlight Aviation School. It occasionally has gyrocopters and paramotors operating from the site and hosts an annual fly-in with around 30–40 aircraft visiting in a single day.

5.5.3 The aerodrome operates during daylight hours and PPR is required for all non-resident flyers prior to landing. This is to allow the aerodrome operator to ensure a safety briefing is provided to anyone intending to land who is not familiar with the aerodrome and its associated operations and hazards.

5.5.4 It is in uncontrolled airspace and circuits are flown to the northeast for Runway 14/32 and to the east for Runway 05/23, both at 800 ft. This is to avoid overflying the local villages of Upton and Headon for noise abatement reasons, as well as to avoid conflict with aircraft operating from Retford/Gamston aerodrome to the west. It should be noted that Runway 14 is only used for taking off to avoid aircraft overflying the houses on the approach to the runway.

5.5.5 Circuit patterns for the aerodrome were taken from the aerodrome's website and confirmed by the aerodrome operator on 27 February 2025 and via email on 27 May 2025.

5.5.6 Circuits are flown at 800 ft Above Aerodrome Level (aal) (284 m AoD); however, the aerodrome occasionally undertakes training flights which require trainee pilots to fly a low-level circuit at 500 ft. During the consultation meeting on the 15 September 2026 the aerodrome owner operator confirmed that low-level circuit training did not need to be flown at the aerodrome and could be undertaken elsewhere.

Potential Mitigation Measures Considered

5.5.7 Due to the proximity of the proposed overhead line, it was concluded via assessment that pylons 4AF235 to 4AF238 posed a high risk to operations at the aerodrome.

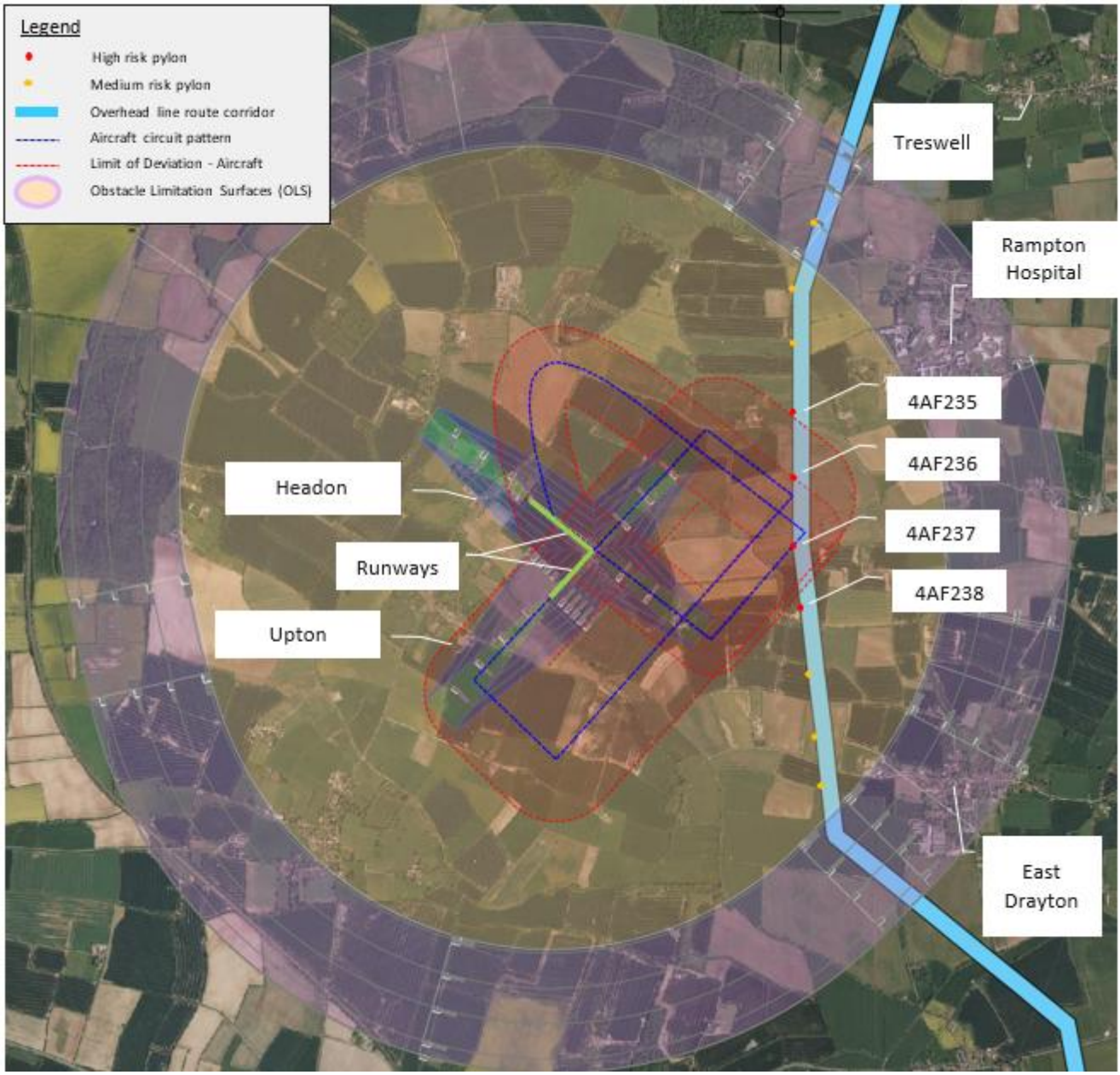
5.5.8 It was therefore recommended that National Grid assess the feasibility of either reducing the height or relocating pylons 4AF235 to 4AF238 to provide the required 500 ft clearance to the circuit.

5.5.9 National Grid assessed alternative heights and routeing to achieve sufficient clearance but concluded that these were not feasible. As the design of the Project has evolved the indicative heights of individual pylons have been reduced in this section of the overhead line however these reductions have not been sufficient to change the outcome of the assessment. The assessment of alternative routing is set out in paragraphs 4.1.5 to 4.1.9. The use of low height pylons is considered in paragraph 4.1.10.

5.5.10 National Grid and WSP subsequently met with the aerodrome owner on the 24 September 2025 and the 15 September 2026 and discussed and agreed alternative operational mitigations. These included ceasing low-level circuit training at the aerodrome and increasing the height of the circuit to 1,000 ft. These mitigations would increase the separation between aircraft in flight and the proposed OHL to an extent sufficient to reduce the risk from High to Medium. An alternative mitigation was discussed which involved relocating the circuit patterns to the west of the aerodrome; however, it was confirmed by the aerodrome owner that this wasn't possible due to noise abatement restrictions with the local villages, as well as proximity to aircraft operating at Retford/Gamston aerodrome.

5.5.11 The full set of risk assessment results for Headon Aerodrome can be found in Annex B with a summary shown in Image 5.5.

Image 5.5 – Headon Aerodrome Risk Assessment Results



5.6 Darlton Gliding Club

Aerodrome Characteristics and Operations



5.6.1 Darlton Gliding Club is located approximately 1 km to the southwest of Darlton village in Nottinghamshire. Representatives from National Grid and WSP met with the aerodrome operator on 27 February 2025 as part of the statutory consultation process to discuss the Project as well as to confirm any changes at the aerodrome since the non-statutory consultation meeting on 18 July 2023. A meeting was also held on 23 September 2025 and 15 September 2026 to discuss project updates and potential mitigation options. This section outlines the characteristics of the aerodrome and provides an overview of the operations.

5.6.2 Darlton is an unlicensed aerodrome with a single grass runway, orientated 05/23 with a length of 1,174 m. It is a relatively active aerodrome with around 3,000 glider launches per year. These are predominantly winch launches but occasionally they do have visiting tugs (powered aircraft) which provide aerotow launches. Motor gliders and single engine piston fixed wing aircraft also visit occasionally. In October 2025 the Trent Valley Gliding Club (TVGC) and Darlton Gliding Club merged, with the former moving 34 members and aircraft over to the Darlton Gliding Club site. This included two aerotow tugs (Eurofox aircraft) and a powered glider. One of the tugs is owned by a syndicate of member pilots, and the other is owned by TVGC. The motor glider is owned by TVGC.

5.6.3 The aerodrome operates during daylight hours and PPR is required for all non-resident flyers prior to landing. This is to allow the aerodrome operator to ensure a safety briefing is provided to anyone intending to land who is not familiar with the aerodrome and its associated operations and hazards.

5.6.4 It is located in uncontrolled airspace and during the consultation meeting on 27 February 2025 the aerodrome operator confirmed that circuits are flown on both sides of the runway at 800 ft. Powered aircraft circuit pattens for landing on Runway 23 were

provided by the aerodrome owner. It was also confirmed that powered aircraft should avoid overflying Darlton village where possible for noise abatement reasons.

5.6.5 Circuits for gliders are typically smaller than those for powered aircraft due to the need for a glider to remain within safe gliding distance of the runway. The aerodrome owner confirmed during the consultation meeting on 27 February 2025 that they did not expect there to be any conflict with gliders in the circuit, with the main concern being powered aircraft landing on Runway 23 and taking off on Runway 05 whilst conducting an aerotow.

5.6.6 The aerodrome operator confirmed during the above consultation meeting that on the 26 July 2023 a powered aircraft acting as an aerotow tug for gliders crashed approximately 1 mile to the northeast of the aerodrome. There was no evidence of a technical malfunction or interference with obstacles. On consideration of all the evidence available, including the pilot's previous medical history, the Air Accidents Investigation Branch (AAIB) investigation determined that the pilot may have experienced a partial or full medical incapacitation which rendered them incapable of controlling the aircraft. More details of this accident can be found in AAIB Bulletin AAIB-29426 dated 21 November 2024.

5.6.7 It should be noted that since the merger with TVGC, Darlton Gliding Club now has two aerotow tugs and a motor glider. An aerotow is where a powered aircraft tows a glider into the air using a 50–100 ft length of cable. The aircraft tows the glider to a height of around 2,000 ft before the glider disconnects the cable and continues its flight. The powered aircraft then turns back to land at the aerodrome, either landing with the cable trailing behind it or retracted using an electric winch. The gliding club have confirmed that the current aerotow aircraft they operate do not have a winch and therefore land with the cable trailing behind the aircraft. An example of an aerotow procedure can be seen in Image 5.6.

5.6.8 When a powered aircraft is towing a glider into the air the climb performance of the two aircraft is degraded, meaning that the aircraft and glider combination cannot climb as quickly as the same aircraft when not towing a glider into the air. Climb rate during an aerotow is typically around 500 ft per minute with a ground speed of around 50–55 knots.

Image 5.6 – Example of an aerotow launch



Potential Mitigation Measures Considered

5.6.9 Due to the proximity of the proposed overhead line, it was concluded via assessment that pylons 4AF243 to 4AF248 posed a high risk to operations at the aerodrome for powered aircraft when taking off on Runway 05 or landing on Runway 23.

5.6.10 It was therefore recommended that National Grid assess the feasibility of either reducing the height or relocating pylons 4AF243 to 4AF248 to provide the required 500 ft clearance to the circuit.

5.6.11 National Grid assessed alternative heights and routeing to achieve sufficient clearance but concluded that these were not feasible. As the design of the Project has evolved the indicative heights of individual pylons have been reduced in the section of the overhead line however these reductions have not been sufficient to change the outcome of the assessment. The assessment of alternative routing is set out in paragraphs 4.1.5 to 4.1.9. The use of low height pylons is considered in paragraph 4.1.10. As a result, it is considered that safe operations for powered aircraft, including aerotow launches, cannot continue at the aerodrome under their current operational procedures.

5.6.12 The location of the proposed pylons is such that safe modifications to the circuit are considered to be possible for powered aircraft when operating on Runway 23, which due to the prevailing south westerly wind would be the most frequently used runway. National Grid met with the aerodrome owner/operator on the 23 September 2025 and 15 September 2026, as well as exchanging emails in November 2025 where a proposed modification to the circuit was discussed, and considered possible, pending further discussion between the aerodrome operator and the tug pilots. This modification would allow powered aircraft to operate from Runway 23 by flying a

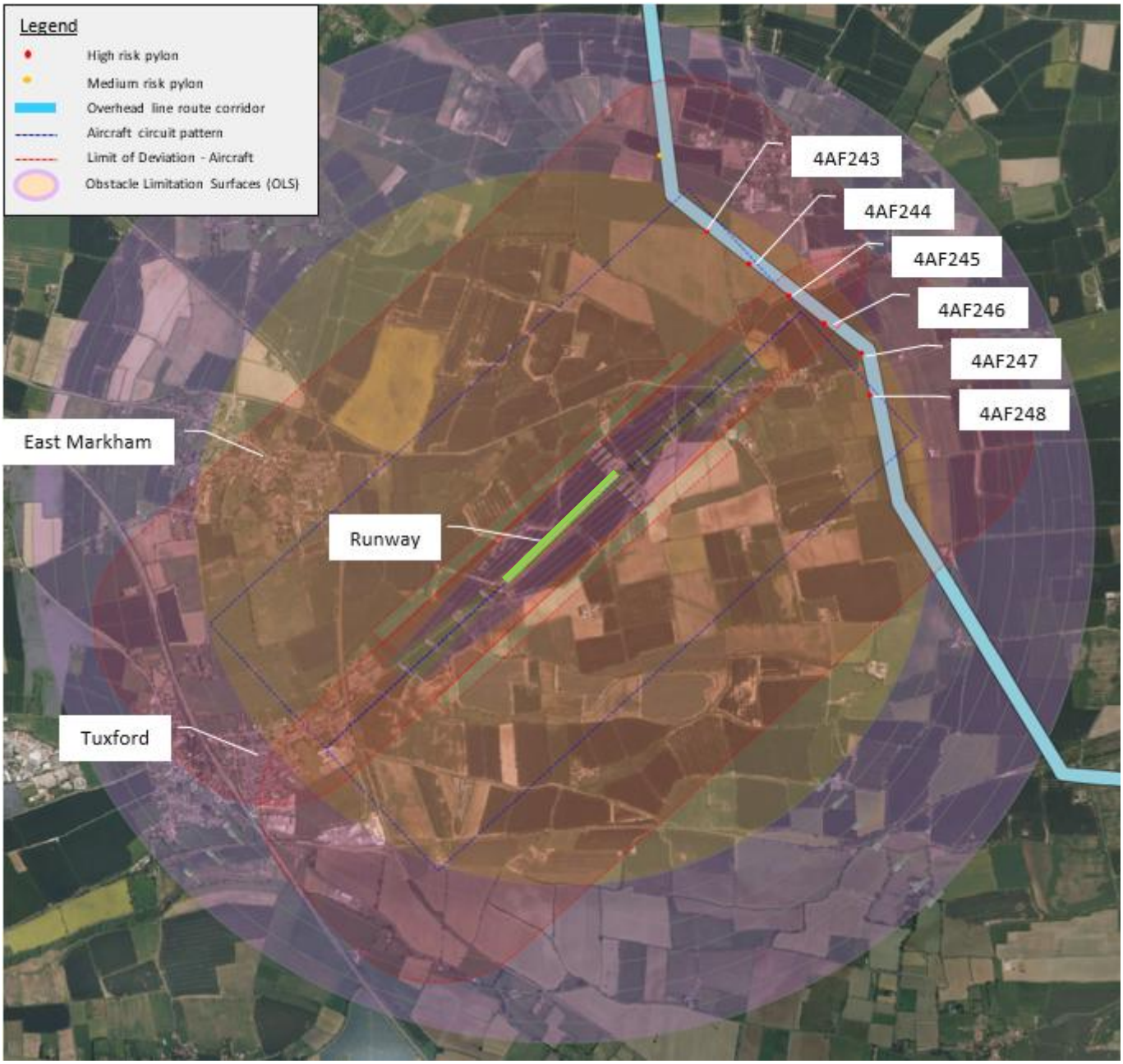
northerly circuit (i.e. a right-hand circuit). The circuit would consist of an abbreviated downwind leg and final approach to enable sufficient clearance to the OHL and pylons. Powered aircraft operations from Runway 05 would still not be possible, and there are no operational mitigations that could be implemented to allow this.

5.6.13 Regardless of the above, gliders could continue operate from both runway directions with no modification to their circuit patterns using winch launches instead of aerotow launches.

5.6.14 During a consultation meeting on the 15 September 2026 the aerodrome operator confirmed that the proposed overhead line would not prevent competitions from being held at Darlton Gliding Club; however, some restrictions on routes may need to be applied to prevent final glides from passing over the overhead line.

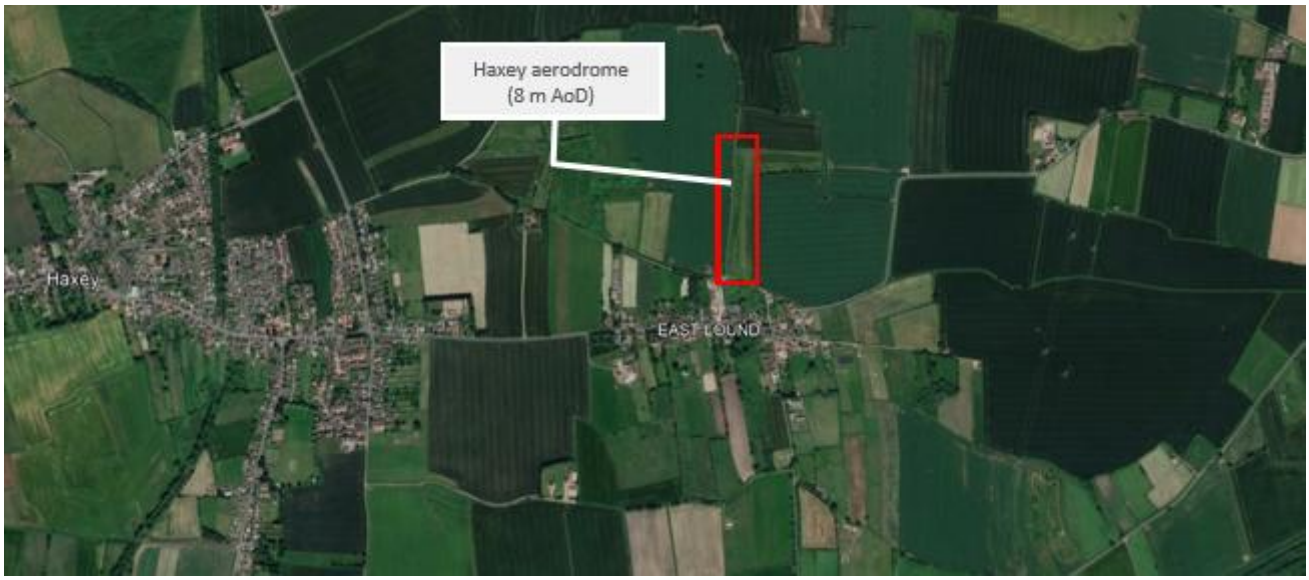
5.6.15 The full set of risk assessment results for Darlton Gliding Club can be found in Annex B with a summary shown in Image 5.7.

Image 5.7 – Darlton Gliding Club Risk Assessment Results (Powered Aircraft Circuits)



5.7 Haxey

Aerodrome Characteristics and Operations



5.7.1 Haxey aerodrome is located approximately 1 km to the east of Haxey village in North Lincolnshire. Representatives from National Grid undertook a telephone conversation with the aerodrome owner on 14 August 2023 as part of the non-statutory consultation process to discuss the Project as well as the operations and characteristics of the aerodrome. National Grid subsequently followed up with the aerodrome operator at the start of the statutory consultation process and received a response on 25 February 2025 stating that the owner had looked at the proposed routing of the OHL and confirmed that it would not obstruct any operations at Haxey aerodrome. The owner also stated that the aerodrome was not currently in use but had an intention to restart operations at some point in the future. In June 2026 the owner of the aerodrome re-affirmed their position that the position of the overhead line would not affect operations at the aerodrome. Following a telephone conversation between National Grid and the aerodrome owner on 10 September 2026 where they raised concerns about the proximity of pylons 4AF158 to 4AF160 to aircraft in the circuit pattern, a meeting was held on 16 September 2026 to discuss the Project.

5.7.2 Haxey is an unlicensed aerodrome with a single grass runway, orientated 01/19 with a length of 300 m. After a period of not being in use the owner has recently purchased an aircraft and begun flying again. It is the only aircraft that operates at the site. During the 2023 consultation the owner confirmed that existing powerlines run to the east of the aerodrome and there are no concerns/objections providing the new line goes to the east of Haxey aerodrome. They also provided information related to the circuit patterns at the aerodrome and confirmed that aircraft take off and land on Runway 01 only.

5.7.3 The aerodrome operates during daylight hours and PPR is required for all non-resident flyers prior to landing. This is to allow the aerodrome operator to ensure a safety briefing is provided to anyone intending to land who is not familiar with the aerodrome and its associated operations and hazards. Movement numbers are very low, and no flight training takes place. This means that in general the pilot operating

from Haxey should have a reasonable level of experience and will not be flying continuous circuits in the same way that pilots undergoing training would do.

Potential Mitigation Measures Considered

5.7.4 Due to the proximity of the proposed overhead line, it was concluded via assessment that pylons 4AF158 to 4AF160 posed a high risk to operations at the aerodrome.

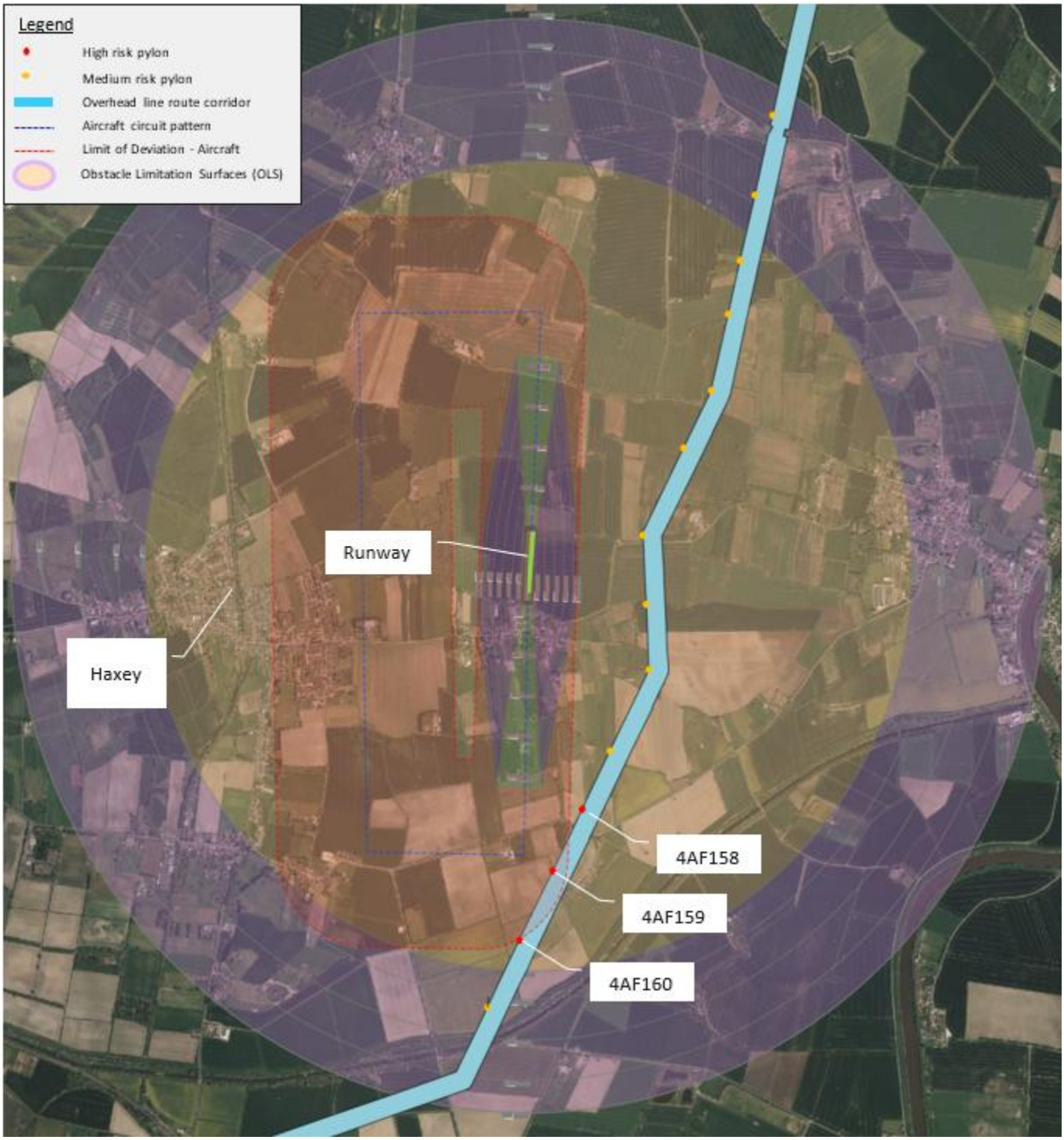
5.7.5 It was therefore recommended that National Grid assess the feasibility of either reducing the height or relocating pylons 4AF158 to 4AF160 to the east to provide the required 500 ft clearance to the circuit.

5.7.6 National Grid assessed alternative heights and routeing to achieve this but concluded that these were not feasible. As the design of the Project has evolved the indicative heights of individual pylons have been reduced in the section of the overhead line however these reductions have not been sufficient to change the outcome of the assessment. In regard to an alternate overhead line route to the east, due to the presence of isolated properties to the east of the current alignment and the presence of the existing 4TM and ZDA overhead lines this was not considered achievable. The use of low height pylons is considered in paragraph 4.1.10.

5.7.7 The location of the proposed pylons is such that safe modifications to the circuit are considered to be possible. National Grid met with the aerodrome owner/operator on the 16 September 2026 where a proposed modification to the circuit was discussed and considered possible. This modification would consist of an abbreviated downwind leg and final approach to enable sufficient clearance to the OHL and pylons. The owner also confirmed that there was a possibility in the future that the runway would be extended back to its original length which could potentially improve the situation further. The owner also confirmed that he uses a local farmhouse as a visual turning point to manoeuvre from base leg to final approach, therefore reducing the risk of the aircraft deviating from its intended circuit pattern.

5.7.8 The full set of risk assessment results for Haxey aerodrome can be found in Annex B with a summary shown in Image 5.8.

Image 5.8 – Haxey Risk Assessment Results



5.8 Willow Farm

Aerodrome Characteristics and Operations



5.8.1 Willow Farm aerodrome is located approximately 1.6 km to the northwest of Gringley on the Hill village in Nottinghamshire. Representatives from National Grid contacted the aerodrome operator on 14 and 24 August 2023 following the close of non-statutory consultation to discuss the proposals as well as the operations and characteristics of the aerodrome. National Grid received a response from the owner on 24 August 2023 thanking National Grid for their consideration and stating that the proposed overhead line would not cause any problems for their operation.

5.8.2 National Grid subsequently contacted the operator on 25 February 2025 with updated proposals but has not received a response. National Grid wrote to the aerodrome operator on 4 June 2026 but has received no response.

5.8.3 Willow Farm is an unlicensed aerodrome with a single grass runway, orientated 06/24 with a length of 405 m. The aerodrome operates during daylight hours and PPR is required for all non-resident flyers prior to landing. This is to allow the aerodrome operator to ensure a safety briefing is provided to anyone intending to land who is not familiar with the aerodrome and its associated operations and hazards.

5.8.4 It is located within Doncaster/Sheffield Airport's Control Zone which is classified as Class D Airspace. This means that aircraft operating in and out of Willow Farm will be required to contact the relevant air traffic control service to request permission to enter this airspace.

Potential Mitigation Measures Considered

5.8.5 Due to the proximity of the proposed overhead line, it was concluded via assessment that pylons 4AF179 to 4AF182 posed a high risk to operations at the aerodrome.

5.8.6 It was therefore recommended that National Grid assess the feasibility of either reducing the height or relocating pylons 4AF179 to 4AF182 to provide the required 500 ft clearance to the circuit. This would require a realignment to remove the dogleg and route the overhead line to the east of Walkeringham Nature Reserve.

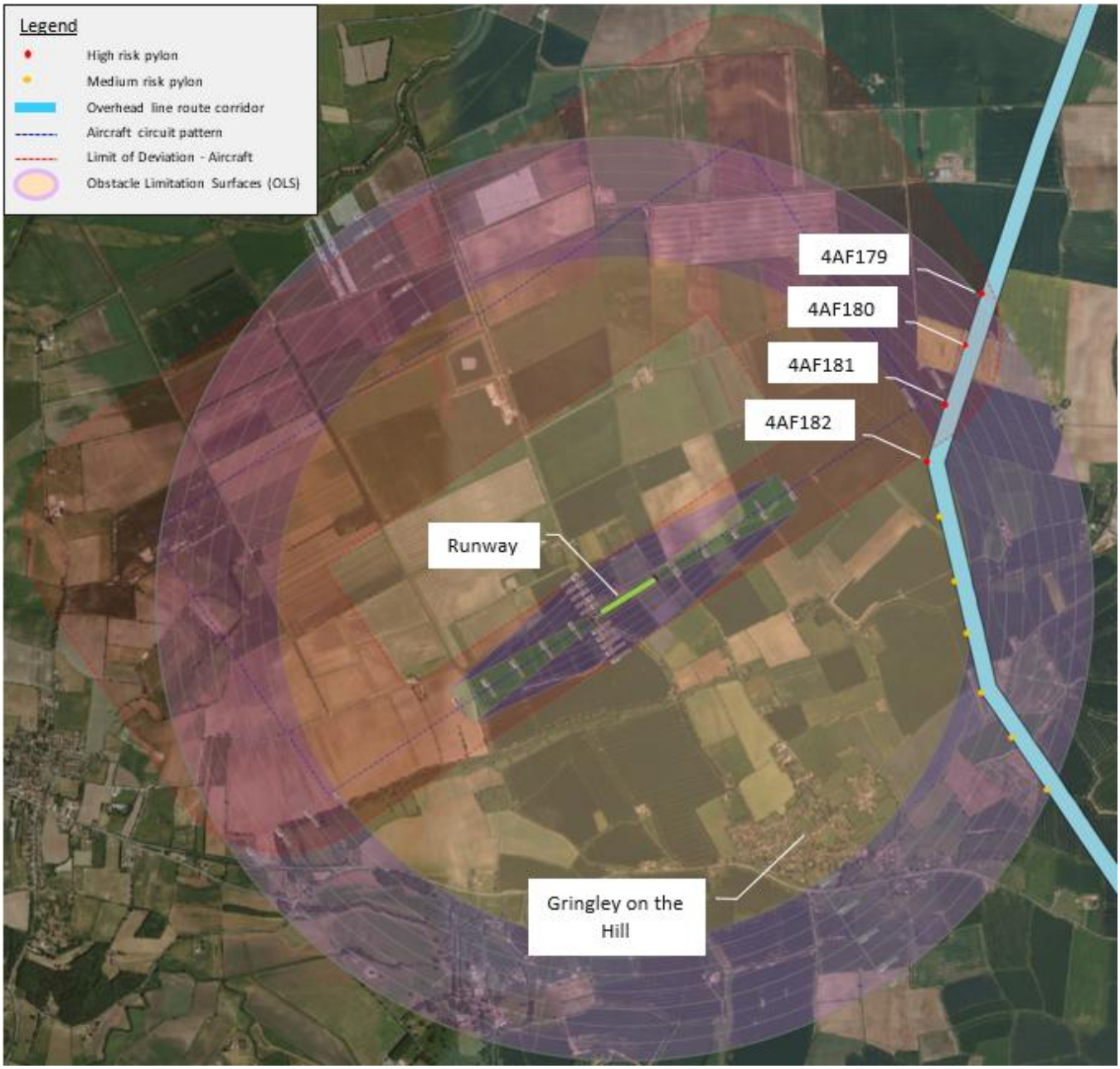
5.8.7 National Grid assessed alternative heights and routes to achieve this but concluded that these were not feasible. As the design of the Project has evolved the indicative heights of individual pylons have been reduced in the section of the overhead line however these reductions have not been sufficient to change the outcome of the assessment. In regard to an alternate overhead line route to the east, due to the proximity of a re-alignment to the Grade II listed Manor Farm and outbuildings, villages and other isolated properties this was not considered achievable. The use of low height pylons is considered in paragraph 4.1.10. It should be noted that for this section of the route the aerodrome operator reviewed the proposed graduated swathe of the overhead line in 2023 and confirmed that it would not obstruct any operations at the aerodrome. This statement is pertinent as the responsibility for safe operations at an unlicensed aerodrome in the UK ultimately lies with the aerodrome operator and the pilot. It is however considered as part of this risk assessment that the proximity of the proposed pylons does pose a high risk to aircraft in flight, and therefore also to the proposed National Grid infrastructure.

5.8.8 As the design of the project has developed and potential mitigation measures developed, National Grid contacted the owner by email and letter in 2025 and 2026. No response was received by the Project from the owner with on-going efforts to engage taking place.

5.8.9 Whilst noting the position of the aerodrome owner, it is considered that in order to reduce the risk of conflict the aerodrome operator should modify the take-off procedure from Runway 05 to make an early left turn to the north and modify the approach procedure to Runway 23 to include an abbreviated base leg and early turn onto final approach.

5.8.10 The full set of risk assessment results for Willow Farm can be found in Annex B with a summary shown in Image 5.9.

Image 5.9 – Willow Farm Risk Assessment Results



6. Other operational risks

6.1.1 Paragraph 5.5.42 of NPS EN-1 identifies a number of other factors that should be taken into account when considering development near aerodromes which include the possibility of an increased risk of an aircraft bird strike, the possible impacts on Instrument Flight Procedures (IFPs) and possible induced wind turbulence from a new building or structure.

6.1.2 New developments near to aerodromes have the potential to attract wildlife which could result in an increase in the risk of a wildlife strike as identified in CAA CAP772. Bird species which typically cause the largest threat of collision with aircraft include larger wetland species such as geese, swans, duck and waders. The development of the proposed overhead line is not expected to increase the number of these species close to the aerodromes as they do not nest or roost on overhead lines or pylons and the presence of the overhead line will not result in any localised changes to habitats that favour such species. There is not expected to be a significant change in the current baseline numbers of these species as a result of the Project.

6.1.3 Other bird species such as corvids, starlings and pigeons are known to roost and nest on overhead lines and pylons. Presence of these species is widespread along the length of the Project with roosts and nests in other locations such as woodland. The presence of a new overhead line is not expected to encourage greater bird numbers in a particular location since population size is limited not only by the availability of nesting habitat, but also by other factors, such as the availability of food, that are not influenced by the presence of pylons and overhead lines. The pylons would instead be likely to provide alternative nest sites and roosting locations, which would not in isolation increase bird populations, instead providing a possible alternative roosting location and no increase in the baseline number of birds is anticipated as a result of the Project.

6.1.4 Birds of prey are known to nest on pylons and so the development of a new overhead line can provide nesting opportunities that would otherwise be absent in a location. However, such species typically occupy and defend relatively large territories and as a result exist at low population densities. Consequentially, any increase in the populations of these species would not be significant and, as for other species, population sizes are limited not only by habitat availability but also by the size of prey populations which will not change as a result of the project.

6.1.5 It has been considered whether EMF from the overhead line might impact aircraft avionics or other aircraft systems, compromising operational safety. It is assessed that minimum clearances allowed for aircraft overflying or otherwise within the vicinity of the overhead line will enable aircraft to be sufficiently distanced to avoid unacceptable adverse effects and is therefore safe. This assessment is justified by National Grid's direct experience of operating aircraft in very close proximity to live overhead lines (within tens of metres), while carrying out routine visual asset assessment regimes in unmodified helicopters, with no impacts on instrumentation noted.

6.1.6 In addition to the clearances to aircraft operating under Visual Flight Rules (VFR) there are also prescribed obstacle clearances for aircraft following Instrument Flight Procedures (IFP) whilst arriving at and departing from aerodromes. These are referred to as Standard Instrument Departures (SIDs) and Standard Terminal Arrival Route (STARs) and are typically flown by commercial aircraft. None of the aerodromes assessed operate any IFPs and it is not anticipated that they will do in the future. Once exception to this is Doncaster Sheffield Airport which has been assessed in Annex C . The airport does not currently have a licence to operate, however the council has plans to open the airport in the future to re-commence commercial passenger operations. If this occurs then it is likely that the airport will develop IFPs. However, due to the location of the OHL in relation to the airport and the fact the OHL does not conflict with the OLS it is considered that there is unlikely to be a conflict with any future IFPs. The design of the IFPs would also need to consider the presence of any obstacles in the area and be designed to avoid conflict with them.

6.1.7 For airport safeguarding in the UK, there is no recognised CAA guidance or regulations specifically for pylon-induced turbulence. The references to turbulence are summarised below:

- ‘CAP 738 – Safeguarding of Aerodromes’ references the need for turbulence from obstacles to be considered in the context of a safeguarding assessment. It refers primarily to building induced turbulence. This is because large buildings and other solid structures in close proximity to aircraft taking off and landing can cause turbulence as a result of the air passing around it and meeting on the lee side of the structure to create turbulent air.
- ‘CAP 764 - CAA Policy and Guidelines on Wind Turbines’ references the risks of turbulence to aircraft, however this is in relation to the turbulence caused by the wake of the rotating turbine blades which extends down-wind behind the blades and the tower.
- There appears to be no evidence of electricity pylons causing wind turbulence effects on aircraft. This is likely due to the open ‘lattice’ type nature of the structures, generating much smaller wake effects and significantly less mechanical turbulence than a solid obstacle of equivalent height. It is therefore considered that the presence of the overhead line will not increase the risk of wind turbulence for aircraft.

Annex A
Airfield Meeting Summaries

nationalgrid

Annex A
Airfield Meeting Summaries

Airfield	Meeting attendee	Date of engagement	Format	Topic/Matters discussed
Mount Airy		01/06/2023	Letter	Non-statutory consultation to Owner/Operator - Notification of non-statutory consultation and invitation to provide feedback.
	Owner/Operator	12/09/2023	Meeting – in person	Project introduction and discussion of Mount Airy's key concerns with the proposal
	Owner/Operator	14/03/2025	Meeting – in person	National Grid visited the aerodrome during statutory consultation to discuss the proposal, view existing pylons and wider site context. National Grid also explained how to submit feedback as part of the statutory consultation.
		22/05/2025	Email	National Grid requested flight circuit details from Owner/Operator to input into the Aviation Assessment. Requested any information that is provided to pilots such as minimum heights prior to turning on to the crosswind leg after take-off, and typical heights of the start and end of each leg of the circuit.
	Owner/Operator	04/11/2025	Meeting – in person	National Grid visited the aerodrome to provide an update on project design following design updates and discuss assessment methodology, flight operations with owner and pilots.
	Owner/Operator	16/09/2026	Meeting – in person	National Grid visited the aerodrome to provide an update on assessment outcomes following updates to the Project design. Flight operations and a potential amendment to a circuit pattern were discussed along with the draft Statement of Common Ground.
West Burton	Owner/Operator	18/07/2023	Meeting – in person	Project meeting with several unlicenced aerodromes located in the project area to present the early design and to gather initial feedback and concerns from the airfields.

	Owner/Operator	18/02/2025	Meeting – in person	Project meeting with aerodrome owner to present the updated design and to gather feedback from the airfield.
Forwood Farm	Owner/Operator	18/07/2023	Meeting – in person	Project meeting with several unlicenced aerodromes located in the project area to present the early design and to gather initial feedback and concerns from the airfields.
		18/02/2025	Email	Notification to Owner/Operator about the beginning of the statutory consultation period and inviting Forwood Farm Airfield to submit feedback.
		21/02/2025	Email	Meeting request to Owner/Operator to discuss the project and Forwood Farm Airfield's key concerns with the DCO.
	Owner/Operator	27/02/2025	Meeting – in person	Joint meeting with Forwood Farm Airfield, Headon Airfield, Grove Farm Airfield, Darlton Gliding Club, an aviation consultant appointed by some of the airfields and a representative of the General Aviation Awareness Council to discuss project overview and key concerns.
		22/05/2025	Email	National Grid requested flight circuit details from Owner/Operator to input into the Aviation Assessment. Requested any information that is provided to pilots such as minimum heights prior to turning on to the crosswind leg after take-off, and typical heights of the start and end of each leg of the circuit.
		11/06/2025	Email	Information received from Forwood Farm Airfield marking out existing circuit patterns following National Grid request.
		29/08/2025	Email	Request from National Grid to Owner/Operator requesting information on a westerly circuit pattern.
		01/09/2025	Email	Response received from Forwood Farm Airfield noting that a westerly circuit pattern is not considered feasible, stating concerns from pilots
	Owner/Operator	23/09/2025	Meeting – in person	Meeting to provide a project update, mitigations and present updated pylon locations.

		24/09/2025	Information request	National Grid requested data and information from Owner/Operator on airfield activities, student pilot information to help assess project impacts on Forwood Farm airfield from owner and flight trainer.
		01/10/2025	Email	Response received from Gamston Flight Training to data request 24/09/2025.
		04/01/2026	Email	Response received from Forwood Farm Airfield to National Grid data request 24/09/2025.
	Owner/Operator	07/10/2026	Meeting – In person	Meeting planned with aerodrome owner/operator to discuss updated assessment outcomes following updates to the Project design and the draft Statement of Common Ground.
Grove Farm	Owner/Operator	18/07/2023	Meeting – in person	Project meeting with several airstrips located in proximity to the project.
		21/02/2025	Email	Notification of statutory consultation to Owner/Operator and invitation to meet to discuss project updates
	Owner/Operator	27/02/2025	Meeting – in person	Joint meeting with Forwood Farm Airfield, Headon Airfield, Grove Farm Airfield, Darlton Gliding Club, an aviation consultant appointed by some of the airfields and a representative of the General Aviation Awareness Council to discuss project overview and key concerns.
		22/05/2025	Email	National Grid requested flight circuit details from Owner/Operator to input into the Aviation Assessment. Requested any information that is provided to pilots such as minimum heights prior to turning on to the crosswind leg after take-off, and typical heights of the start and end of each leg of the circuit
		11/06/2025	Email	Email received from owner with information relevant to airfield and flight operations.
		14/06/2025	Email	Flight circuit details received from owner.

	Owner/Operator	23/09/2025	Meeting – in person	Meeting to provide a project update, mitigations and present updated pylon locations. Viewed airstrip and general topography of land.
Headon Airfield	Owner/Operator	18/07/2023	Meeting – in person	Meeting to introduce the project with several airstrips located in proximity to the project.
		09/07/2024	Letter	Notification about the localised non-statutory consultation to Owner/Operator and invitation to provide feedback.
		21/02/2025	Email	Notification to Owner/Operator about the statutory consultation and invitation to discuss the proposal in a meeting
	Owner/Operator	27/02/2025	Meeting – in person	Joint meeting with Forwood Farm Airfield, Headon Airfield, Grove Farm Airfield, Darlton Gliding Club, an aviation consultant appointed by some of the airfields and a representative of the General Aviation Awareness Council to discuss project overview and key concerns.
		22/05/2025	Email	National Grid requested flight circuit details from Owner/Operator to input into the Aviation Assessment. Requested any information that is provided to pilots such as minimum heights prior to turning on to the crosswind leg after take-off, and typical heights of the start and end of each leg of the circuit.
		27/05/2025	Email	Email received from owner with information relevant to flight circuit request, airfield and flight operations.
	Owner/Operator	24/09/2025	Meeting – in person	National Grid visited the airstrip to provide an update on project design and discuss flight operations with owner and pilots.
	Owner/Operator	16/09/2026	Meeting – in person	National Grid visited the aerodrome to provide an update on assessment outcomes following updates to the Project design. Flight operations and potential amendments to circuit patterns were discussed along with the draft Statement of Common Ground.
Darlton Gliding Club		01/06/2023	Email	Notification of the commencement of non-statutory consultation to Operator and invitation to provide feedback.

	Operator	18/07/2023	Meeting – in person	Project meeting with several aerodromes located in the project area on the early design.
		09/07/2024	Email	Notification of the commencement of a localised non-statutory consultation to Operator and invitation to provide feedback.
		21/02/2025	Email	Notification of the commencement of statutory consultation to Operator, and a request to meet with DGC to discuss the Project and any key concerns, with support from aviation specialists to respond to technical queries.
	Operator	27/02/2025	Meeting – in person	Joint meeting with Forwood Farm Airfield, Headon Airfield, Grove Farm Airfield, Darlton Gliding Club, an aviation consultant appointed by some of the airfields and a representative of the General Aviation Awareness Council to discuss project overview and key concerns.
		22/05/2025	Email	National Grid requested flight circuit details from Operator to input into the Aviation Assessment. Requested any information that is provided to pilots such as minimum heights prior to turning on to the crosswind leg after take-off, and typical heights of the start and end of each leg of the circuit.
		01/09/2025	Telephone	Phone call with Operator to discuss project progression and impacts
	Operator	23/09/2025	Meeting – in person	National Grid met with a representative of Darlton Gliding Club and Trent Valley Gliding Club to discuss project design updates and feedback received during statutory consultation.
		25/09/2025	Email	National Grid emailed requesting information from Operator on operations undertaken at Darlton Gliding Club to help assess the impacts of the project.
		10/10/2025	Email	Following September meeting, National Grid shared an abbreviated aero-tow circuit with the Operator for comment.
		21/10/2025	Telephone	Phone call with Operator to discuss key concerns and alternative alignments for the Project.

	Operator	15/09/2026	Meeting – in person	National Grid visited the aerodrome to provide an update on assessment outcomes following updates to the Project design. Flight operations and a potential amendment to the aero-tow circuit pattern were discussed as well as discussion about how the gliding club operate gliding competitions at the site and the draft Statement of Common Ground.
Haxey Airfield		14/08/2023	Telephone	Discussion with the Owner of Haxey Airfield on the proposed overhead line, who raised no concern with the alignment.
		25/02/2025	Email	National Grid notified the Owner about statutory consultation and invitation to discuss the proposal in a meeting if required.
		25/02/2025	Email	Confirmation from Owner that the proposed alignment had been reviewed and confirmation that it will not obstruct any aerodrome operations.
		22/05/2025	Email	National Grid requested flight circuit details from the Owner to input into the Aviation Assessment. Requested any information that is provided to pilots such as minimum heights prior to turning on to the crosswind leg after take-off, and typical heights of the start and end of each leg of the circuit.
		08/05/2026	Email	National Grid explained to the Owner changes to existing circuit pattern operated at Haxey airfield to include an early right-hand turn after take-off to the south and an abbreviated circuit pattern when turning onto base leg and landing to the north to avoid potential conflict with the overhead line (OHL). National Grid provided a map extract of the proposed OHL to the airfield Operator on 22/05/2026.
		03/06/2026	Email	The Owner of Haxey Airfield confirmed to National Grid that having studied the proposed alignment and considered the suggested mitigations that they had no objections to the proposed route and understood the need to amend relevant legs of flight circuit.
		10/09/2026	Telephone	Telephone call with the Owner of Haxey Airfield following their receipt of the draft Statement of Common Ground. In the call the

				owner highlighted concerns around the suggested abbreviated leg of the circuit pattern on take-off and landing. Arranged to meet owner during other visits.
	Owner	16/09/2026	Meeting – in person	National Grid visited the aerodrome to discuss the assessment outcomes in regard to operations at the aerodrome. Flight operations and a potential amendment to a circuit pattern were discussed along with the draft Statement of Common Ground. The land used for the aerodrome was also visited.
Willow Farm		14/08/2023	Email	Invite to Owner/Operator to introduce the project and discuss any concerns the aerodrome had. NGET provided links to the consultation material with the proposed alignment.
		24/08/2023	Email	Response received from aerodrome Owner/Operator stating the Project is not of a concern to the aerodrome and no meeting is required.
		25/02/2025	Email	Notification sent to Owner/Operator about the statutory consultation period and invitation for a meeting to discuss any feedback. No response received.
		11/03/2025	Email	Follow up email to Owner/Operator to the 25/02/2025 email to request a meeting to discuss any feedback or concerns the Willow Farm Airfield has on the proposal. No response received.
		22/05/2025	Email	National Grid requested flight circuit details from Owner/Operator to input into the Aviation Assessment. Requested any information that is provided to pilots such as minimum heights prior to turning on to the crosswind leg after take-off, and typical heights of the start and end of each leg of the circuit. No response received.
		04/06/2026	Letter	Letter sent to airfield Owner/Operator by National Grid to confirm whether flights currently operate from Willow Farm and reminder of previous contact attempts. No response received.

Annex B
Risk Assessment

nationalgrid

Annex B
Risk Assessment

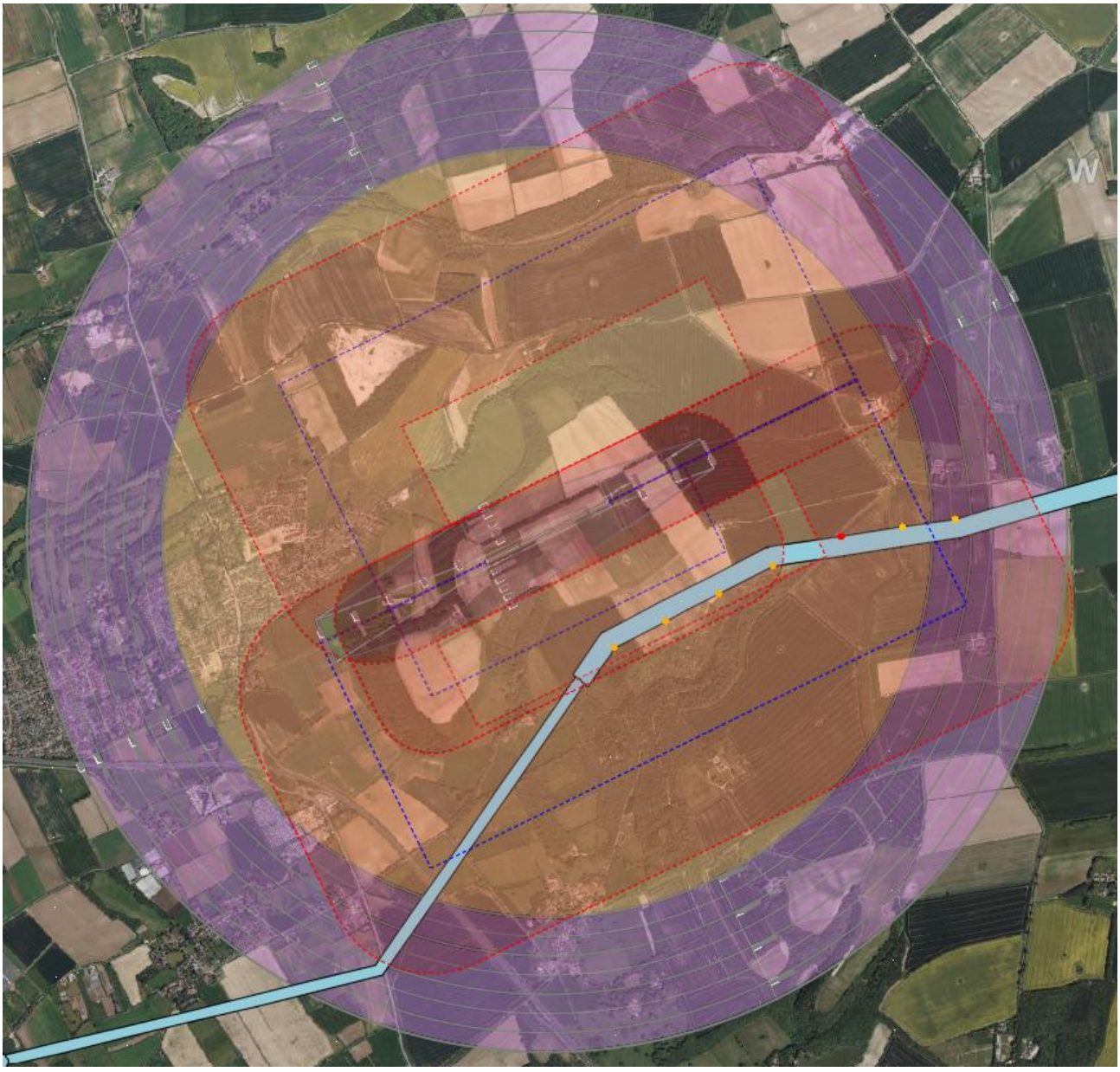
B.1.1 This section covers the output of the risk assessment that was carried out for each aerodrome following the methodology explained in Chapter 3 of this report. For each aerodrome it shows the overall risk, assessment results, followed by the more detailed assessment of each circuit pattern at the aerodrome which have been used to inform the overall risk assessment results.

Mount Airy Risk Assessment

B.1.2 This section details the risk assessment that was undertaken for Mount Airy.

B.1.3 Image B.1 shows the extent of the modelled OLS and circuit patterns along with the alignment of the proposed overhead line.

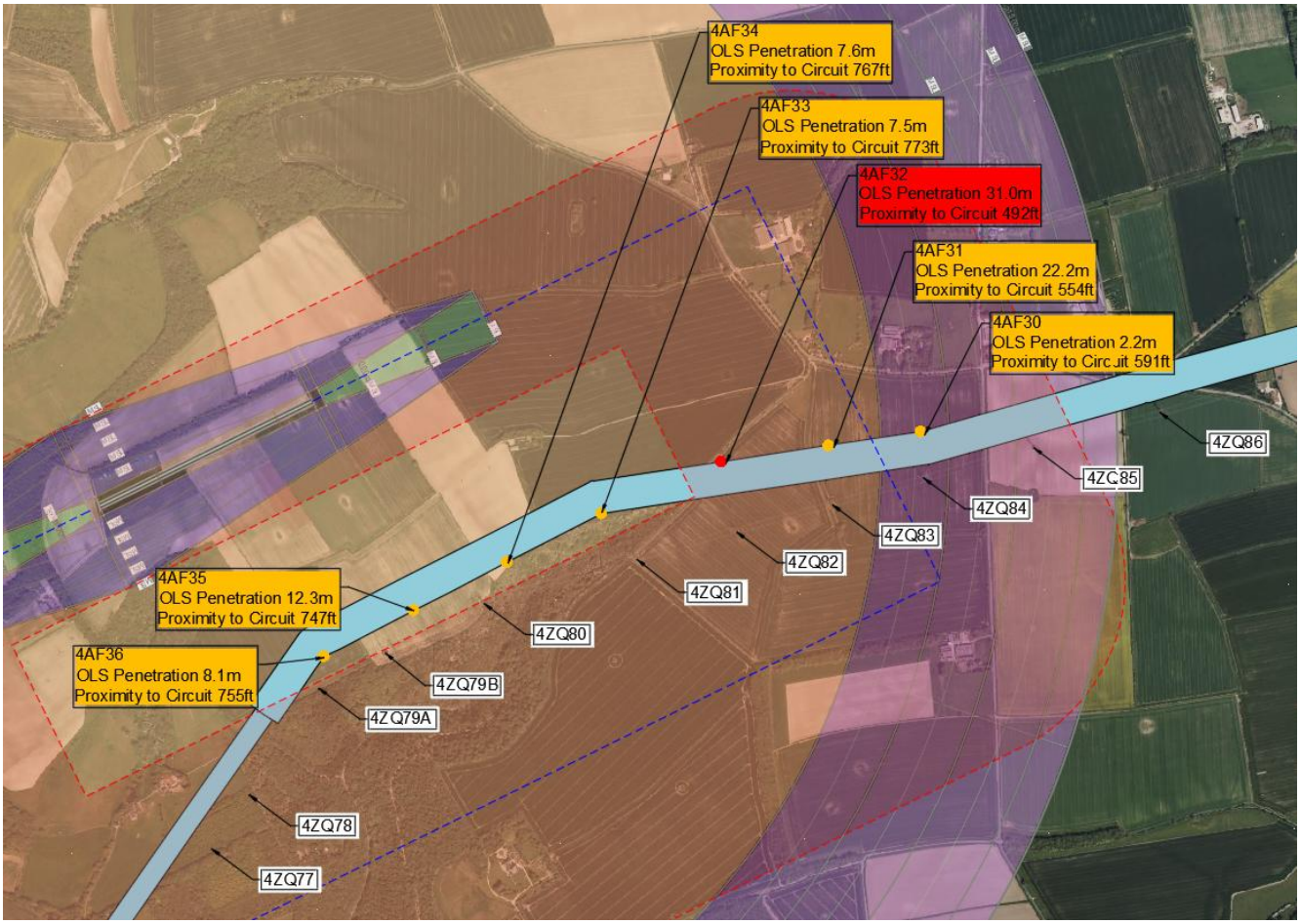
Image B.1 – Mount Airy – modelled circuit pattern and OLS



Fixed wing aircraft circuit south (1,000 ft)

B.1.4 The standard fixed wing aircraft circuit to the south of the aerodrome was modelled with a height of 1,000 ft and assessed with the results shown in Image B.2. There is a high likelihood that proposed pylon 4AF32 could have a clearance of marginally less than 500 ft (492 ft) to aircraft flying in the circuit, therefore posing a high risk. The remaining pylons have a high likelihood of a clearance of greater than 500 ft but still penetrate the OLS, therefore posing a medium risk.

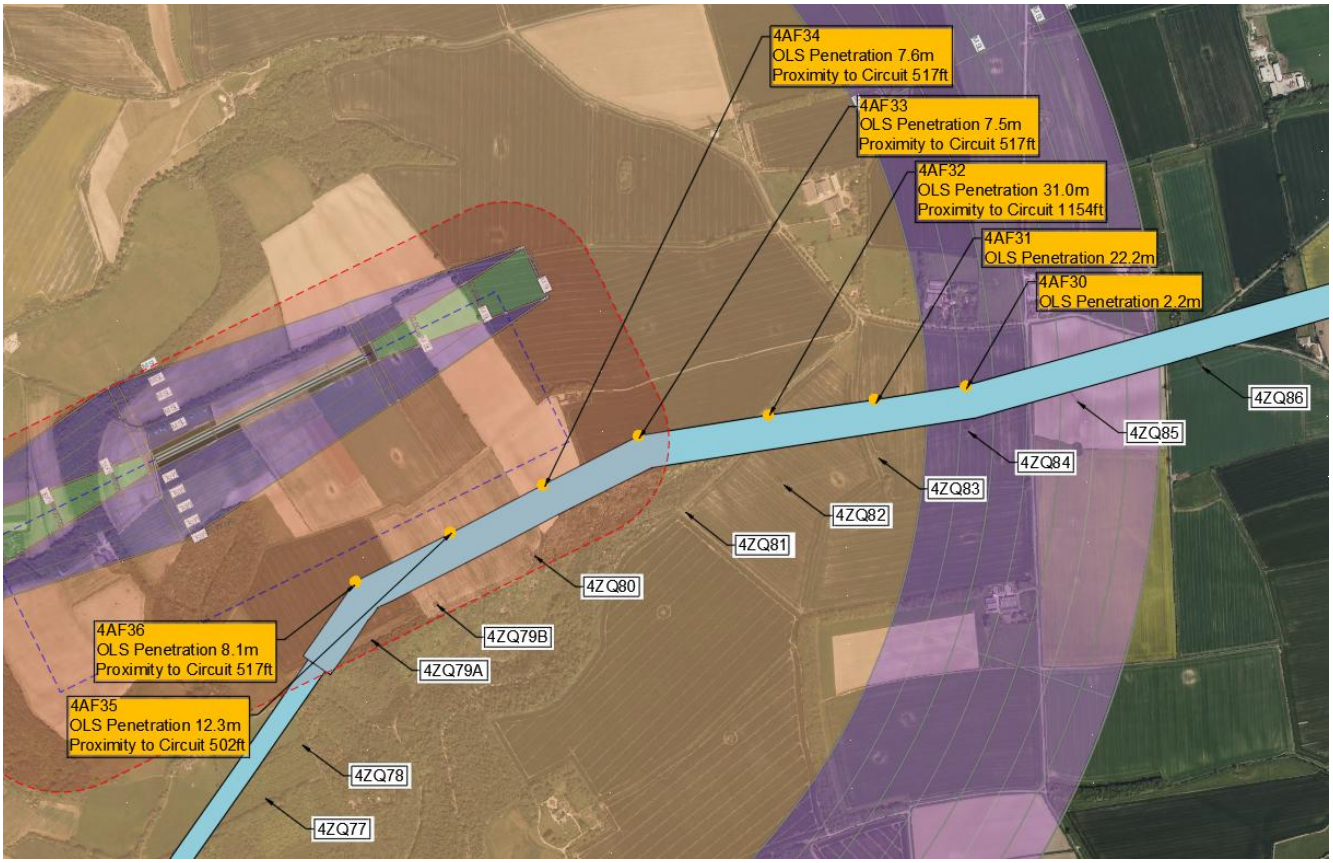
Image B.2 – Mount Airy risk assessment – fixed wing aircraft circuit south (1,000 ft)



Microlight aircraft circuit south (800 ft)

B.1.5 The standard microlight aircraft circuit to the south was modelled with a height of 800 ft and assessed with the results shown in Image B.3. Pylons 4AF30 to 4AF36 have a clearance of greater than 500 ft to the circuit but still penetrate the OLS, therefore posing a medium risk.

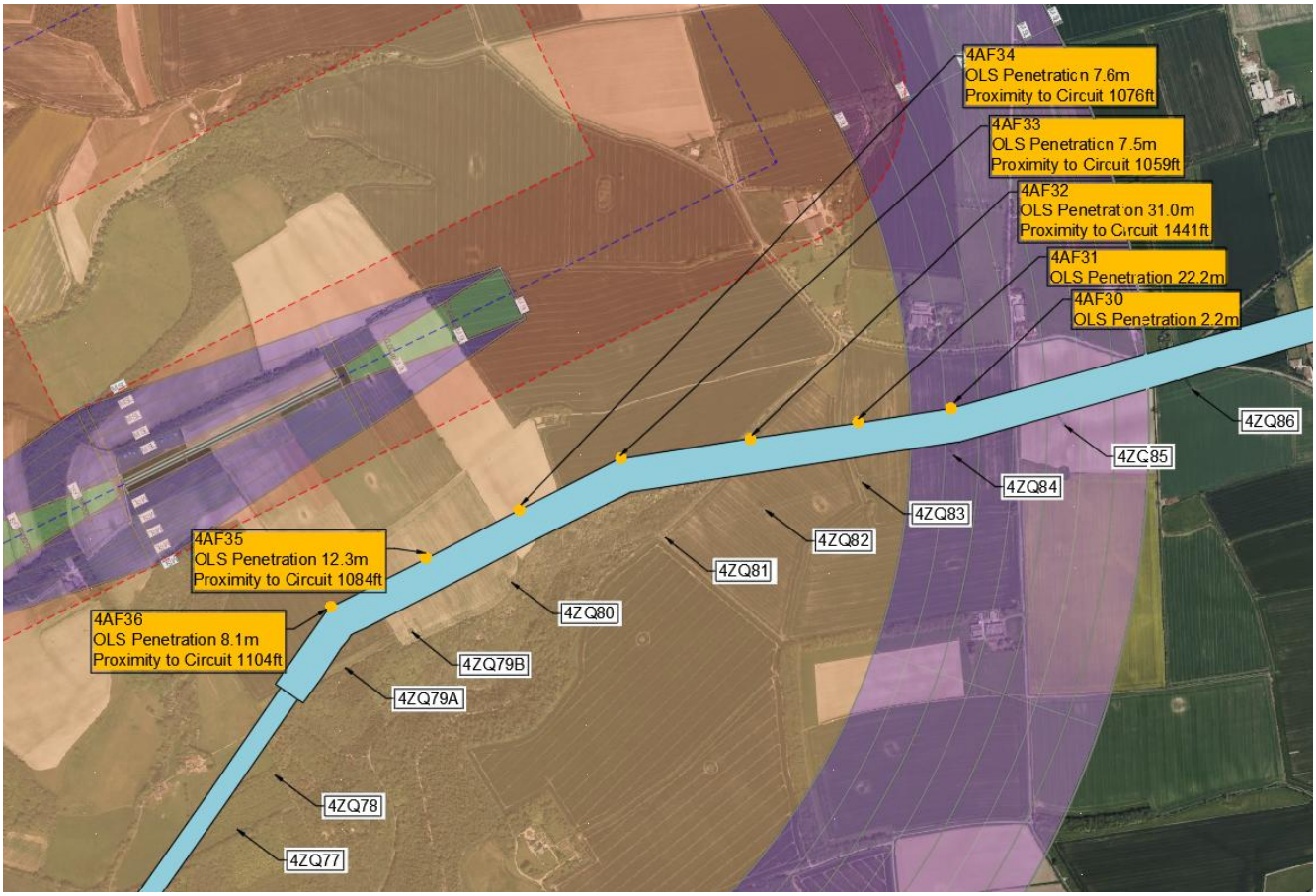
Image B.3 – Mount Airy risk assessment – microlight aircraft circuit south (800 ft)



Fixed wing aircraft circuit north (1,000 ft)

B.1.6 The standard fixed wing aircraft circuit to the north was modelled with a height of 1,000 ft and assessed with the results shown in Image B.4. It can be seen that pylons 4AF30 to 4AF36 penetrate the OLS but have a clearance of greater than 500 ft to the circuit, therefore posing a medium risk.

Image B.4 – Mount Airy risk assessment – fixed wing aircraft circuit north (1,000 ft)

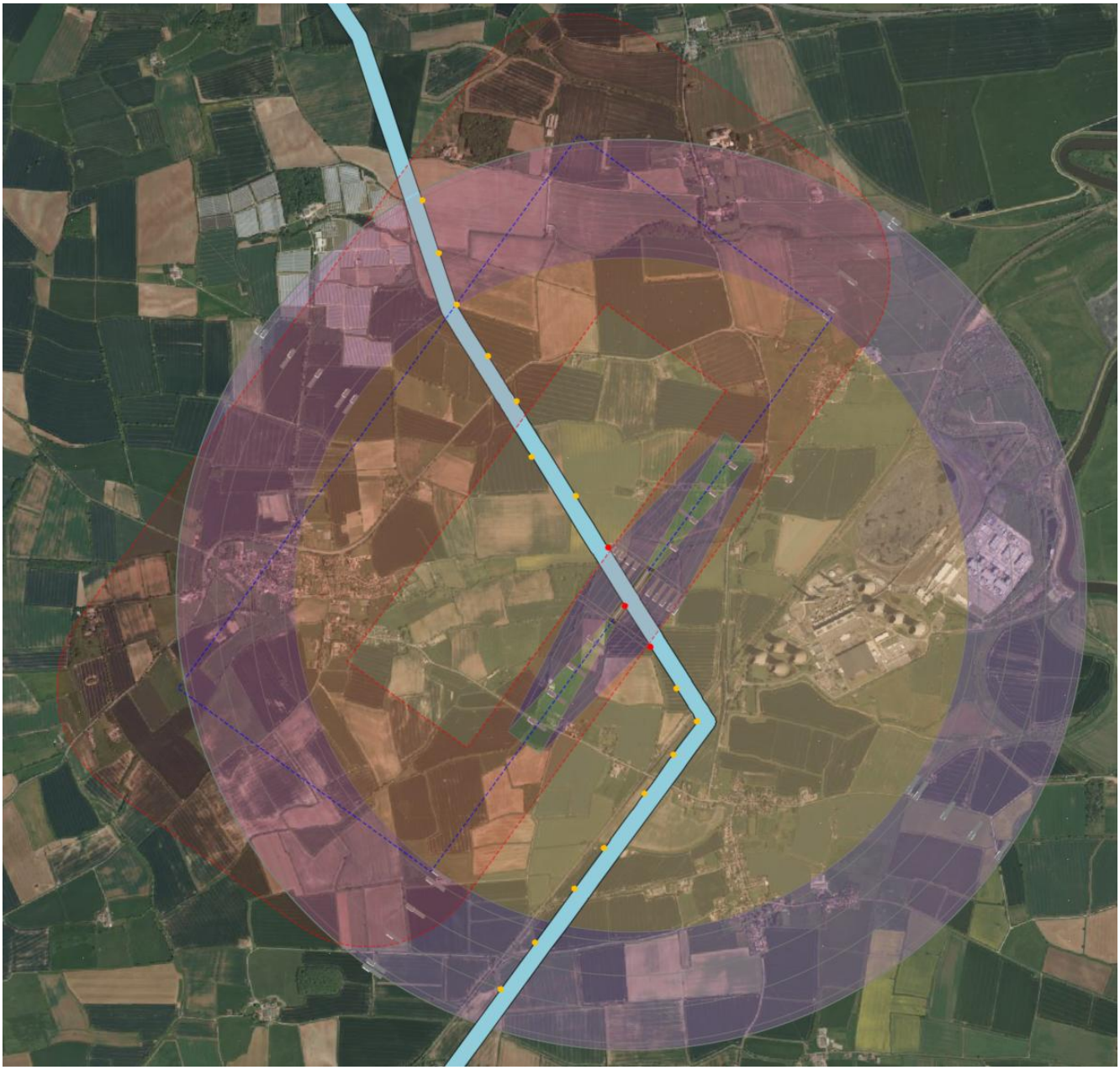


West Burton Risk Assessment

B.1.7 This section details the risk assessment that was undertaken for West Burton.

B.1.8 Image B.5 shows the extent of the modelled OLS and circuit patterns along with the alignment of the proposed overhead line.

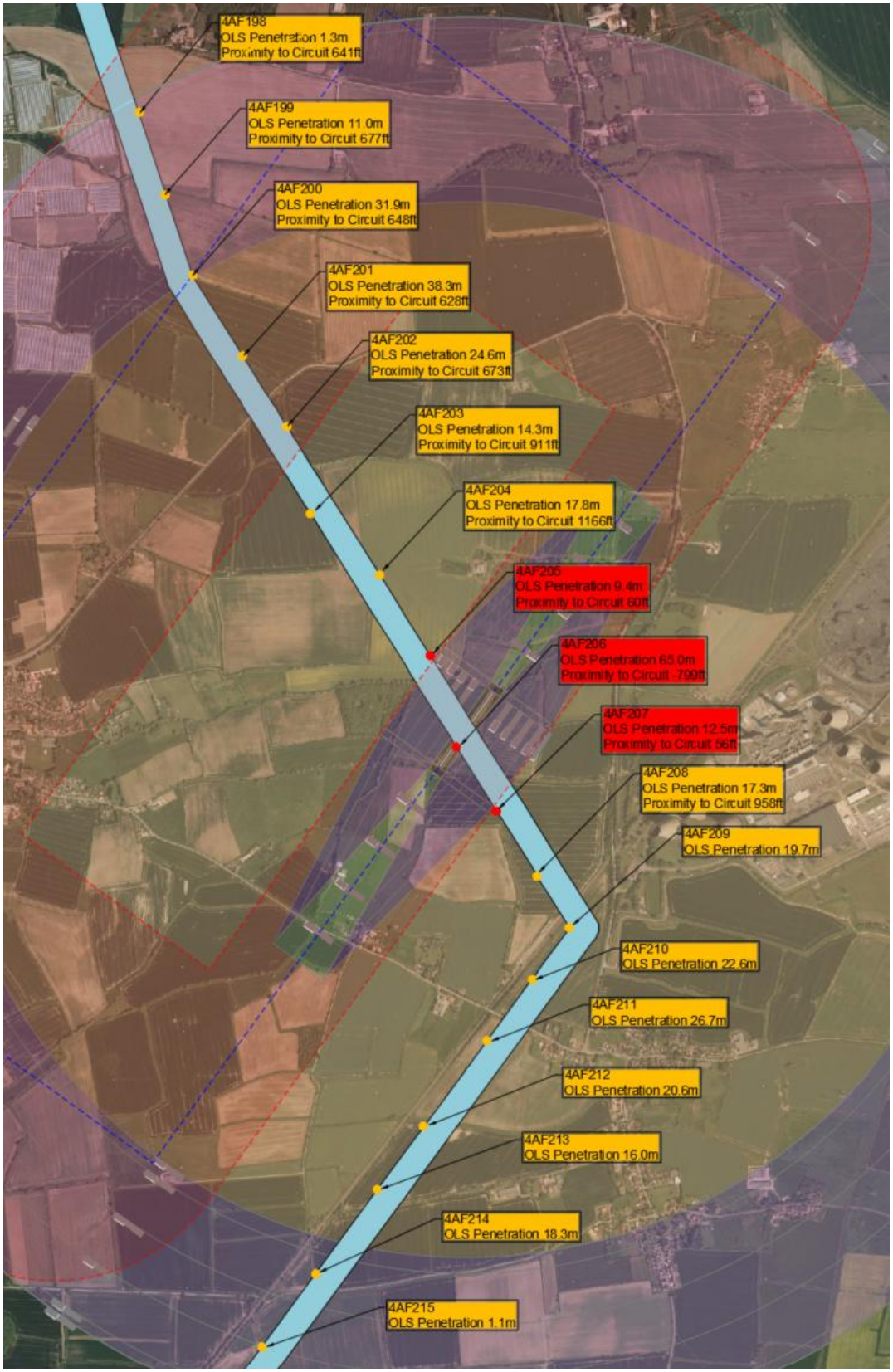
Image B.5 – West Burton – modelled circuit pattern and OLS



Standard circuit (1,000 ft)

B.1.9 The standard circuit to the west has been modelled with a height of 1,000 ft and assessed with the results shown in Image B.6. Since the OHL and associated pylons cross the runway, with one of the pylons located on the runaway itself, pylons 4AF205 to 4AF207 pose an unacceptably high risk, and as such flight operations would need to cease. The remaining pylons have a high likelihood of a clearance of greater than 500 ft but still penetrate the OLS, therefore posing a medium risk. In addition to the above, one of the pylons (4AF206) is located on the runway and the overhead line crosses the midpoint of the runway at an almost 90-degree angle. These factors constitute an unacceptable hazard to the safe operation of the aerodrome.

Image B.6 – West Burton risk assessment – standard circuit (1,000 ft)

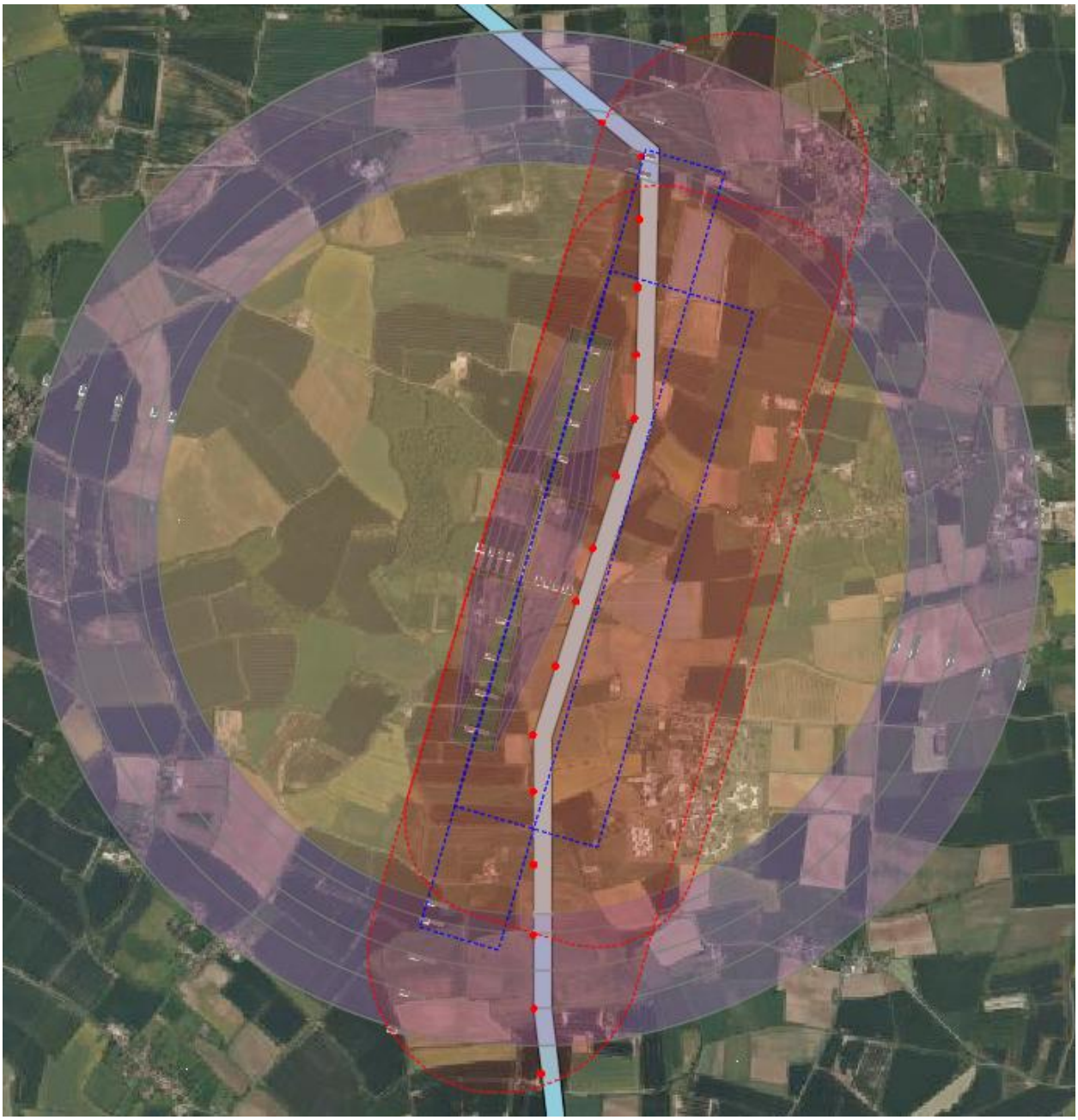


Forwood Farm Risk Assessment

B.1.10 This section details the risk assessment that was undertaken for Forwood Farm.

B.1.11 Image B.7 shows the extent of the modelled OLS and circuit patterns along with the alignment of the proposed overhead line.

Image B.7 – Forwood Farm – modelled circuit pattern and OLS



Low-level easterly circuits (500 ft)

B.1.12 Image B.8 shows the risk assessment results for each proposed pylon. There is a high likelihood that proposed pylons 4AF223 to 4AF238 could have a clearance of less than 500 ft to aircraft flying a low-level training circuit, therefore posing a high risk.

Image B.8 – Forwood Farm risk assessment (500 ft low-level easterly circuits)

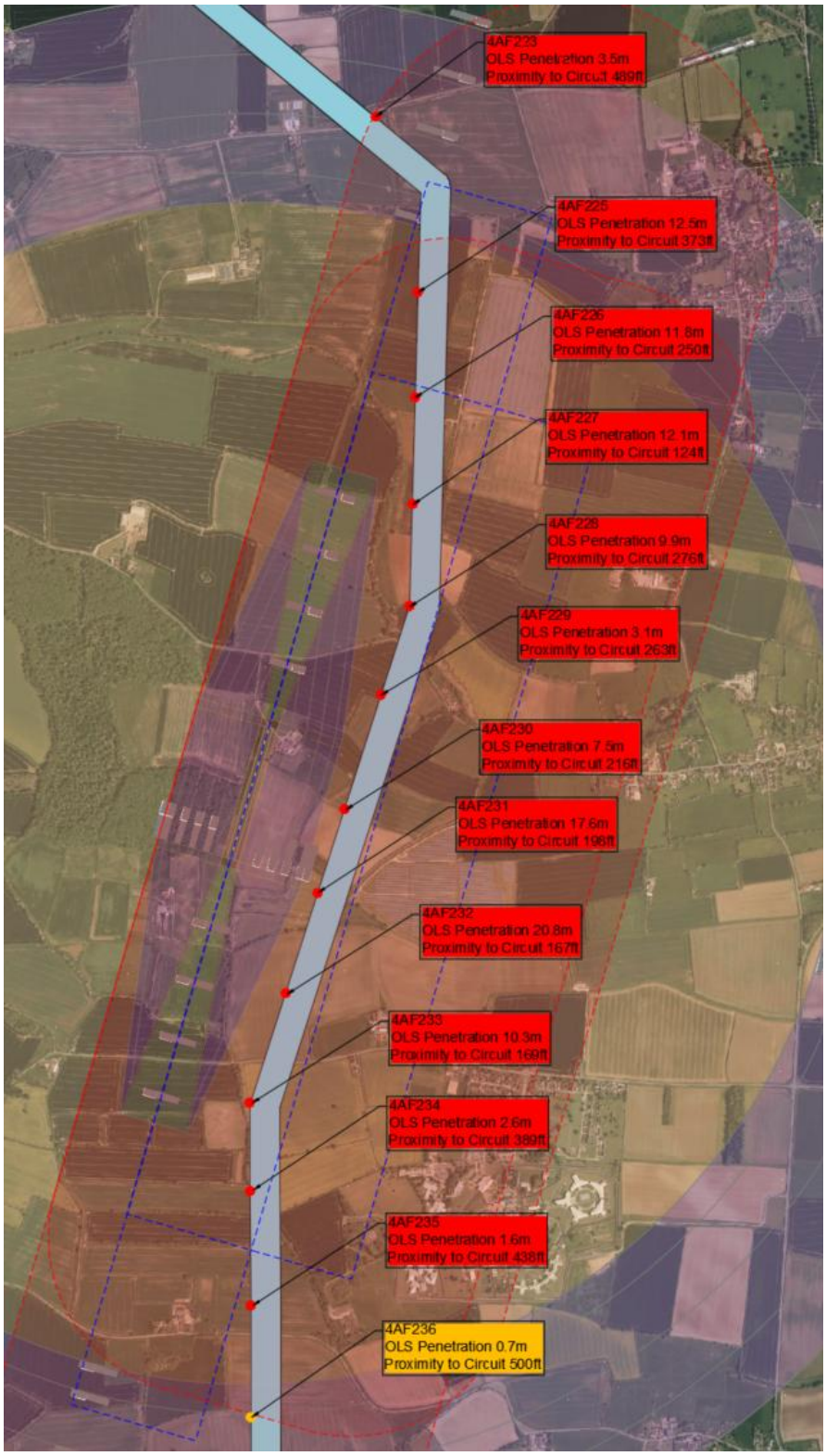


Standard easterly circuits (1,000 ft)

B.1.13 The standard circuit height of 1,000 ft has also been modelled (for both landing directions) and assessed with the results shown in Image B.9. There is a high likelihood that proposed pylons 4AF223 and 4AF225 to 4AF235 could have a

clearance of less than 500 ft to aircraft in the circuit, therefore posing a high risk. The remaining pylons have a high likelihood of a clearance of greater than 500 ft but still penetrate the OLS, therefore posing a medium risk.

Image B.9 – Forwood Farm risk assessment (1,000 ft standard easterly circuits)

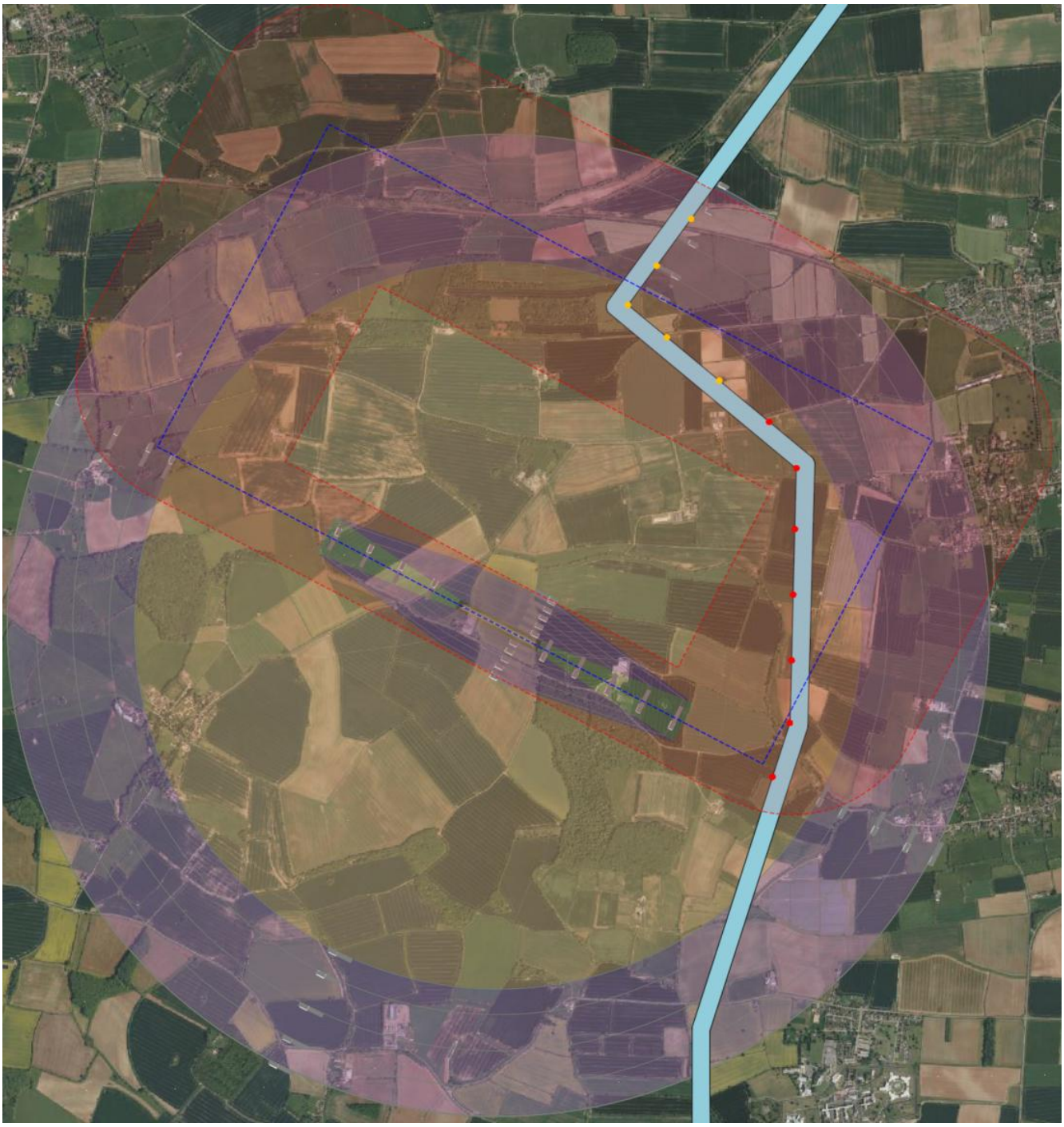


Grove Farm Risk Assessment

B.1.14 This section details the risk assessment that was undertaken for Grove Farm.

B.1.15 Image B.10 shows the extent of the modelled OLS and circuit patterns along with the alignment of the proposed overhead line.

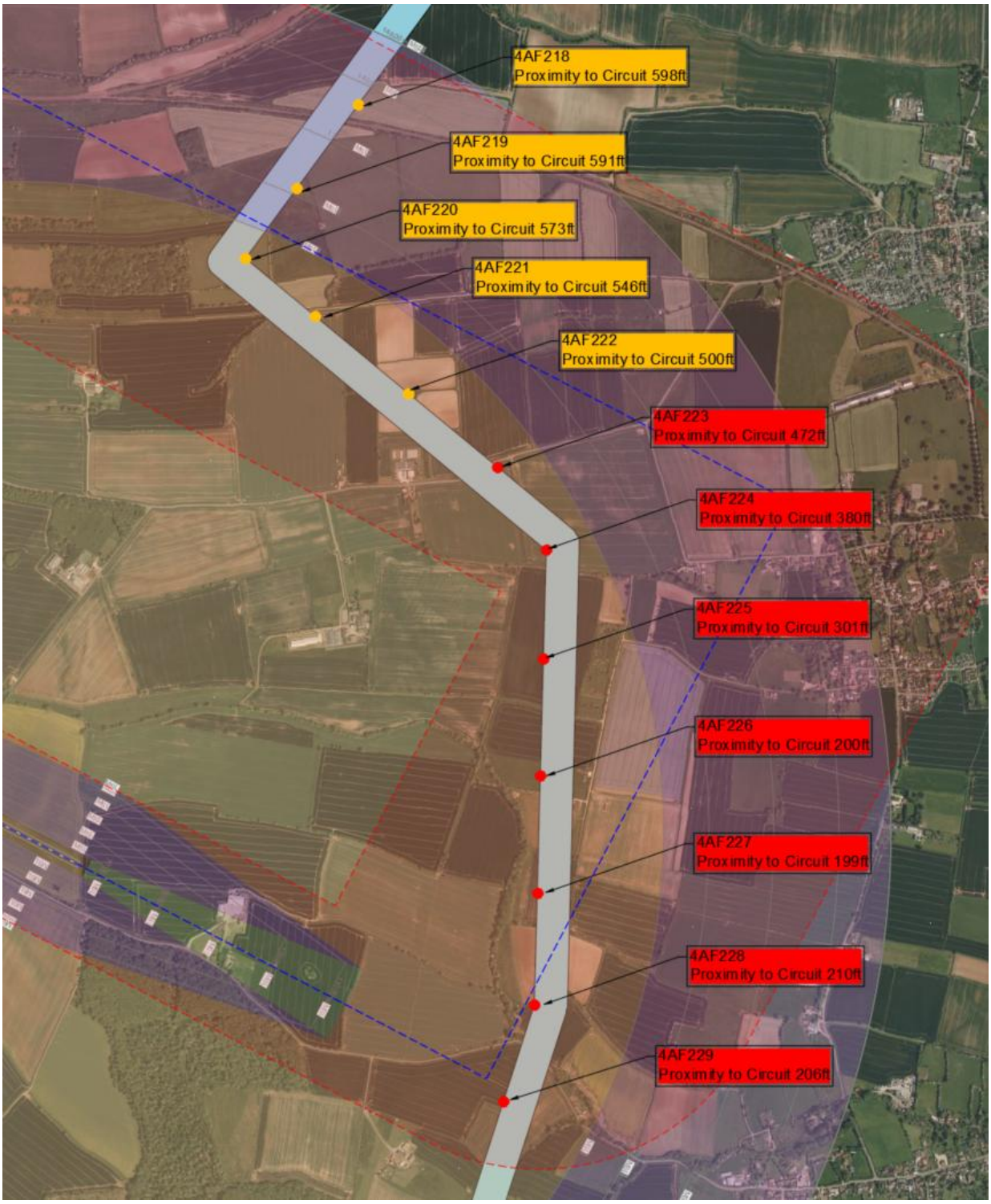
Image B.10 – Grove Farm – modelled circuit pattern and OLS



Standard circuit (1,000 ft)

B.1.16 The standard circuit height of 1,000 ft has been modelled and assessed with the results shown in Image B.11. None of the proposed pylons in the vicinity of Grove Farm penetrate the OLS but there is a high likelihood that pylons 4AF223 to 4AF229 could have a clearance of less than 500 ft to aircraft flying a standard circuit, therefore posing a high risk.

Image B.11 – Grove Farm risk assessment standard circuit (1,000 ft)

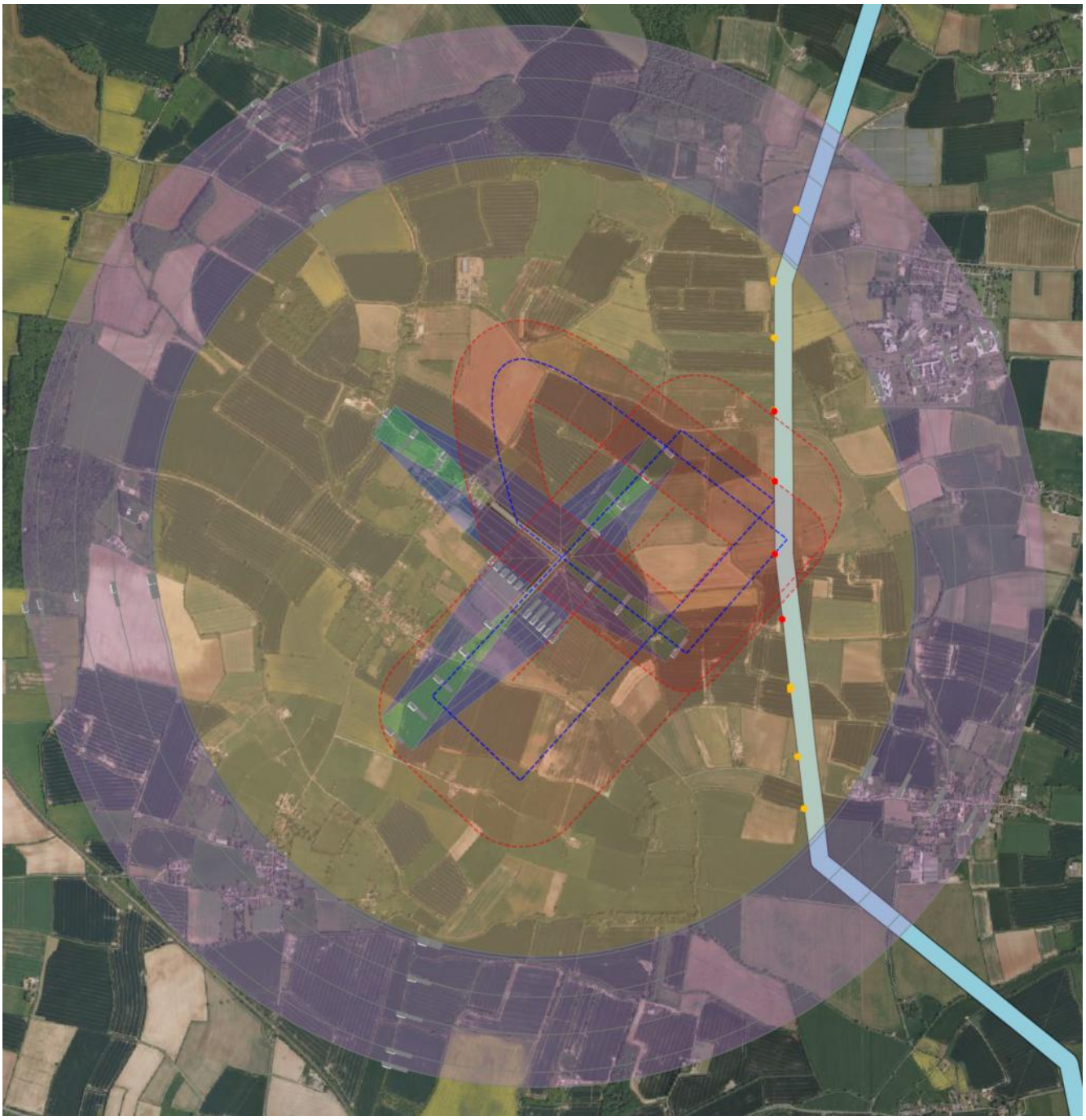


Headon Airfield Risk Assessment

B.1.17 This section details the risk assessment that was undertaken for Headon Airfield.

B.1.18 Image B.12 shows the extent of the modelled OLS and circuit patterns along with the alignment of the proposed overhead line.

Image B.12 – Headon Airfield – modelled circuit pattern and OLS



Low-level circuits (500 ft)

B.1.19 Image B.13 and Image B.14 show the risk assessment results for each proposed pylon. There is a high likelihood that proposed pylons 4AF235 to 4AF238 could result in a clearance of less than 500 ft to aircraft flying a low-level training circuit, therefore posing a high risk. The remaining pylons have a high likelihood of a clearance of greater than 500 ft but still penetrate the OLS, therefore posing a medium risk.

Image B.13 – Headon Airfield risk assessment (500 ft low-level circuits runway 05/23)

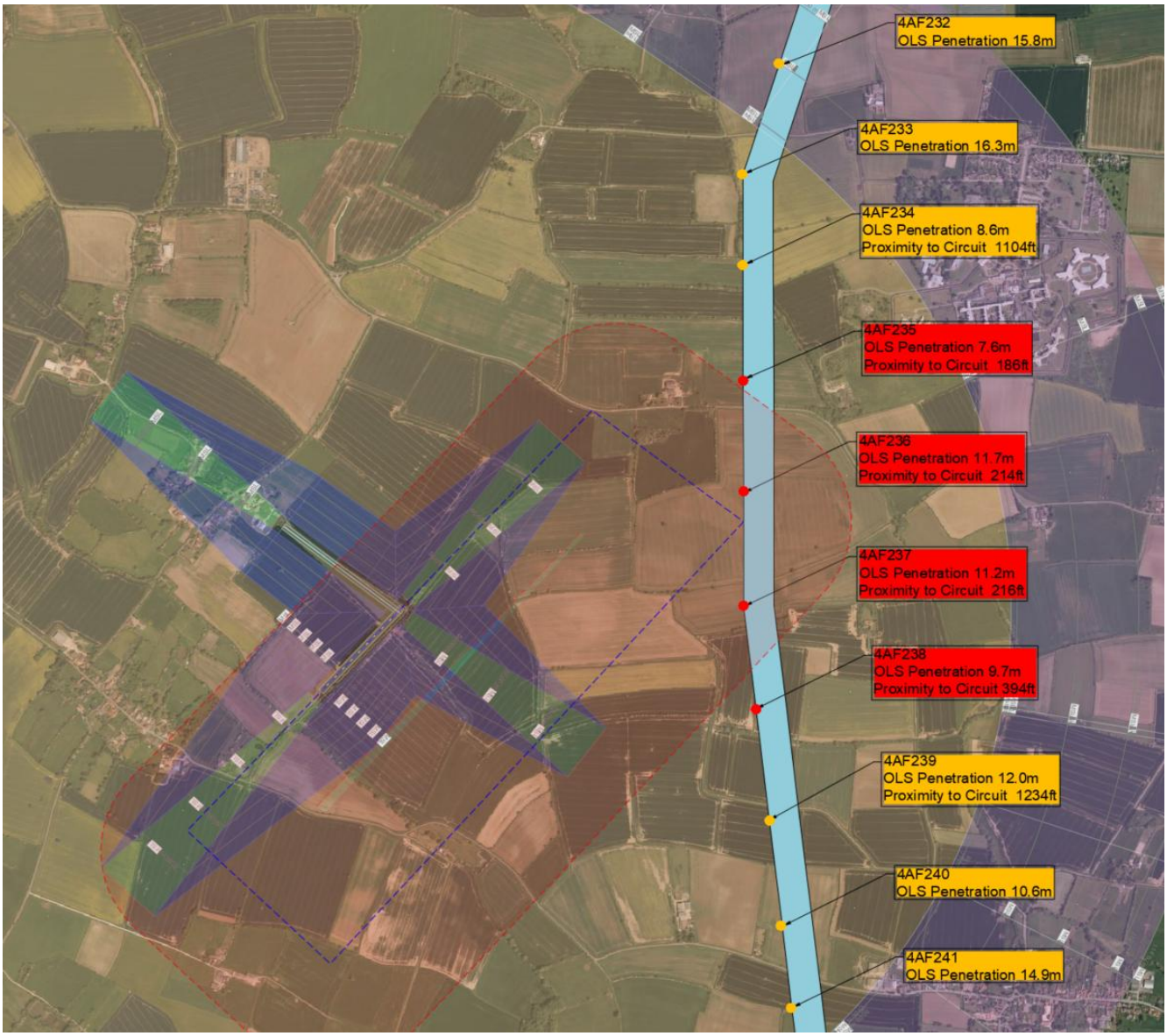
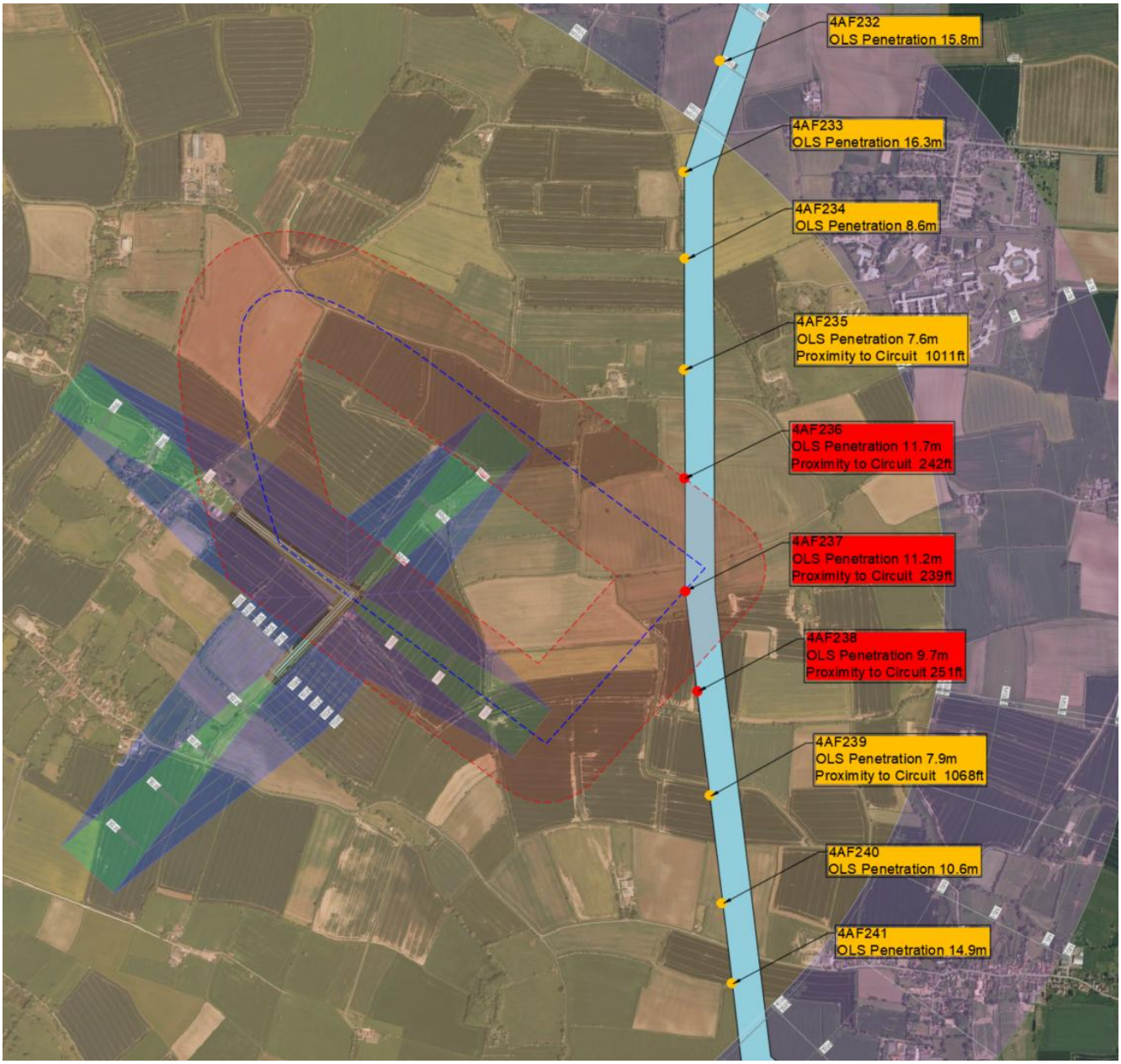


Image B.14 – Headon Airfield risk assessment (500 ft low-level circuits runway 14/32)



Standard circuits (800 ft)

B.1.20 The standard circuit height of 800 ft has also been modelled and assessed with the results shown in Image B.15 and Image B.16. There is a high likelihood that proposed pylons 4AF235 and 4AF238 could have a clearance of less than 500 ft to aircraft flying a standard circuit, therefore posing a high risk. The remaining pylons have a high likelihood of a clearance of greater than 500 ft but still penetrate the OLS, therefore posing a medium risk.

Image B.15 – Headon Airfield risk assessment (800 ft standard circuits runway 05/23)

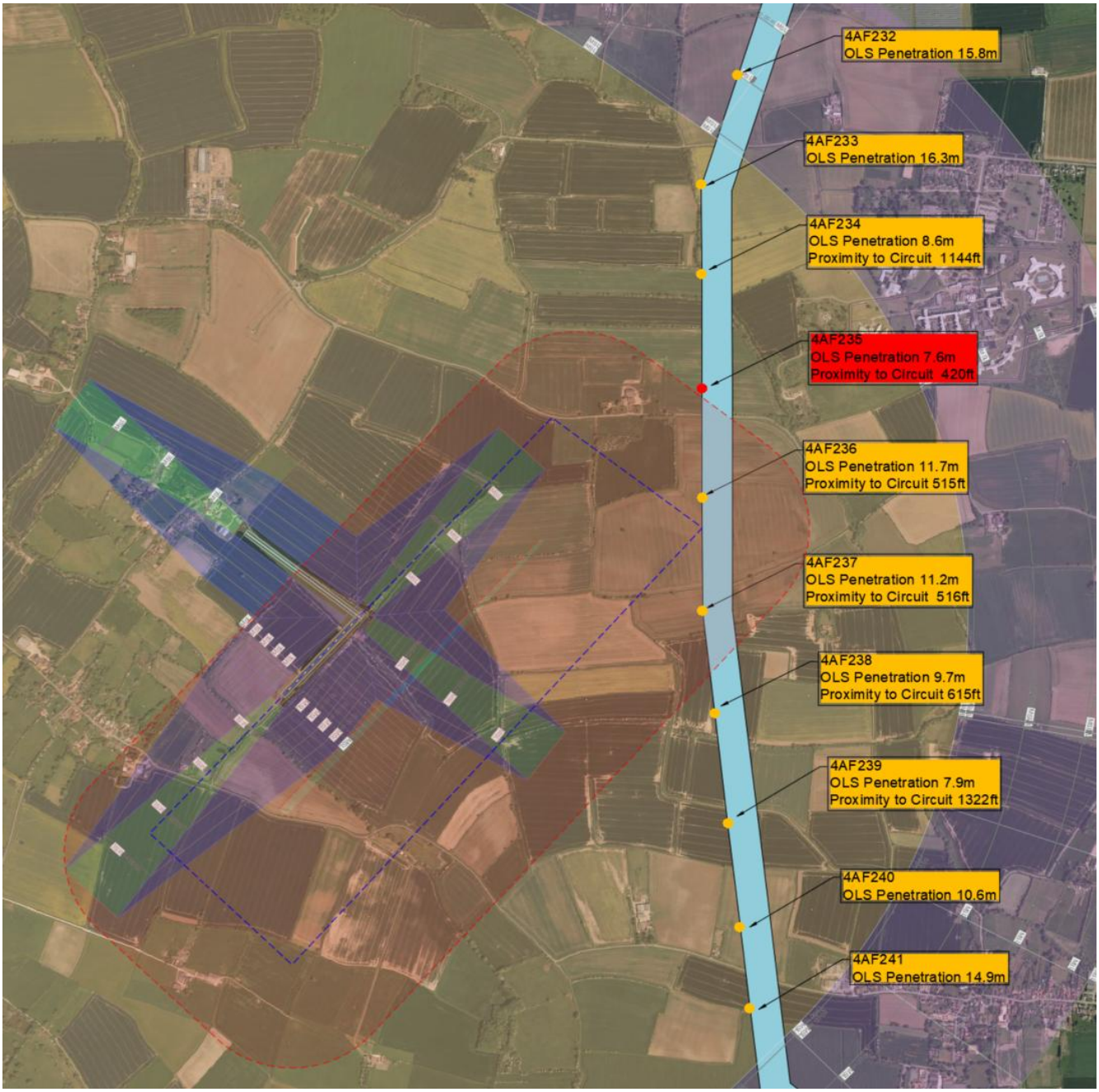
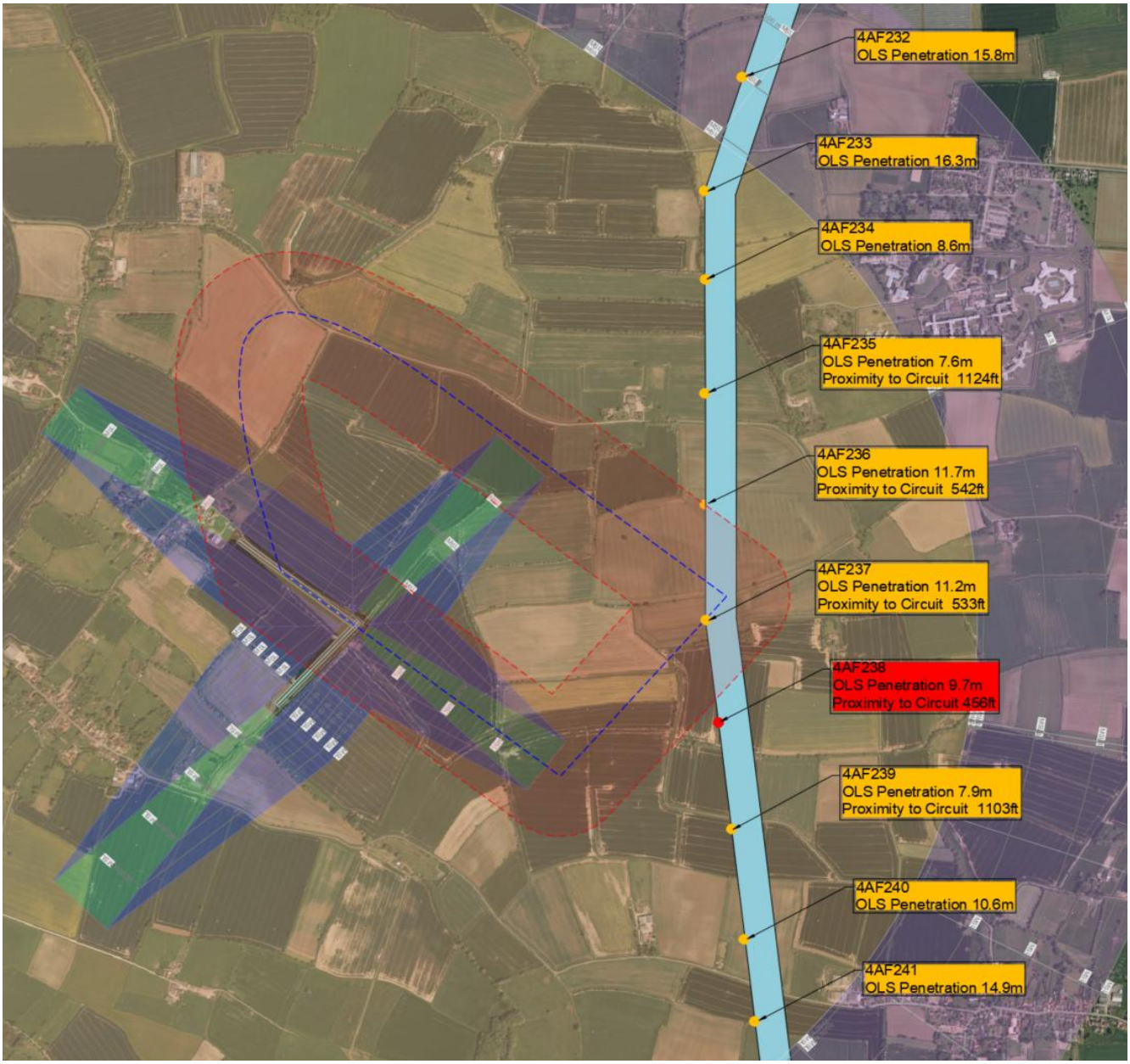


Image B.16 – Headon Airfield risk assessment (800 ft standard circuits runway 14/32)

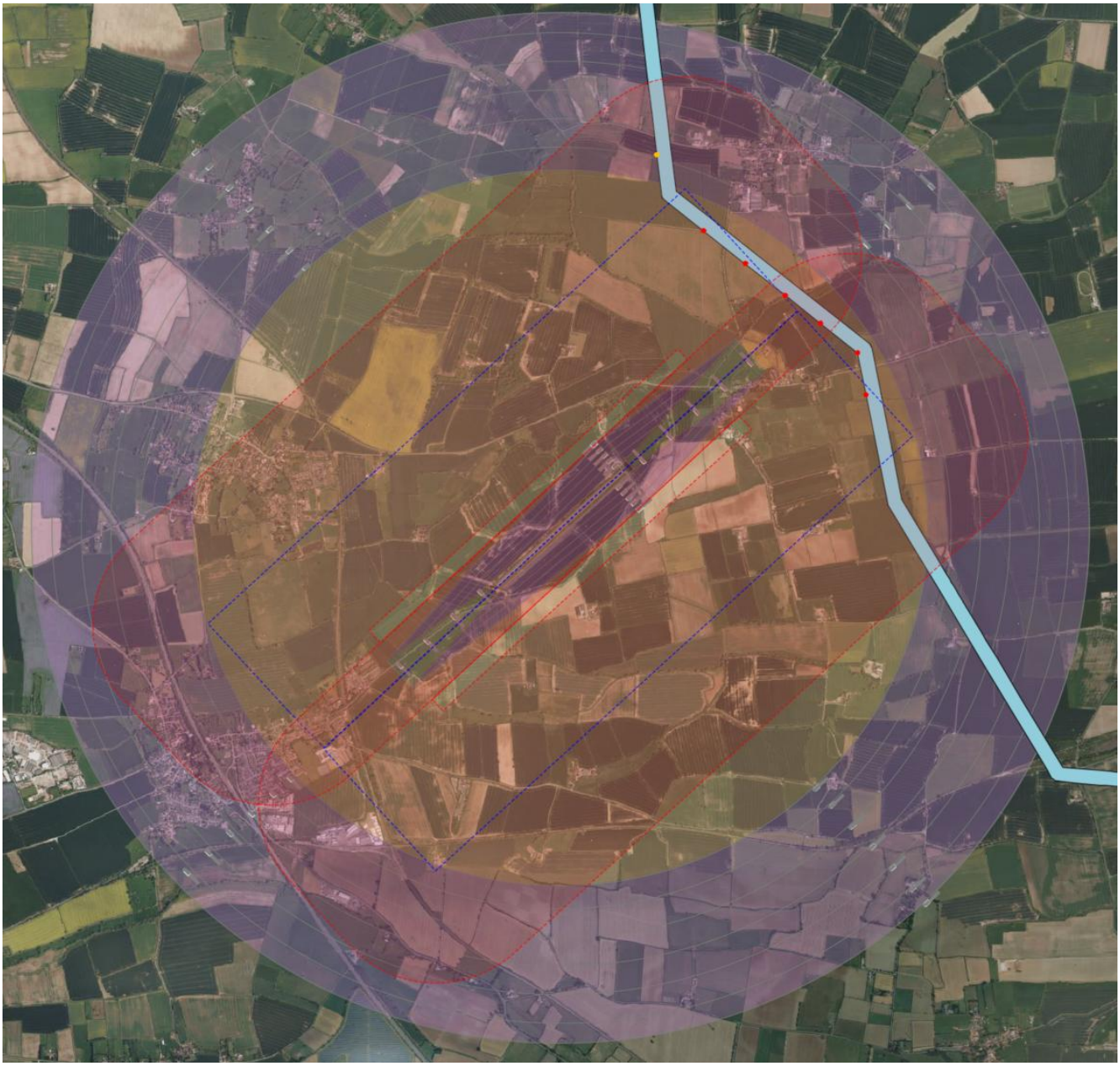


Darlton Gliding Club Risk Assessment

B.1.21 This section details the risk assessment that was undertaken for Darlton Gliding Club.

B.1.22 Image B.17 show the extent of the modelled OLS and two individual circuit patterns along with the alignment of the proposed overhead line.

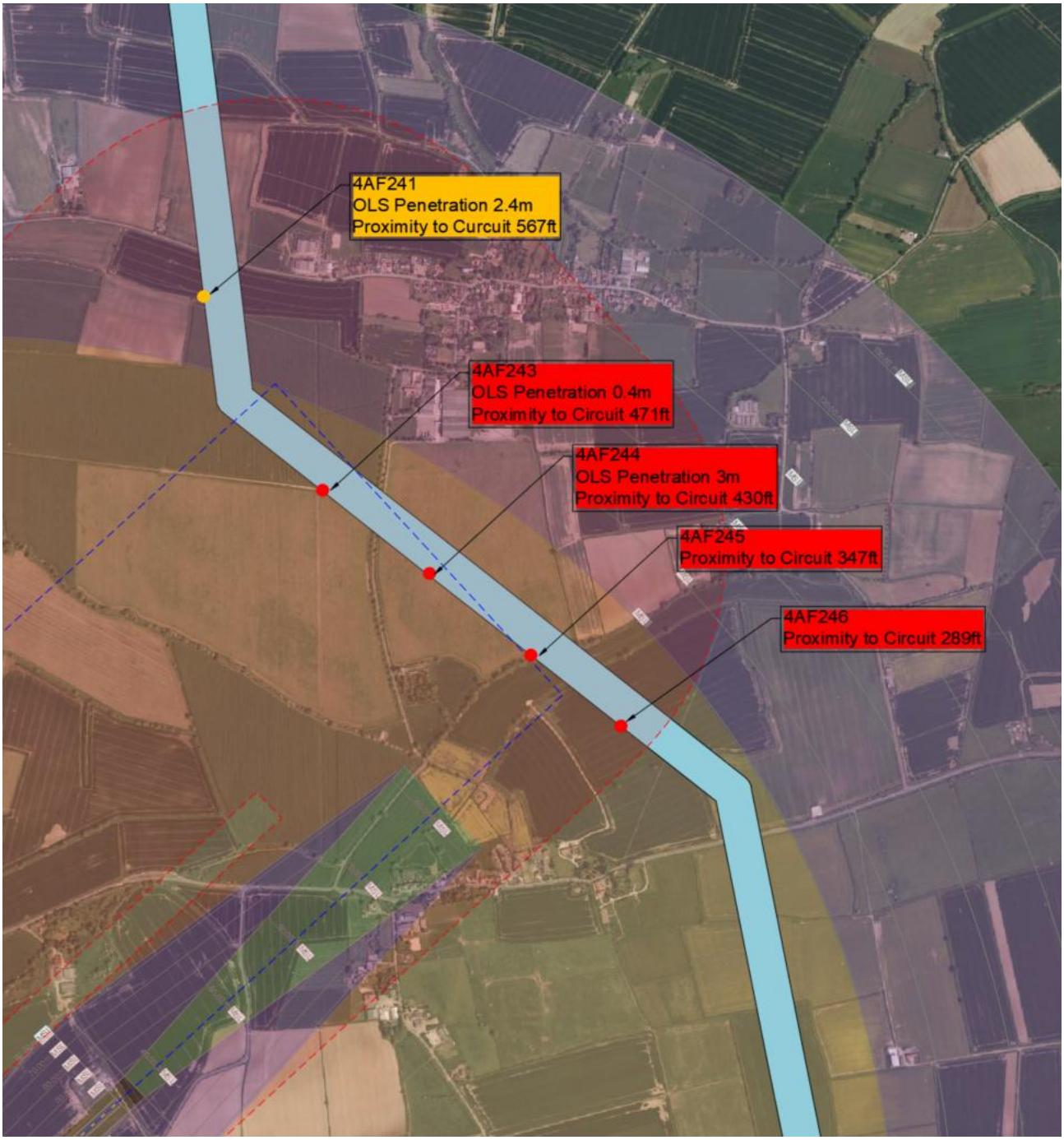
Image B.17 – Darlton Gliding Club – modelled powered aircraft circuit pattern (north and south) and OLS



Powered aircraft circuit north (800 ft)

B.1.23 The circuit height of 800 ft has been modelled for circuits flown to the north and assessed with the results shown in Image B.18. There is a high likelihood that proposed pylons 4AF243 to 4AF246 could have a clearance of less than 500 ft to aircraft flying in the circuit, therefore posing a high risk. The remaining pylons have a high likelihood of a clearance of greater than 500 ft but still penetrate the OLS, therefore posing a medium risk.

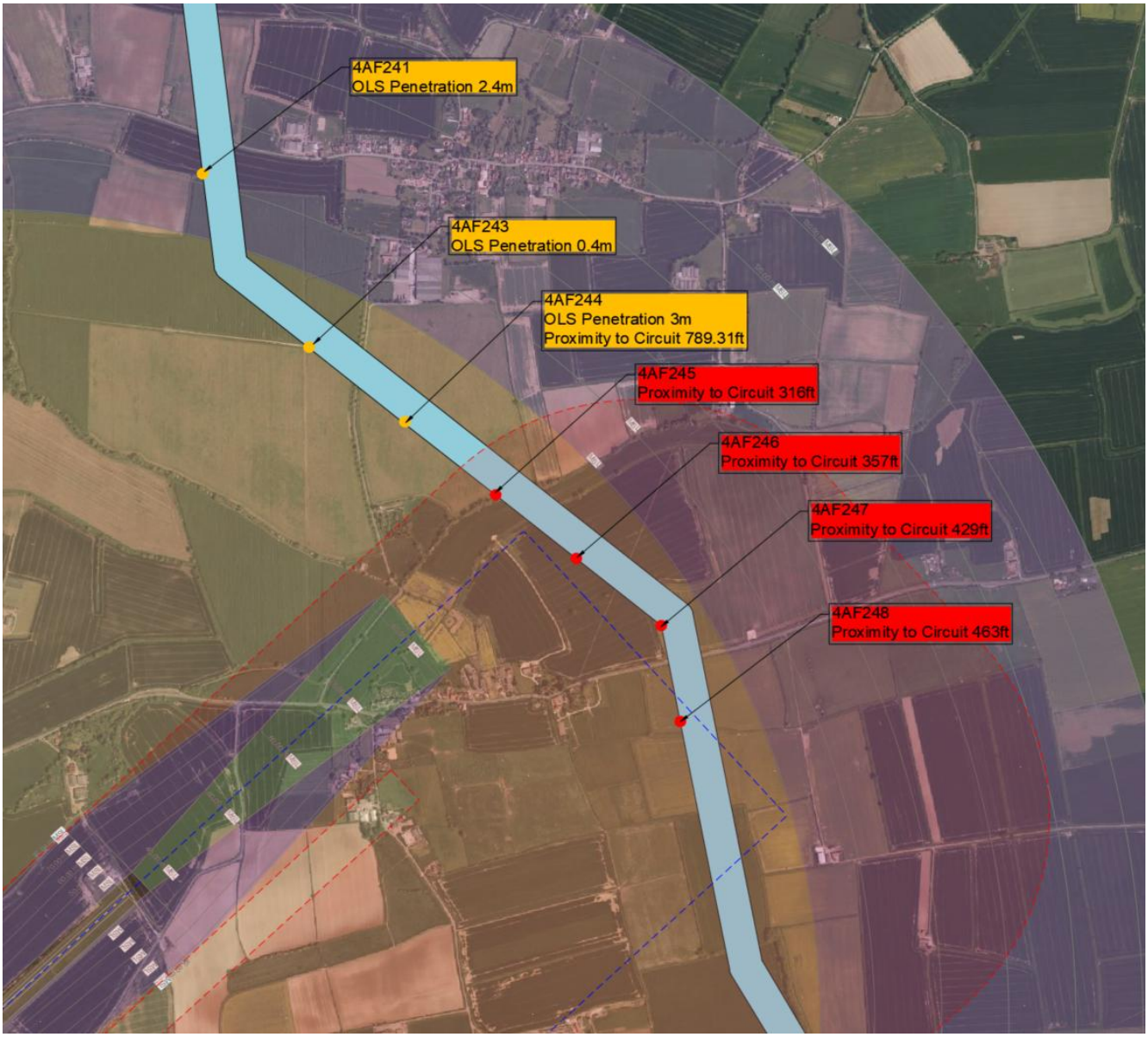
Image B.18 – Darlton Gliding Club risk assessment – powered aircraft circuit pattern (north)



Powered aircraft circuit south (800 ft)

B.1.24 The circuit height of 800 ft has been modelled for circuits flown to the south and assessed with the results shown in Image B.19. There is a high likelihood that proposed pylons 4AF245 to 4AF248 could have a clearance of less than 500 ft to aircraft flying in the circuit, therefore posing a high risk. The remaining pylons have a high likelihood of a clearance of greater than 500 ft but still penetrate the OLS, therefore posing a medium risk.

Image B.19 – Darlton Gliding Club risk assessment – powered aircraft circuit pattern (south)



Haxey Risk Assessment

B.1.25 This section details the risk assessment that was undertaken for Haxey aerodrome.

B.1.26 Image B.20 shows the extent of the modelled OLS and circuit pattern along with the alignment of the proposed overhead line.

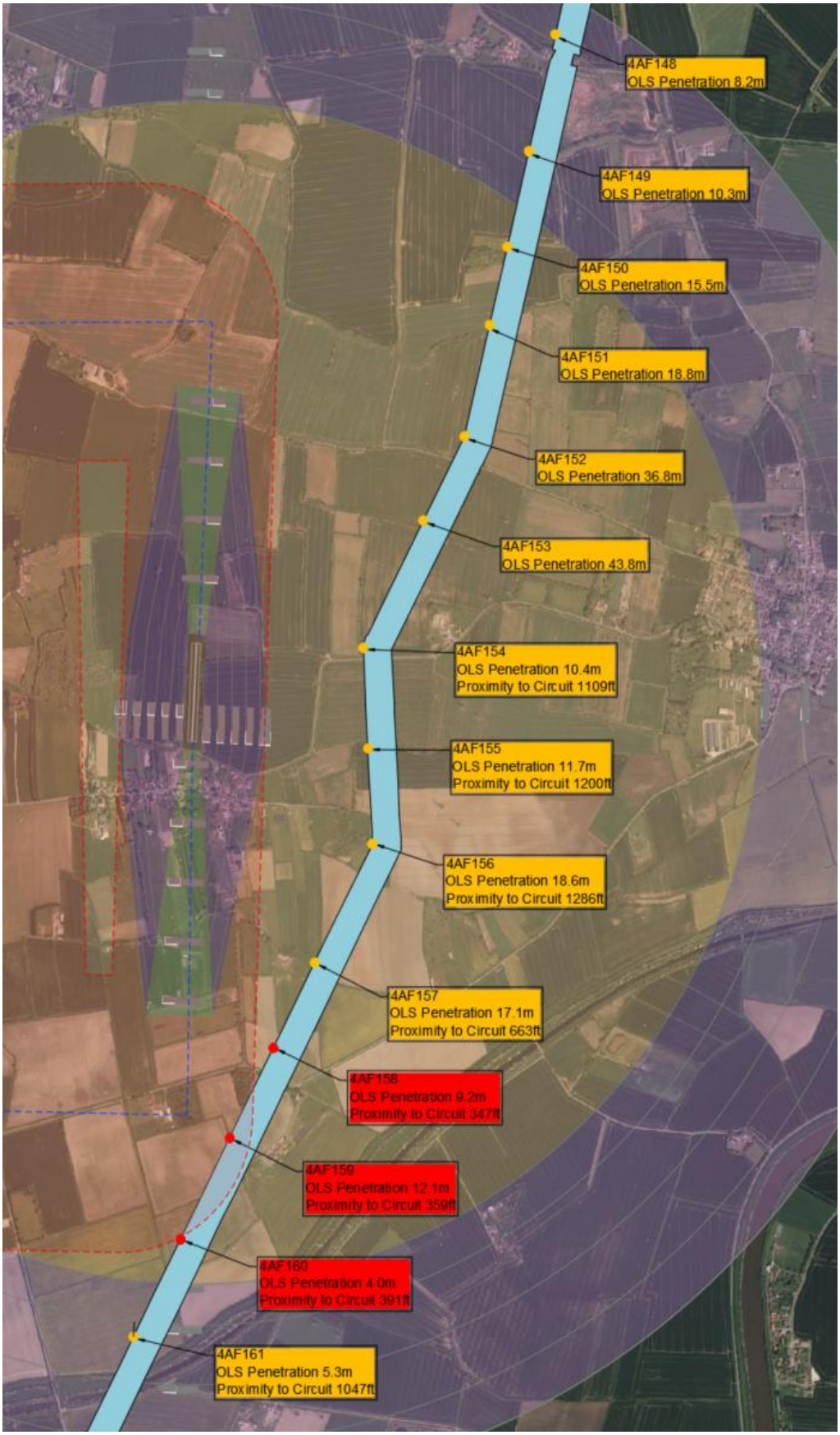
Image B.20 – Haxey – modelled circuit pattern and OLS



Standard circuit (1,000 ft)

B.1.27 Image B.21 shows the risk assessment results for each proposed pylon. There is a high likelihood that proposed pylons 4AF158 to 4AF160 could have a clearance of less than 500 ft to aircraft flying in the circuit, therefore posing a high risk. This is due to their proximity to the base leg and turn onto final approach. In this scenario an aircraft would be descending towards the pylons with limited visibility. In the reverse direction an aircraft would be taking off towards the pylons, again with limited visibility. The remaining pylons have a high likelihood of a clearance of greater than 500 ft but still penetrate the OLS, therefore posing a medium risk.

Image B.21 – Haxey risk assessment

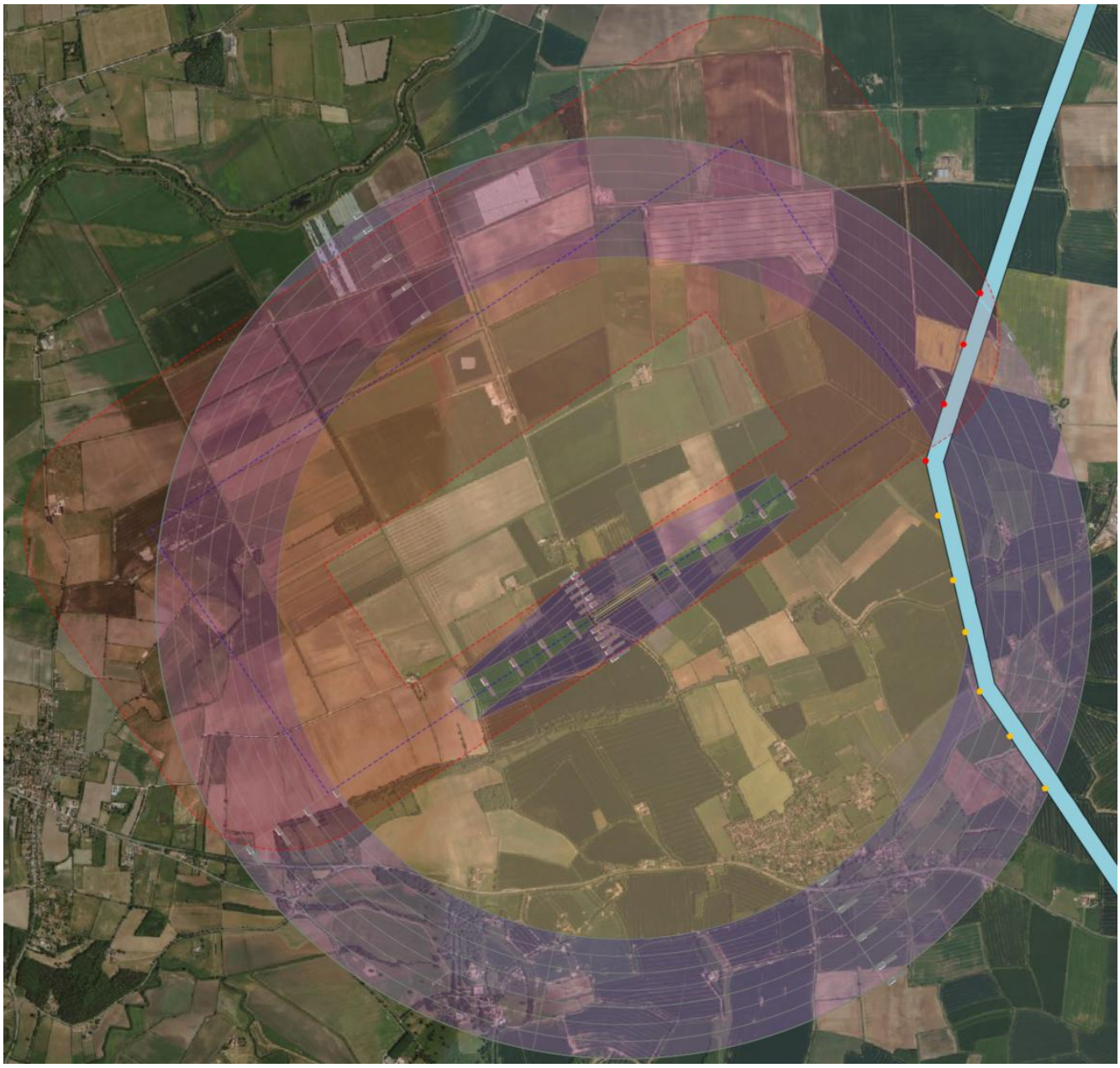


Willow Farm Risk Assessment

B.1.28 This section details the risk assessment that was undertaken for Willow Farm.

B.1.29 Image B.22 shows the extent of the modelled OLS and circuit pattern along with the alignment of the proposed overhead line.

Image B.22 – Willow Farm– modelled circuit pattern and OLS

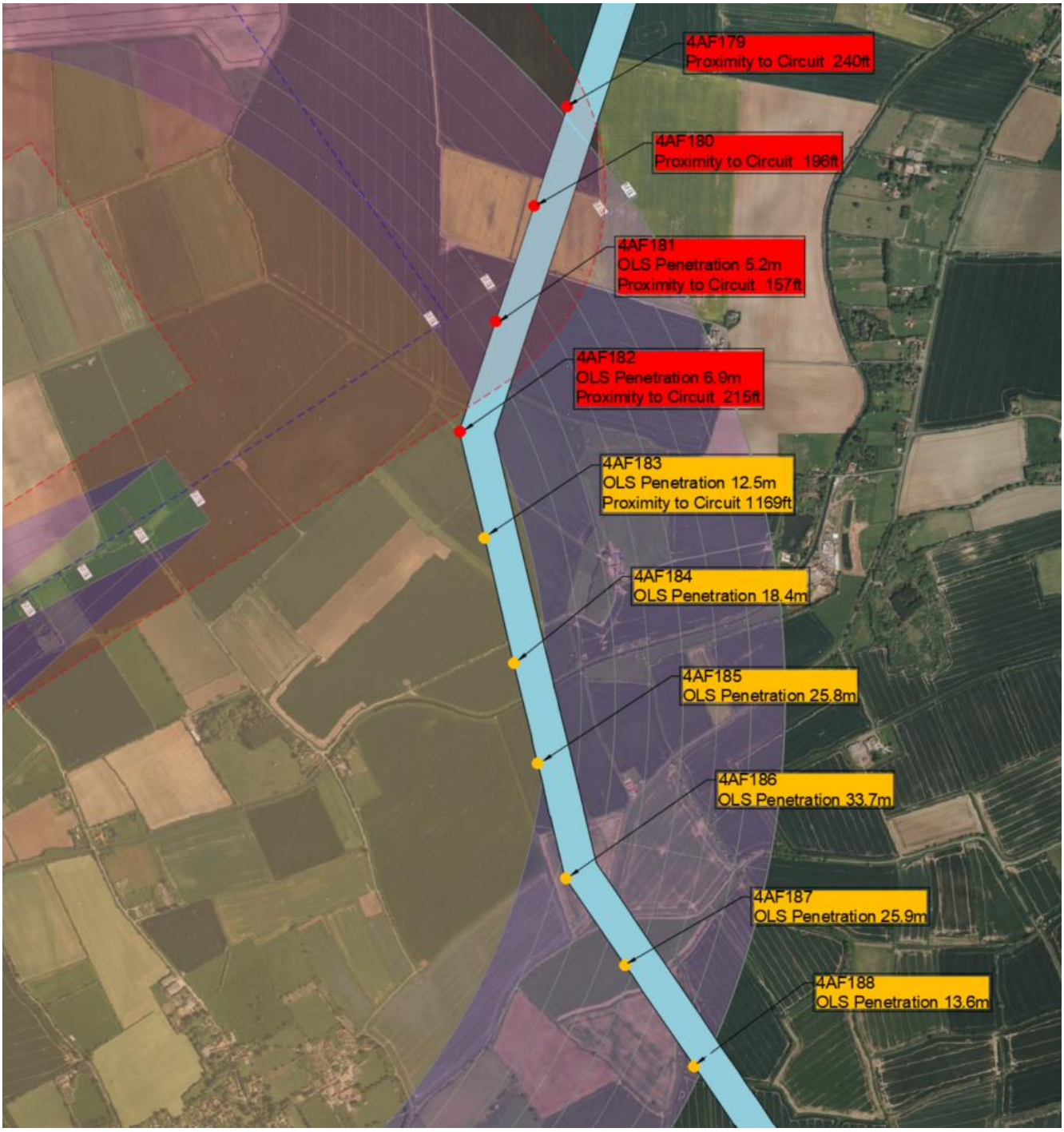


Standard circuit (800 ft)

B.1.30 Image B.23 shows the risk assessment results for each proposed pylon. There is a high likelihood that proposed pylons 4AF179 to 4AF182 could have a clearance of less than 500 ft to aircraft flying in the circuit, therefore posing a high risk. The remaining pylons have a high likelihood of a clearance of greater than 500 ft but still penetrate the OLS, therefore posing a medium risk.

B.1.31 It should be noted that for this section of the route the aerodrome owner has reviewed the proposed alignment of the overhead line and confirmed that the proposed OHL would not cause any problems for their operation. This statement is pertinent as the responsibility for safe operations at an unlicensed aerodrome in the UK ultimately lies with the aerodrome operator and the pilot. It is, however, considered as part of this risk assessment that the proximity of the proposed pylons does pose a high risk to aircraft in flight, and therefore also to the proposed National Grid infrastructure.

Image B.23 – Willow Farm risk assessment



Annex C Assessment of, Humberside International, Doncaster Sheffield, Retford/Gamston and Sandtoft Aerodromes

nationalgrid

Annex C
Assessment of Humberside International, Doncaster Sheffield and Retford/Gamston and Sandtoft aerodromes

C.1.1 In addition to the eight unlicenced aerodromes which have been assessed in this report, National Grid also requested that WSP undertake a high-level assessment of four additional aerodromes which are located further from the overhead line. These aerodromes/airports were:

- Retford/Gamston Aerodrome;
- Humberside International Airport;
- Sandtoft Aerodrome; and
- Doncaster Sheffield Airport

C.1.2 It should be noted that Retford, Humberside and Sandtoft aerodromes/airports are licensed and therefore afforded formal safeguarding protections under UK Civil Aviation Authority regulations. Doncaster Sheffield Airport is not currently licenced due to it being non-operational, however it was licenced prior to 2022 and is highly likely to be licenced in the near future and has therefore been treated as a licenced aerodrome for the purposes of this assessment.

C.1.3 In contrast to the other eight unlicensed aerodromes in this report, the assessment for Retford/Gamston, Humberside, Sandtoft and Doncaster is more straightforward. This is due to the process for safeguarding being clearly prescribed in the Civil Aviation Authority regulatory and guidance documents such as CAP 168 and CAP 738.

C.1.4 The following sections lay out the assessment carried out for each site.

Retford/Gamston

C.1.5 Retford/Gamston is located 3 km south of the town of Retford in Nottinghamshire and operated by Gamston Aviation Limited. It has two runways, one orientated 14/32 which is 800 m long and unlicensed, and another orientated 02-20 which is 1,199 m long and licensed. Operations include both fixed wing and rotary aircraft, with pilot training taking place at the site.

C.1.6 Circuits are predominantly flown to the west of the runway to avoid conflict with aircraft operating from Headon aerodrome which is located 5 km to the east of Retford/Gamston.

C.1.7 The Obstacle Limitation Surfaces (OLS) are shown in Image C.1 where it can be seen that no conflict exists with the proposed overhead line. The closest distance between the proposed overhead line route and the OLS is 3 km.

Image C.1 – Retford/Gamston – OLS



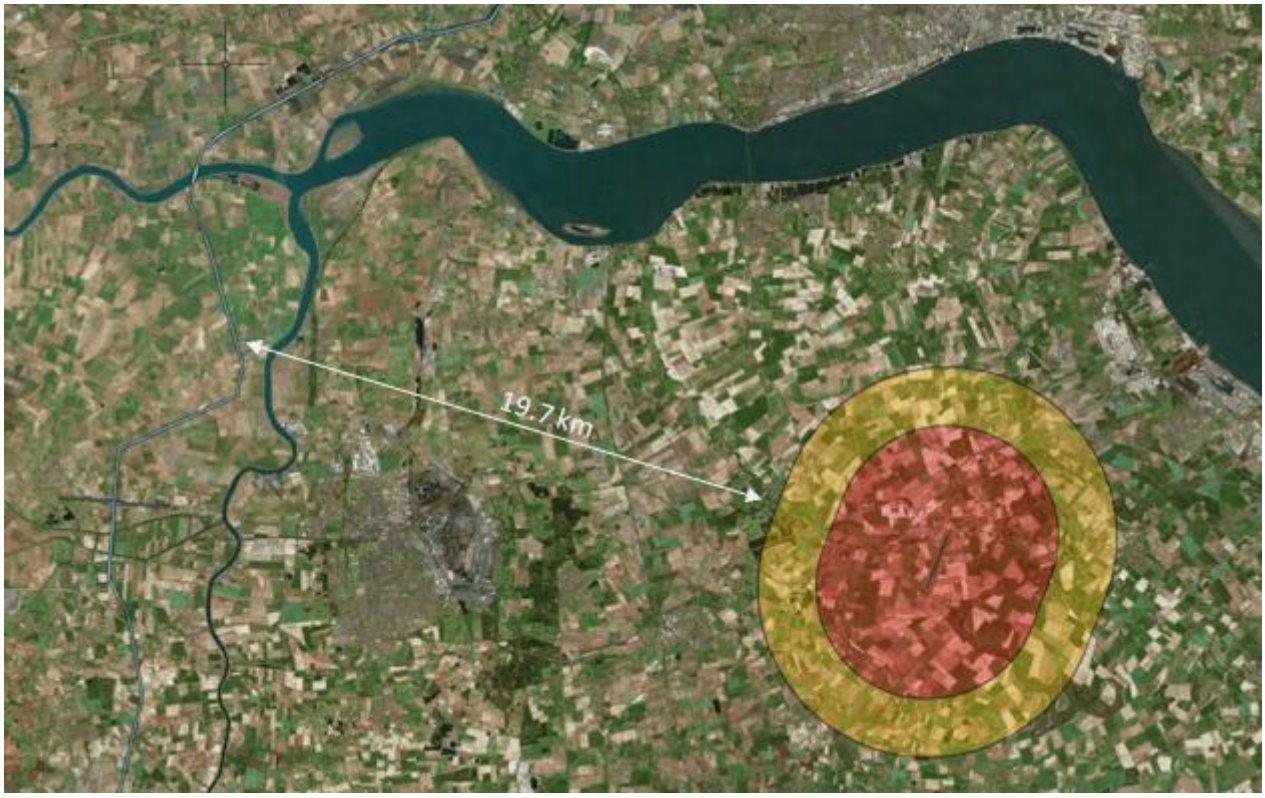
Humberside International Airport

C.1.8 Humberside International Airport is located 16 km northwest of the town of Grimsby in Lincolnshire and operated by Humberside International Airport Limited. It has two runways, a main runway orientated 02/20 which is 2,200 m long and licensed, and another orientated 08/26 which is 990 m long and also licensed. It is a fully licensed international airport with commercial passenger transport jets operating at the site, as well as rotary aircraft and pilot training.

C.1.9 The OLS are shown in Image C.2 where it can be seen that no conflict exists with the proposed overhead line. The closest distance between the proposed overhead line route and the OLS is 19.7 km.

C.1.10 A check has also been carried out on the standard instrument departures and arrivals (SIDS and STARS) which are the prescribed routes which commercial aircraft use to arrive and depart from the airport. No conflict has been found between these and the proposed overhead line.

Image C.2 – Humberside – OLS



Sandtoft

C.1.11 Sandtoft is located 19.7 km miles southwest of the town of Scunthorpe in Lincolnshire and operated by E-Plane Limited. It has a single runway orientated 05/23 which is 886 m long and licensed. Operations include both fixed wing, flexiwing (microlights) and rotary aircraft, with pilot training also taking place at the site.

C.1.12 Sandtoft do not publish their circuit patterns; however, the latest edition of Pooleys Guide (2025) states that right hand circuits are flown on Runway 23 and left hand circuits are flown on Runway 05, therefore both being flown to the northwest of the runway which is on the opposite side of the runway to the proposed overhead line.

C.1.13 The OLS are shown in Image C.3 where it can be seen that no conflict exists with the proposed overhead line. The closest distance between the proposed overhead line route and the OLS is 0.5 km.

Image C.3 – Sandtoft – OLS



Doncaster Sheffield Airport

C.1.14 Doncaster Sheffield Airport (DSA), previously known as Robin Hood Airport Doncaster Sheffield, is located at the former RAF Finningley site, approximately 10 km southeast of Doncaster and 31 km east of Sheffield.

C.1.15 It is owned by Peel Group but the site is controlled by the City of Doncaster Council under a 125-year lease following its closure in 2022 and is currently non-operational and unlicenced.

C.1.16 The council have plans to re-open the airport in the near future and re-commence commercial operations. This will be through a council-owned operator named Fly Doncaster Ltd and involve reinstating airspace arrangements and obtaining Civil Aviation Authority approvals to re-licence the airport for commercial operations.

C.1.17 It has a single runway orientated 02/20 which is 2,893 m long, making it one of the longest runways in the UK.

C.1.18 Due to it being non-operational the airport does not currently publish any operational information such as circuit patterns, approach and departure paths.

C.1.19 The OLS are shown in Image C.4 where it can be seen that no conflict exists with the proposed overhead line. The closest distance between the proposed overhead line route and the OLS is 3.2 km.

Image C.4 – Doncaster Sheffield Airport - OLS



Annex D
Assessment of Engine Failure Rates

nationalgrid

Annex D
Assessment of Engine Failure Rates

D.1.1 This annex summarises the available evidence on engine failure and malfunction rates in light aircraft, drawing primarily on the Australian Transport Safety Bureau (ATSB) Aviation Research Statistics report: Engine Failures and Malfunctions in Light Aeroplanes 2009–2014 (AR-2013-107). Following extensive research this appears to be the most comprehensive analysis of engine failures in light aircraft.

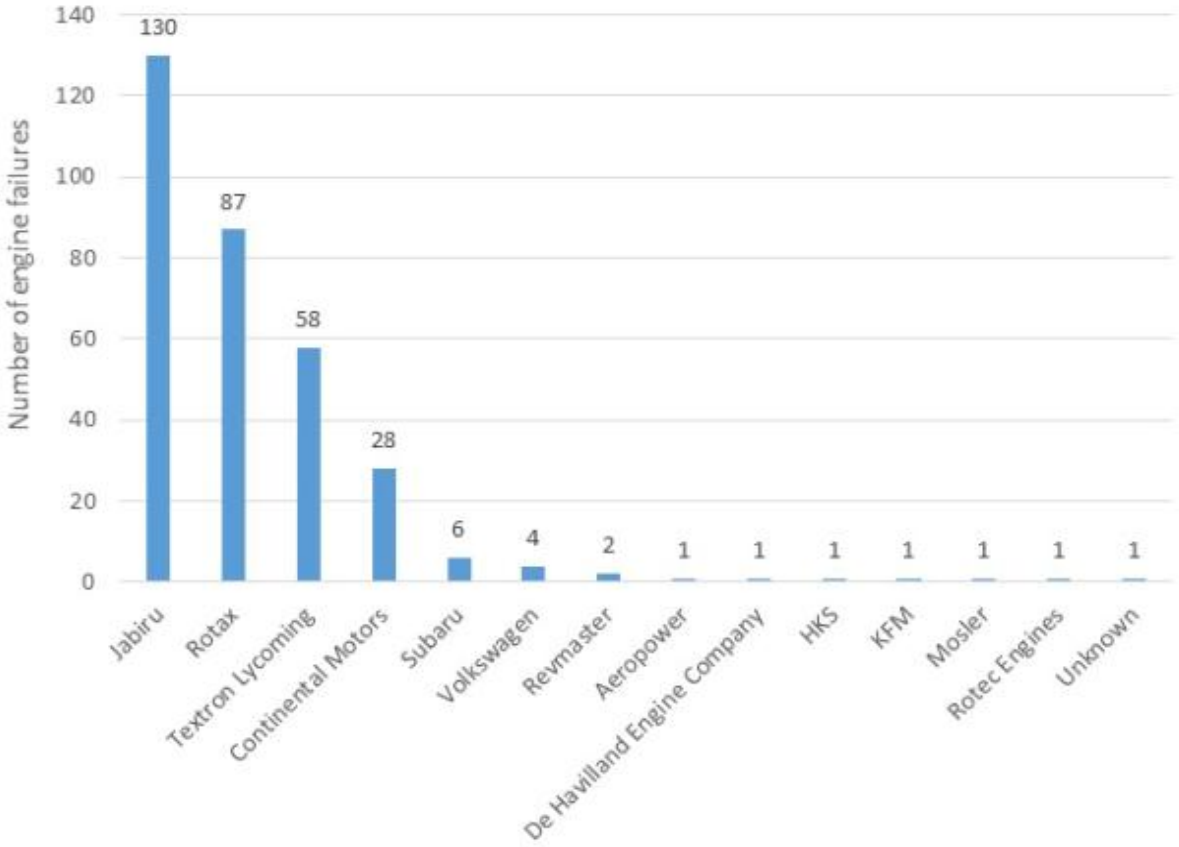
D.1.2 The objective is to inform an assessment of the risk of engine failure during take-off and landing operations at small general aviation (GA) aerodromes, recognising both the strengths and limitations of the available data.

D.1.3 The ATSB study focuses on single-engine piston aeroplanes with a maximum take-off weight of up to 800 kg, a category broadly comparable to a significant proportion of UK GA activity at small aerodromes, including light sport aircraft, microlights, and amateur-built aircraft. While the data is Australian, the underlying mechanical failure mechanisms and operational phases considered are directly relevant to UK operations.

Overview of the ATSB Dataset and Methodology

D.1.4 The ATSB analysed 322 engine failure or malfunction occurrences reported between 2009 and 2014. Across the six-year study period, the ATSB estimated a total of approximately 1.6 million flight hours for the relevant aircraft population, equating to an average of one reported engine failure or malfunction every 5,000 flight hours. Normalisation of occurrence counts by hours flown allowed comparison of failure rates across engine manufacturers. This data is presented in Image D.1.

Image D.1 – Number of engine failures per manufacturer



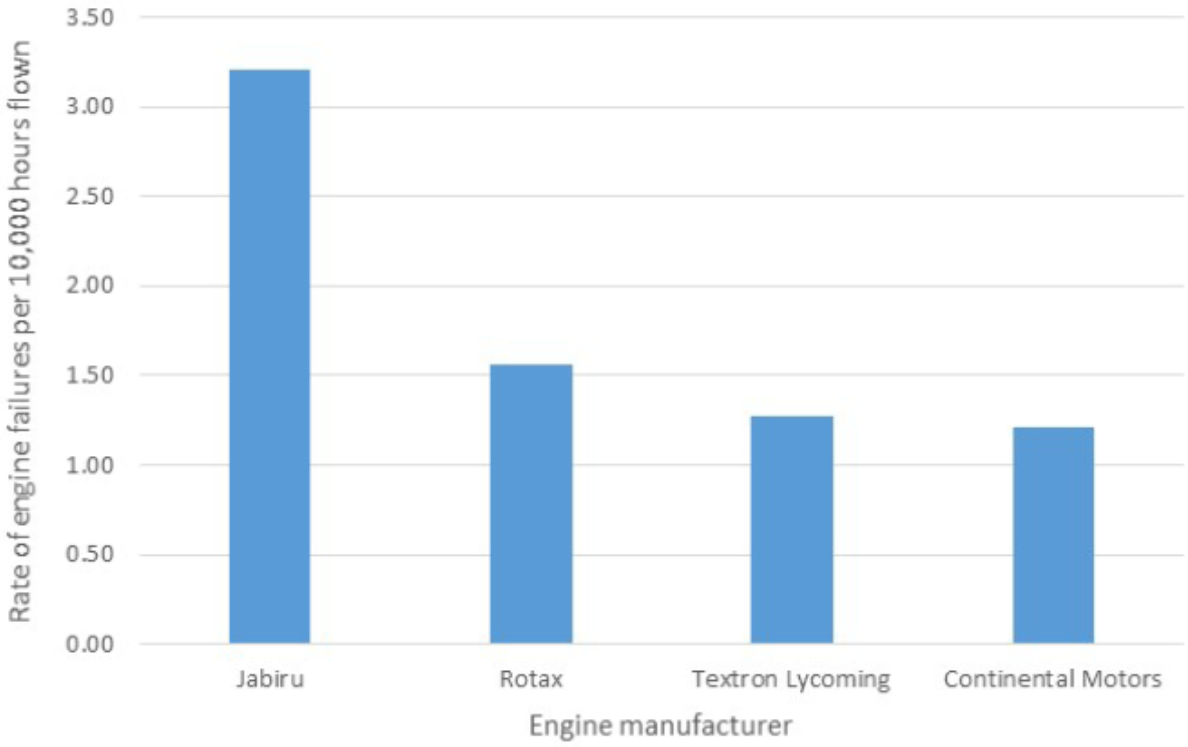
Engine Failure Rates and Manufacturer-Related Trends

D.1.5 Four engine manufacturers accounted for 94% of all reported occurrences: Jabiru, Rotax, Textron Lycoming, and Continental Motors. When normalised by hours flown, the ATSB reported the following average failure or malfunction rates per 10,000 flight hours over the study period:

- **Jabiru:** 3.21 per 10,000 hours;
- **Rotax:** 1.56 per 10,000 hours;
- **Textron Lycoming:** 1.27 per 10,000 hours; and
- **Continental Motors:** 1.21 per 10,000 hours.

D.1.6 This data is presented in Image D.2.

Image D.2 – Rate of engine failures per manufacturer



Relevance of Failure Timing to Take-Off and Landing Risk

D.1.7 The ATSB analysis highlights that the safety consequences of an engine failure are strongly dependent on phase of flight, with initial climb, approach, and landing presenting the most credible risk of serious outcome due to limited height, airspeed margin, and available landing options.

D.1.8 Of the 18 high-risk occurrences identified, a substantial proportion occurred during initial climb after take-off or during approach, including several fatal accidents and forced landings following power loss shortly after departure or below 300 ft on approach. These phases closely align with operations at small GA aerodromes, where:

- Runway lengths are typically shorter;
- Obstacle clearance margins are reduced;
- Suitable forced-landing areas may be limited; and
- Traffic density and circuit constraints may restrict manoeuvring options.

D.1.9 For the purposes of risk assessment, the ATSB data demonstrate that while engine failures are relatively infrequent in absolute terms, failures occurring close to the ground disproportionately contribute to serious and fatal outcomes.

Limitations and Uncertainty

D.1.10 Several limitations must be recognised when applying the ATSB findings to the UK:

- The data is Australian, with different regulatory, maintenance, and reporting environments.

- Occurrence reporting practices influence observed rates; under-reporting cannot be excluded.
- The study does not provide phase-of-flight-specific failure rates, only outcome-based risk classification.
- Fleet age, maintenance practices, and operating intensity in the UK may differ from the ATSB study population.

D.1.11 These factors suggest that the ATSB rates should be used as indicative rather than precise, and embedded within a conservative safety case framework.

Summary

D.1.12 The evidence summarised in this annex demonstrates that engine failures in light general aviation aircraft have a very low-frequency but can have a significant impact, with an overall order-of-magnitude likelihood of approximately one engine failure or malfunction every 5,000 flying hours. While the absolute probability of such an event during any single take-off or landing is low, the ATSB data clearly shows that engine failures occurring at low height and low airspeed carry a disproportionately high risk of serious or fatal outcome, particularly during initial climb and late approach.

D.1.13 This has direct relevance when considering the introduction of new fixed obstacles, such as an overhead line, in the vicinity of a small general aviation aerodrome. The critical issue is not whether an engine failure is likely to occur at a specific point in space, but that the presence of additional obstacles reduces the margins available to pilots responding to an unexpected loss of power. In the event of an engine failure shortly after take-off or on approach, pilots may have only seconds to select a forced-landing path; any reduction in obstacle-free options materially increases the severity of the outcome.

D.1.14 Given the nature of the risk, mitigation should focus on consequence reduction rather than prevention of engine failure itself, which is largely outside the control of aerodrome operators or infrastructure developers. Appropriate and proportionate mitigations may include:

- Obstacle placement and height;
- Locating overhead lines outside the primary climb-out and approach sectors where practicable;
- Aligning infrastructure to minimise the likelihood that a forced landing or shallow turn-back trajectory would intersect the obstacle;
- Clear depiction of the obstacle in aeronautical information, aerodrome documentation, and local briefing material; and
- Consultation with the aerodrome owners and operators to discuss their engine failure procedures.

Annex E
Historical Examples of Incidents / Accidents Between Aircraft and Power Lines in the UK

nationalgrid

Annex E
Historical Examples of Incidents / Accidents Between Aircraft and Power Lines in the UK

E.1.1 The table below lists the incidents and accidents that have occurred within the past ten years in the UK between light aircraft (fixed wing and rotary) and power lines. This data was taken from the UK Air Accidents Investigation Branch.

E.1.2 From the information provided the below conclusions can be deduced:

- There have been 11 reported instances of aircraft colliding with power lines in the UK between 2015 and 2025.
- Out of these 11 cases it appears that there is only one case of an aircraft colliding with a high voltage (132 kV) power line. This was not in proximity to the departure aerodrome and was a result of the pilot flying below the minimum legal height in proximity to the power line.
- Ten of the cases were during either the take-off or landing phases of flight and the majority involved wood pole power lines.
- Three of the incidents involved fixed wing aircraft.
- Three of the incidents involved microlight aircraft.
- Four of the incidents involved helicopters.
- One of the incidents involved a gyrocopter.
- Six of the incidents resulted in no injuries.
- Four of the incidents resulted in minor injuries.
- One of the incidents resulted in serious injuries.

Report	Date	Object struck	Phase	Category	Aircraft	Location	Injury	Damage	Description	Type of power line
DH82A_Tiger_Moth_G-ANMO_05-22	26/08/2021	Powerline	Approach	General aviation – fixed wing	DH82A Tiger Moth (fixed wing)	Headcorn Aerodrome, Kent	Crew – 2 (Minor)	Damage to landing gear, propeller, wings and fuselage	During a flight to teach a qualified pilot to land on a short unlicensed grass strip, the aircraft was low and slow on short final. It contacted a tree followed by a power line, which was atop wooden pylons, before toppling to the ground onto its back.	Wooden poles
Quik_GT450_G-CFKJ_05-20	02/12/2019	Powerline	Approach	Sport aviation and balloons	Quik GT450 (microlight)	Field approx. 2 miles northeast of Caernarfon Airport, Gwynedd	None	Damage to pod, windshield, wheel spat. and electrical systems	During a local flight, the engine stopped and could not be restarted. A field was selected for a forced landing and at a late stage of the approach, the aircraft struck overhead power cables (11,000 V) which were not seen by the pilot or the passenger. The cables were severed, the aircraft sustained minor damage and the occupants were uninjured.	11 kV wooden poles
Pegasus_Quasar_IITC_G-MYJT_05-20	27/08/2019	Powerline	Landing	Sport aviation and balloons	Pegasus Quasar IITC (microlight)	Brindle, Lancashire	None	Destroyed	The aircraft collided with power lines and was destroyed during a precautionary landing at dusk. The pilot departed with little contingency time before night fell and was delayed by navigation difficulty.	Not described
AW109SP_G-VIVE_05-20	04/11/2019	Powerline	Approach	Commercial – Rotorcraft	AW109SP (helicopter)	Robins Farm, Chiddingfold, Surrey	None	Nose landing gear door damaged	The aircraft was on final approach to a rural landing site at night. During the later stages of the approach the aircraft sank below the planned approach path and struck power lines.	Not described
Robinson_R44_Raven_G-HWKS_05-19	26/02/2019	Powerline	Approach	Commercial – Rotorcraft	Robinson R44 Raven (helicopter)	Near Sketrick Island, County Down	None	Blades damaged, minor damage to mast and tail cone	The pilot was flying an approach to a private site on Sketrick Island. As he made his final approach over the water between the Island and the mainland, the helicopter struck electrical power lines which were strung from the mainland to the island. The pilot decided to land the helicopter immediately on the nearest road.	Not described
MBB-BK_117_D-2_EC145_G-HEMC_04-19	15/12/2018	Telegraph wires	Landing	Commercial – Rotorcraft	MBB-BK 117 D-2 EC145 (helicopter)	Near Hollesley, Suffolk	None	None	Whilst repositioning to land during a Helicopter Emergency Medical Service (HEMS) operation at night, the aircraft struck a wire. No damage was caused. Despite a reconnaissance from the air and on foot, the presence of the wire was not known to the crew.	Confirmed as telegraph pole
Groppo_Trail_G-CIGR_10-18	14/07/2018	Telegraph wires	Take-off	General aviation – fixed wing	Groppo Trail (fixed wing)	South Longwood Farm,	Minor	Extensive	The aircraft was very close to its maximum take-off weight when it began its take-off roll in conditions of light wind and with a temperature of	Confirmed as

Report	Date	Object struck	Phase	Category	Aircraft	Location	Injury	Damage	Description	Type of power line
						Owslebury, Hampshire			approximately 27°C. After lift-off the aircraft climbed by no more than about 15–20 ft and, after crossing a public road, it struck a telegraph pole and dropped into the hedgerow below.	telegraph pole
Rotorsport_UK_MTOsport_G-SIXG_06-17	17/12/2016	Powerline	Landing	Sport aviation and balloons	Rotorsport UK MTOsport (gyrocopter)	Hope Farm, Braithwaite, Caldbeck, Cumbria	None	Substantial	G-SIXG was flying at approximately 2,000 ft Above Mean Sea Level (amsl) when it struck a bird, causing 'violent shaking' of the airframe until the propeller blades detached. The pilot positioned the aircraft for a forced landing onto a field on a southerly heading. He saw power cables running along the side of the field but the low sun prevented him from seeing other power cables running across the field. Just before the aircraft landed it struck one of the cables running across the field, which brought it to a halt and tipped it onto its side.	Not described
Pegasus_Quik_G-XJJM_02-16	23/07/2015	Powerline	Normal flight	Sport aviation and balloons	Pegasus Quik (microlight)	Hall Lane Farm, Burtonwood, Cheshire	Crew – 1 (Serious)	Aircraft damaged beyond economic repair	The flex-wing aircraft, while being flown at low level by a student, struck an electrical transmission cable and crashed into a field to the east of Hall Lane Farm, Burtonwood, Cheshire. The aircraft was observed by a number of witnesses flying at low level before it collided with the 132 KV electrical transmission cable before it struck the ground. The engineers who inspected the cable reported that the aircraft initially struck the top phase conductor, which was measured as being 25 m (80 ft) above the ground and then passed between the top phase and earth conductor, measured as being 30 m (100 ft) above the ground. The aircraft struck the cable at a position midway between the supporting pylons. While the outer copper conductor on the cable had been damaged, the inner steel core remained intact.	132 kV 100 ft high
Enstrom_480_G-IGHH_01-16	09/09/2015	Powerline	Take-off	Commercial – Rotorcraft	Enstrom 480 (helicopter)	Church Farm House, Aldbury, Hertfordshire	Crew – 1 (Minor)	Aircraft destroyed	The pilot was planning to take off from a private site. Having lifted vertically to about 30 ft Above Ground Level (agl), to clear a barn that was directly in front, the helicopter was flown forward followed by a right turn. The pilot then descended the helicopter slightly to	Not described

Report	Date	Object struck	Phase	Category	Aircraft	Location	Injury	Damage	Description	Type of power line
									accelerate. At this point he saw, about 80 m ahead, some power cables which had become visible against the sky as the helicopter descended. The pilot attempted to turn right and climb over the cables but the helicopter's left skid caught the cables, causing the helicopter to roll upright and nose down before the cable snapped.	
Cirrus_SR22T_2-RORO_07-20	12/05/2019	Powerline	Take-off	General aviation – fixed wing	Cirrus SR22T (fixed wing)	A40, near Abergavenny, Wales	Crew – 1 (Minor) Passengers – 2 (Minor)	Aircraft destroyed	On take-off from Abergavenny Aerodrome the engine of 2-RORO started to produce varying amounts of power, which the pilot and witnesses described as the engine 'surging'. The power available was insufficient to allow the aircraft to climb away, and it contacted power lines before pitching down and striking a dual carriageway. The aircraft came to rest inverted and was quickly consumed by fire. All three occupants were helped to escape by a passing motorist.	Not described

National Grid plc
National Grid House,
Warwick Technology Park,
Gallows Hill, Warwick.
CV34 6DA United Kingdom

Registered in England and Wales
No. 4031152
nationalgrid.com

National Grid plc
National Grid House,
Warwick Technology Park,
Gallows Hill, Warwick.
CV34 6DA United Kingdom

Registered in England and Wales
No. 4031152
nationalgrid.com