

The Great Grid Upgrade

Chesterfield to Willington

Design Development Report

March 2026

nationalgrid

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Executive summary

The purpose of this report is to describe how the Chesterfield to Willington Project (the 'Project') has evolved between the non-statutory (Stage 1) and the statutory (Stage 2) consultation periods.

National Grid Electricity Transmission plc (NGET), referred to as National Grid in this report, 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 is produced to where it is needed. It is National Grid that is developing plans for the Project. The Project would support the UK's net zero target through a proposed network reinforcement located in the East Midlands.

The Project conducted a Stage 1 consultation between May and September 2024. This consultation (i) introduced the Project, (ii) explained why new electricity transmission infrastructure is needed in this region, (iii) explained how National Grid had developed its proposals, and (iv) sought the views of the public and stakeholders.

The feedback received during the Stage 1 consultation has been carefully reviewed and considered, alongside the findings of environmental and engineering studies and emerging results from survey works.

A review of the work done to date, comprising the previous development stages of the Project, including the Strategic Proposal stage and Options Identification and Selection stage, has been carried out following the Stage 1 consultation.

This report presents the changes that have been made to the Project and its evolution since the Stage 1 consultation, and includes an explanation of how the proposed route alignment and associated draft Order Limits for the Project have been identified.

Following consideration of the feedback received in response to the upcoming Stage 2 consultation between March and May 2026, National Grid will further develop and refine its proposals and continue to review the work done to date throughout the process of developing the Project.

The Project is still in development, and therefore the detailed design is not fully understood at this stage; however, the Project is likely to comprise the following principal components:

- A new 400 kV overhead line, approximately 60 kilometres (km) in length between a proposed new Chesterfield Substation and the existing Willington Substation. It is anticipated that this would comprise steel lattice pylons in accordance with National Grid's guidance and national planning policy.
- A new 400 kV Chesterfield Substation, to be built in the vicinity of the existing Chesterfield 275 kV Substation and the existing 132 kV National Grid Electricity Distribution Substation to the south east of Chesterfield (referred to as the 'new Chesterfield Substation'). This is proposed to be a gas insulated switchgear (GIS) substation.
- The replacement of short sections of existing overhead line and local changes to the lower voltage distribution networks to facilitate the construction of the Project.

The Project would include other required works, for example temporary and permanent diversions for works on existing overhead line routes, temporary access roads, highway works, temporary works compounds, work sites and other ancillary works. The Project would also include utility diversions and drainage works. There would also be land required for mitigation, compensation and enhancement of the environment including Biodiversity Net Gain (BNG).

The feedback from the Stage 1 and Stage 2 consultations (as applicable) will be used to inform the final designs that will be put forward in the application for a development consent order (DCO). National Grid expects to submit an application for a DCO for the Project in 2027.

1. Introduction

1.1 Purpose of This Report

1.1.1 The purpose of this report is to describe how the Chesterfield to Willington Project (the 'Project') has developed since the non-statutory (Stage 1) consultation undertaken between May and September 2024. Following the consultation, the Project has evolved in response to information collected from further environmental and engineering studies and from feedback received during the consultation period. Project design is an ongoing iterative process and further refinement, reviews and backchecking of the Project will continue to be undertaken in the light of additional surveys, assessments and responses to the statutory consultation being undertaken between March and May 2026.

1.2 Overview

1.2.1 National Grid Electricity Transmission plc (National Grid), owns, builds and maintains the high voltage electricity transmission network throughout England and Wales. National Grid is responsible for ensuring electricity is transported safely and efficiently from where it is produced to where it is needed and for developing upgrades to the network, as agreed with the industry regulator, the Office of Gas and Electricity Markets (Ofgem). As the Transmission Licence holder, section 9 of the Electricity Act 1989 (Ref 1) requires National Grid to develop and maintain an efficient, coordinated and economical electricity transmission system in a way which considers people, places and the environment. National Grid is working to build a cleaner, fairer, and more affordable energy system that serves everyone, powering the future of our homes, transport, and industry.

1.2.2 The Project is part of The Great Grid Upgrade and is needed to reinforce the electricity transmission system to help deliver the UK government's Net Zero targets. It will support these targets by adding capacity to accommodate increasing power flows from offshore wind and interconnections in Scotland and North East England to homes and businesses in the Midlands and the south. These power flows are expected to double within the next 10 years. The Project will play an important role in building a more secure and resilient future energy system. The need for the Project was first identified by the National Grid ESO¹ and the need case for the Project is set out in the Updated Project Background Document (Ref 2).

1.2.3 The Project will establish a new 400 kV transmission connection between a new 400 kV substation to be located to the south east of Chesterfield (anticipated to be developed under the separate Chesterfield to High Marnham project) and the existing Willington Substation located to the south west of Derby². Please see **Chapter 6 Design Evolution** of this report, which explains the rationale for the proposed inclusion of these works as part of this Project. The connection is expected to comprise a new wholly or largely overhead line. National Grid will also need to facilitate other local network configurations.

¹ Now the National Electricity System Operator (NESO) following its acquisition by the UK government.

² See section 1.4 for Project description

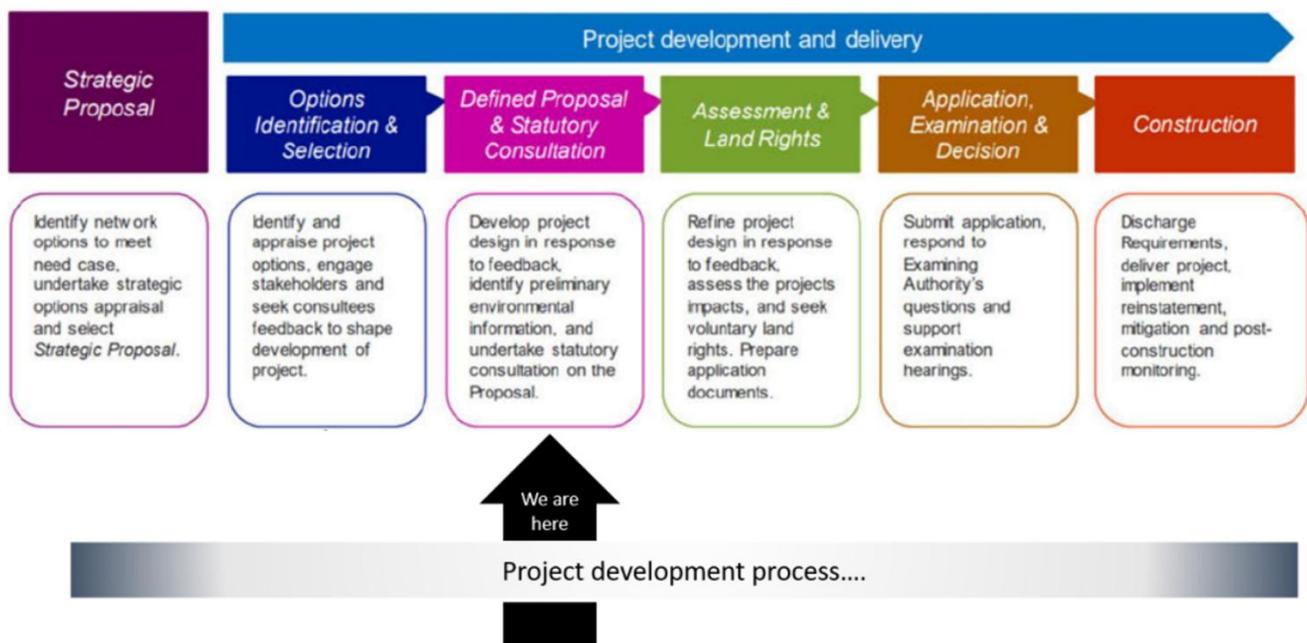
- 1.2.4 The Project is a Nationally Significant Infrastructure Project (NSIP), as defined under section 16 of the Planning Act 2008 (PA 2008) (Ref 3) because it comprises a new electricity line above ground with a length of more than 2 kilometres (km), and with an operating voltage of above 132 kV. NSIPs are projects which are considered by the government to be of national importance and permission to build them therefore needs to be given at a national level, in this case, by the Secretary of State for Energy Security and Net Zero (the SoS).
- 1.2.5 National Grid must apply for development consent for the Project, via the Planning Inspectorate. If the application is accepted, an examining authority of one or more examining inspectors would be appointed who, after a period of public examination, would make their recommendation to the SoS. The SoS would then decide as to whether development consent for the Project should or should not be granted. The timescale between acceptance of the submission and a decision is approximately 18 months in most cases.

1.3 National Grid Approach to Consenting

1.3.1 National Grid’s Approach to Consenting (Ref 4) outlines the development process for major infrastructure projects, from initial inception to consent and construction. The approach is divided into the following six stages, as detailed in **Image 1.1**:

- Stage 1: Strategic Proposal;
- Stage 2: Options Identification and Selection;
- Stage 3: Defined Proposal and Statutory Consultation;
- Stage 4: Assessment and Land Rights;
- Stage 5: Application, Examination and Decision; and
- Stage 6: Construction.

Image 1.1: National Grid’s consenting process (Our Approach to Consenting (Ref 4))



- 1.3.2 To date National Grid has identified a ‘Strategic Proposal’ (Stage 1) and has undertaken ‘Options Identification and Selection’ (Stage 2).
- 1.3.3 At Stage 1, National Grid undertook a Strategic Options Appraisal which identified the preferred strategic option to address the identified need. This considered a wide range of options for providing the necessary north–south power flows and concluded that the establishment of a new electricity transmission route between Chesterfield and Willington Substations represented the most appropriate solution. The Strategic Options Appraisal is reported in the Strategic Options Report (Ref 5).
- 1.3.4 Since publication of the Strategic Options Report, an exercise to review the conclusions of these reports has been undertaken and reported on in the Strategic Options Report Update (Ref 6). This review exercise is discussed in **Chapter 4 Review of Previous Development Stages**.
- 1.3.5 Following identification of the Strategic Proposal, National Grid undertook the Options Identification and Selection Stage (Stage 2), which is reported in the Corridor Preliminary Routeing and Siting Study (CPRSS) (Ref 7). The CPRSS describes the identification and assessment of preliminary route corridors and concludes with the identification of an emerging preferred corridor. The emerging preferred corridor was subject to Stage 1 consultation undertaken between May and September 2024.
- 1.3.6 The Project is now at the Defined Proposal and Statutory Consultation Stage (Stage 3) and is the subject of a statutory consultation under the PA 2008. A list of all the documents produced for the statutory consultation is available on the Project website.
- 1.3.7 As the Project progresses and additional information becomes available, including feedback received from consultees in response to consultation, previous design decisions will continue to be reviewed and backchecked to ensure that the outcome of each stage remains a valid basis for the next stage. As such, no final decision has been made and no conclusions should be considered as final.

1.4 Project Description

- 1.4.1 The Project would establish a new 400 kV transmission connection between a new substation to be located to the south east of Chesterfield and the existing Willington Substation to the south west of Derby.
- 1.4.2 National Grid’s current draft proposals for the Project is still in development, and therefore the detailed design is not fully understood at this stage; however, the Project is likely to comprise the following principal components:
- A new 400 kV overhead line, approximately 60 kilometres (km) in length between a proposed new Chesterfield Substation and the existing Willington Substation. It is anticipated that this would comprise steel lattice pylons in accordance with National Grid’s guidance and national planning policy.
 - A new 400 kV Chesterfield Substation, to be built in the vicinity of the existing Chesterfield 275 kV Substation and the existing 132 kV National Grid Electricity Distribution Substation to the south east of Chesterfield (referred to as the ‘new Chesterfield Substation’). This is proposed to be a gas insulated switchgear (GIS) substation.
 - The replacement of short sections of existing overhead line and local changes to the lower voltage distribution networks to facilitate the construction of the Project.

- 1.4.3 The Project would include other required works, for example temporary and permanent diversions for works on existing overhead line routes, temporary access roads, highway works, temporary works compounds, work sites and other ancillary works. The Project would also include utility diversions and drainage works. There would also be land required for mitigation, compensation and enhancement of the environment including Biodiversity Net Gain (BNG).
- 1.4.4 The Project would be designed, constructed, and operated in accordance with applicable health and safety legislation. The Project will also comply with design safety standards including the National Electricity Transmission System (NETS) Security and Quality of Supply Standard, which sets out the criteria and methodology for planning and operating the NETS. This informs a suite of National Grid policies and processes, which contain details on design standards required to be met when designing, constructing, and operating assets such as those proposed for the Project.
- 1.4.5 The permanent and temporary aspects of the Project are described in detail in **Chapters 7 and 8** of this document, respectively.

1.5 Project Timeline

- 1.5.1 The Stage 1 consultation took place between May and September 2024. This Design Development Report sets out how the Project has developed in response to feedback from that the Stage 1 consultation and further environmental and engineering studies. As required under the PA 2008, a statutory (Stage 2) consultation is taking place between March and May 2026.
- 1.5.2 An indication of the Project timeline through to operation is provided in **Image 1.2**.

Image 1.2: Project timeline

Project timeline



All timings are indicative and subject to change as the project progresses.

1.6 Structure of This Report

1.6.1 The report is structured as follows:

- **Chapter 2** – provides an overview of the legislation and national policy relevant to the Project;
- **Chapter 3** – provides an overview of the 2024 Stage 1 consultation;
- **Chapter 4** – outlines the review of the previous development stages undertaken by National Grid;
- **Chapter 5** – describes how additional information from environmental and technical studies, surveys and feedback from the Stage 1 consultation has influenced the proposals which are the subject of the Stage 2 consultation;
- **Chapter 6** – describes the design evolution of the Project, including the design principles and technical considerations, pylon types, consultation responses, planning and environmental considerations, and approach to mitigation;
- **Chapter 7** – describes the development of the 2026 proposed route alignment and substation siting;
- **Chapter 8** – describes the temporary works that will be required; and
- **Chapter 9** – sets out the next steps that will be undertaken prior to the submission of an application for a development consent order.

1.6.2 The report also includes the following appendices:

- **Appendix A Local Planning Policy of Relevance to Good Design;**
- **Appendix B Chapter 5 (Review of the Corridor Presented at Stage 1 Consultation) Figures;** and
- **Appendix C Chapter 7 (Development of the Proposed Route Alignment and Substation Siting) Figures.**

1.7 Relationship to Other Documents

1.7.1 This Design Development Report draws on information previously published at Stage 1 consultation, including:

- Chesterfield to Willington – Strategic Options Report 2024 (Ref 5); and
- Chesterfield to Willington – Corridor Preliminary Routeing and Siting Study (CPRSS) 2024 (Ref 7).

1.7.2 This report also refers to the following documents published in support of the statutory consultation being undertaken between March and May 2026:

- Chesterfield to Willington – Updated Project Background Document 2026 (Ref 2);
- Chesterfield to Willington – Updated Strategic Options Report 2026 Ref 6);
- Chesterfield to Willington – Stage 1 Consultation Feedback Report 2026 (Ref 8); and
- Chesterfield to Willington – Preliminary Environmental Information Report 2026 (Ref 9).

2. Relevant Legislation and Planning Policy Context

2.1 Context

- 2.1.1 This chapter sets out a summary of the principal legislation and national planning policy of relevance to the design of the Project.
- 2.1.2 A summary of the wider regulatory and planning context of relevance to the Project is set out in the Preliminary Environmental Information (PEI) Report Volume 1 Chapter 2, Legislative, Regulatory and Planning Policy Context (Ref 9) and supporting appendices. A summary of the relevant local planning policy is set out in **Appendix A** of this document. The Planning Statement which will accompany the development consent order (DCO) application will identify and consider relevant legislation and policies and provide analysis on planning policy compliance.

2.2 Planning Act 2008

- 2.2.1 The Planning Act 2008 (PA 2008) (Ref 3) introduced a new consenting procedure for Nationally Significant Infrastructure Projects (NSIPs). Under section 14(1)(b) and section 16 of the PA 2008, and The Planning Act 2008 (Nationally Significant Infrastructure Projects) (Electric Lines) Order 2013 (Ref 10), a project that involves the installation of an electric line above ground of more than 2 km, which will operate at 400 kV in England, is an NSIP.
- 2.2.2 For an NSIP the grant of development consent is required by the making of a DCO under the PA 2008 which includes associated development through section 115 of the Act. As noted in **Chapter 1**, the Project is classed as an NSIP for which National Grid will need to obtain ‘development consent’ under statutory procedures set by government. Further details of the PA 2008 regime are set out in Volume 1 Chapter 2 of the PEI Report.
- 2.2.3 Section 10 of the PA 2008 (Ref 3) place importance on good design:
‘the Secretary of State must (in particular) have regard to the desirability of—
(a) mitigating, and adapting to, climate change;
(b) achieving good design.’
- 2.2.4 Section 104 of the PA 2008 states at (2)(a) and (3) that the SoS ‘*must have regard to any national policy statement which has effect in relation to development of the description to which the application relates*’ and ‘*must decide the application in accordance with any relevant national policy statement*’, except in a limited number of circumstances listed in subsections 4 to 8 of section 104.

2.3 Electricity Act 1989

2.3.1 Section 9(2) of the Electricity Act 1989 (Ref 1) places general duties on National Grid as a licence holder:

'to develop and maintain an efficient, co-ordinated and economical system of electricity transmission...'

2.3.2 In addition, section 38 and Schedule 9 of the Electricity Act 1989 require an electricity licence holder such as 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 shall 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.'

2.3.3 National Grid's Stakeholder, Community and Amenity Policy (Ref 11), published December 2016, sets out how the company will meet the Schedule 9 duty placed upon it by the legislation.

2.4 National Planning Policy

2.4.1 This section sets out the design considerations of relevance to the Project within the current national planning policy documents for which the SoS must have regard when determining the DCO application for the Project.

2.4.2 As identified in paragraph 1.3.4 of the Overarching National Policy Statement (NPS) for Energy (EN-1) (Ref 12), for infrastructure projects providing above ground electric lines at or above 132 kV (meeting the thresholds set out in the PA 2008), the following NPSs will be the primary basis for SoS decision making:

- Overarching National Policy Statement for Energy (EN-1) (Adopted 2024) (Ref 12); and
- National Policy Statement for Electricity Networks Infrastructure (EN-5) (Adopted 2024) (Ref 13).

2.4.3 National Policy Statement for Renewable Energy (EN-3) (Adopted 2024) (Ref 14) is also of relevance 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.

2.4.4 As background to the recently adopted NPSs referred to above, it is noted that an Electricity Networks Commissioner was appointed in 2022 to work with and advise the government on how to halve the build time for new transmission infrastructure from around 12–14 to 7 years. The Commissioner's report (Ref 15) and a companion report (Ref 16) including a set of 43 recommendations, referred to as the 'Winner Report', was published in August 2023. This report acknowledged that the speeding up of the delivery of strategic transmission is both vital and challenging, and the recommendations on how to accelerate the deployment of strategic electricity transmission infrastructure in Great Britain covered every part of the process and set out an integrated programme of reform.

- 2.4.5 The then government's response to the Winser Report was set out in the Transmission Acceleration Action Plan (November 2023) (Ref 17). This Plan recognises that Great Britain's transmission network must undergo unprecedented expansion, as the economy electrifies to deliver energy security and Net Zero. It confirms that with the increasing shift towards electrification of transport, heating and industrial processes, a significant amount of additional grid capacity is required, and to deliver this expansion in time, there is a need to significantly reduce the current end-to-end build time for transmission infrastructure. The Action Plan accepted the 43 recommendations set out in the Winser Report, to accelerate the expansion of the transmission network. The new government has continued to prioritise these issues.
- 2.4.6 The 2023 revised NPSs (NPS EN-1, EN-3 and NPS EN-5) were published on 22 November 2023 and came into force on 17 January 2024. The revised NPSs include changes to ensure the appropriate balance between the need to build vital infrastructure and the impacts this can have on the environment and communities and to ensure that the planning policy framework is suitably robust to support the infrastructure required for the transition to net zero carbon emissions. Low-carbon infrastructure, including large electricity grid infrastructure projects, are given 'Critical National Priority' status to reflect the need for critical national infrastructure. The NPSs reinforce the government's ambitions for high quality energy infrastructure set out in the British Energy Security Strategy (April 2022) (Ref 18) and the Growth Plan (September 2022) (Ref 19). Further details are provided below.
- 2.4.7 In 2025, the UK government published draft updates to National Policy Statements EN-1, EN-3 and EN-5, which were subject to consultation between 24 April 2025 and 29 May 2025. The position at the time of authoring is that the approved updated NPSs have not yet been published and the policy position remains unchanged³.

Overarching National Policy Statement for Energy (EN-1)

- 2.4.8 NPS EN-1 (Ref 12) sets out the government's overarching policy regarding the development of NSIPs in the energy sector. EN-1 emphasises the need for new energy projects and that there is a critical national priority for the provision of nationally significant low carbon infrastructure. Paragraph 4.2.17 confirms that this includes electricity grid infrastructure including all power lines in the scope of EN-5 including network reinforcement and upgrade works, and associated infrastructure.
- 2.4.9 Section 4.7 provides details on the criteria for good design for energy infrastructure.
- 2.4.10 Paragraph 4.7.1 states:
- '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.'*

³ The updated NPSs came into force on 6 January 2026; however, this post-dated the authoring of this report and so are not reflected within the relevant policy descriptions within this report, which are instead based on the 2023 versions of the NPSs that were in force at the time. These sections will be updated in the Environmental Statement as part of the Application.

- 2.4.11 Paragraphs 4.7.2 – 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.
- 2.4.12 Paragraph 4.7.6 notes the ability for the design and sensitive use of materials for development such as electricity substations to assist in ensuring that such development contributes to the quality of the area.
- 2.4.13 Paragraph 4.7.7 is of particular reference to this Design Development Report and the need 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.’
- 2.4.14 The role of the SoS in decision making is outlined in Paragraphs 4.7.10 – 4.7.15.
- 2.4.15 Paragraph 4.7.10 states:
‘In the 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 account of natural hazards such as flooding) as they can be.’
- 2.4.16 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.’
- 2.4.17 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.’
- 2.4.18 Section 4.6 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.’*
- 2.4.19 Section 4.10 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.

2.4.20 Section 5.4 also reiterates that the design process should embed opportunities for nature inclusive design, stating:

'energy infrastructure projects have the potential to deliver significant benefits and enhancements beyond Biodiversity Net Gain, which result in wider environmental gains...'

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

2.4.21 NPS EN-5 (Ref 13) relates to electricity networks, and section 2 provides 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.

2.4.22 Section 2.2 considers factors influencing site selection and design and states that the SoS should bear in mind that the:

'...development zone – of new electricity networks infrastructure is not substantially within the control of the applicant:

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.'*

2.4.23 However, paragraphs 2.2.5 – 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 good design in section 2.4 of EN-5.

2.4.24 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.'

2.4.25 Paragraph 2.2.10 reiterates the duties under section 9 of the Electricity Act 1989, both in relation to developing and maintaining an economical and efficient network and, in formulating proposals for new electricity networks infrastructure, to:

'have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiological features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest; and...do what [they] 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.'

- 2.4.26 Section 2.3 of NPS EN-5 details how electricity networks infrastructure should consider climate change adaptation and resilience within the design of new schemes. Paragraph 2.3.2 details that applicants should set out to what extent the Project is expected to be vulnerable and how it has been designed to be resilient to:
- flooding, particularly for substations;
 - the effect of wind and storms on overhead lines;
 - higher than average temperatures leading to increased transmission losses; and
 - earth movement or subsidence caused by flooding or drought, for underground cables.
- 2.4.27 Section 2.4 considers good design for energy infrastructure, reiterating that the PA 2008 requires the SoS to have regard to the desirability of good design in determining applications, and that applicants should consider the criteria for good design set out in EN-1 section 4.7 at an early stage in project development.
- 2.4.28 Paragraph 2.4.3 states that:
- '...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.'*
- 2.4.29 Paragraph 2.4.4 follows on to say that whilst the above principles govern the design of electricity networks, the functional performance of the infrastructure in respect of security of supply and safety must not be threatened in the avoidance of, or mitigation of potential adverse impacts.
- 2.4.30 Section 2.5 considers environmental and biodiversity net gain:
- 'When planning and evaluating the proposed development's contribution to environmental and biodiversity net gain, it will be important – for both the applicant and the Secretary of State – to supplement the generic guidance set out in EN-1 (Section 4.6) with recognition that the linear nature of electricity networks infrastructure can allow for excellent opportunities to...connect people to the environment, for instance via footpaths and cycleways constructed in tandem with environmental enhancements.'*
- 2.4.31 Strategic network planning is covered in section 2.8 and reinforces that the SoS should take into account that Transmission Owners are required to bring forward efficient and economical proposals in network design under section 9 of the Electricity Act 1989. This section also identifies the need to take account of environmental and community impacts, alongside deliverability and economic cost, from the outset, and that strategic network planning, such as through the Holistic Network Design helps reduce the overall impact of infrastructure by identifying opportunities for coordination, where appropriate.
- 2.4.32 Section 2.9 covers the considerations for applicant assessment, including the expectation of compliance with the Holford and Horlock Rules.

2.4.33 Paragraph 2.9.17 sets out the Holford Rules, first published in 1959 and updated in the 1990s as guidelines for the routing of new overhead lines (Ref 20). 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.'*

2.4.34 Paragraph 2.9.18 covers the requirements of the Horlock Rules (Ref 21) which are the guidelines for the design and siting of substations established by National Grid in 2009 pursuant to its duties under Schedule 9 of the Electricity Act 1989.

2.4.35 EN-5 also includes policies on the design of electricity networks infrastructure. Paragraph 2.9.21 covers undergrounding:

'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 Landscape).'

2.4.36 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 (see section 2.11.4) is not outweighed by its 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.'

2.4.37 Section 2.11 covers the SoS decision making considerations and sets out the requirement for the potential impact, siting and design alternatives to be fully considered as part of an application if a statutory consultee identifies a risk that electric and magnetic fields would compromise the effective and safe operation of the electricity networks infrastructure.

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

- 2.4.38 NPS EN-3 (Ref 14) 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.
- 2.4.39 Section 2.5 covers the considerations for good design of energy infrastructure, noting section 4.7 of EN-1 sets out the criteria for good design that should be applied to all energy infrastructure
- 2.4.40 Paragraph 2.5.2 states:
‘Proposals for renewable energy infrastructure should demonstrate good design, particularly in respect of landscape and visual amenity, opportunities for co-existence/co-location with other marine and terrestrial uses, and in the design of the project to mitigate impacts such as noise and effects on ecology and heritage.’
- 2.4.41 Section 2.8 deals with offshore wind. Paragraph 2.8.1 states that:
‘Offshore wind (including floating wind) is expected to play a significant role in meeting demand and decarbonising the energy system. This government is committed to accelerating the deployment of offshore wind to meet the Clean Power 2030 Mission, with an expectation that there will be a need for substantially more installed offshore capacity beyond 2030 to achieve net zero carbon emissions by 2050.’
- 2.4.42 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’.
- 2.4.43 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.
- 2.4.44 NPS EN-3 also includes references to critical national priority infrastructure outlining that the assessment principles outlined in section 4 of EN-1 continue to apply to this:
‘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 SNCBs [Statutory Nature Conservation Bodies], both before and at the formal pre-application stage.’

National Planning Policy Framework (NPPF)

- 2.4.45 The revised National Planning Policy Framework (NPPF) (Ref 22) was published in December 2024. The NPPF sets out in Paragraph 5 that the *‘Framework does not contain specific policies for nationally significant infrastructure projects. These are determined in accordance with the decision-making framework in the Planning Act 2008 (as amended) and relevant national policy statements for major infrastructure, as well as any other matters that are relevant (which may include the National Planning Policy Framework)’.*

- 2.4.46 While NPS EN-1 and EN-5 remain the prime decision-making documents, the NPPF does include policies pertinent to generic development management considerations and some of its principles may be considered by the Secretary of State, where relevant to the Project. These principles are concerned with protection and conservation of the natural and built and historic environment, climate change and flooding as well as sustainable growth, development, and a strong, competitive economy.
- 2.4.47 At this stage, it is not possible to confirm if such secondary guidance will be considered important or relevant by the SoS, and it is therefore included for completeness.
- 2.4.48 Section 12 of the NPPF sets out policies relating to ‘Achieving well-designed and beautiful places’. Specifically, paragraph 137 sets out that:
- ‘Design quality should be considered throughout the evolution and assessment of individual proposals. Early discussion between applicants, the local planning authority and local community about the design and style of emerging schemes is important for clarifying expectations and reconciling local and commercial interests. Applicants should, where applicable, provide sufficient information to demonstrate how their proposals will meet the design expectations set out in the local and national policy, and should work closely with those affected by their proposals to evolve designs that take account of the views of the community. Applications that can demonstrate early, proactive and effective engagement with the community should be looked on more favourably than those that cannot.’*
- 2.4.49 Furthermore, paragraph 164 of the NPPF states that:
- ‘New development should be planned for in ways that:*
- a) avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through incorporating green infrastructure and sustainable drainage systems; and*
- b) help to reduce greenhouse gas emissions, such as through its location, orientation, and design. Any local requirements for the sustainability of buildings in plans should reflect the Government’s policy for national technical standards.’*
- 2.4.50 The NPPF is supported by the National Planning Practice Guidance.

National Infrastructure Commission (NIC) Project Level Design Principles

- 2.4.51 The NIC Design Group was established in 2019 to inspire renewed ambition for the quality of the UK’s infrastructure, with a mission to inspire, promote and champion design excellence on all major infrastructure projects, which has social value and responds creatively to the needs of people, places and the environment.
- 2.4.52 The 2024 NIC Design Principles document (Ref 23) replaces the previous Design Principles for National Infrastructure published in 2020.

- 2.4.53 Section 1 covers the purpose and scope of the guidance, stating the National Infrastructure Commission’s remit covers six economic infrastructure sectors, including the energy sector. It also impresses the importance of the design process being fit for purpose, and underpinned by principles that will drive standards and accountability, particularly as the UK’s economic infrastructure needs to be transformed to:
- *‘meet the challenge of net zero*
 - *provide climate resilience*
 - *deliver sustainable economic growth.’*
- 2.4.54 Section 2 emphasises the importance of an iterative, structured design process from the project outset to deliver environmental, social, and economic benefits, while limiting adverse impacts.
- 2.4.55 The design principles for national infrastructure are covered in section 3 and include four main principles:
- *‘Climate – seek opportunities to enable the decarbonisation of society through the mitigation of emissions, and allow the project to adapt over time to build resilience*
 - *People – design infrastructure for people, not architects or engineers; make it human scale, easy to navigate and instinctive to use, helping to improve quality of life*
 - *Places – provide a strong sense of identity and improve the natural and built environment; make a positive contribution to landscapes within and beyond the project boundary*
 - *Value – achieve multiple benefits and solve problems well; add value by defining issues clearly from the outset and providing overall direction for everyone working on the project.’*
- 2.4.56 These principles form an outline framework for more detailed design thinking on individual schemes, and for the development of project level principles.
- 2.4.57 The development of project level principles is covered in section 4, noting that they should directly address the Design Principles for National Infrastructure laid out above. The development of project level design principles should be an iterative process that becomes fixed once consent is achieved to outline how projects will achieve their outcomes. The principles should also be used to align all parties around agreed, shared outcomes. Paragraph 7 in section 4 states that a project’s design principles should:
- *‘reflect the overarching design vision and address the agreed project requirements, benefits and outcomes*
 - *firmly anchor the proposal, supporting a design narrative that’s relevant to the local context*
 - *recognise place including landscape, the natural environment, culture and heritage*
 - *be informed by the people affected, including residents, community groups, infrastructure users, interest groups, and local employers*

- *reflect an inclusive approach to ensure equitable delivery of benefits and prevention from harm*
- *demonstrate that opportunities have been identified to deliver wider benefits and outcomes beyond the project, utilising systems thinking*
- *be clearly written, with quantifiable measures, so that final outcomes can be tested against them.'*

2.4.58 The importance of effective leadership is covered in section 5, with leaders having overall responsibility for effective design and driving buy in to the design process from the project team.

2.4.59 Section 6 shows the process through which design principles can be developed and embedded within a project throughout its lifecycle and is particularly relevant to this Design Development Report with respect to how the design principles have influenced design development.

Nationally Significant Infrastructure Projects: Advice on Good Design

2.4.60 The Planning Inspectorate published the guidance Advice on Good Design (Ref 24) in October 2024, which sets out how good design might be successfully delivered in applications for NSIPs. The note reiterates that the NPSs set out criteria for achieving good design in projects and that this guidance is non-statutory but is intended to complement the legislation, regulations and guidance issued by government and is produced under section 51 of the PA 2008.

2.4.61 The advice note states that:

'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.

Achieving high quality, good design outcomes requires an effective, intentional, transparent, deliverable process to be planned, followed and secured. Success in good design comes from a combination of securing both good process and good outcomes.'

2.4.62 The guidance references the 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 guidance further makes reference to the NIC Design Principles of climate, people, place and value, and of the Project Level Design Principles, which provide applicants with the issues to consider under each of the design principles, as set out above.

2.4.63 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.*

[...]

Achieving good design outcomes involves:

- *securing a clearly understood, integrated design concept, consistent design language, and project-wide sustainability*
- *consistent design language where all components can be followed through in post-consent decisions*
- *clarity on achieving project-wide sustainability that goes beyond mitigating adverse effects to achieve economic, environmental and social net-gain*
- *design principles that respond positively to the four elements – climate, people, place and value - established by the NIC*
- *realistic assessments of the project’s durability and effectiveness during its operational phase, to underpin and secure a successful maintenance and monitoring regime*
- *sufficient flexibility for technical innovation balanced by sufficient detail and controls for post-consent approvals that will ensure good design outcomes are achieved*
- *particular attention on place-making to ensure the development’s positive effects on the character of a place and delivery of public benefits*
- *well thought out mechanisms to enable design outcomes to be scrutinised, assessed and developed during the post-consent design process. For example, parameter plans, design codes, management plans, independent design review and intentional community engagement which are secured in requirements or certified documents.’*

2.4.64 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** – Setting a brief including the project’s purpose, budget, timeline, multi-disciplinary team with design skills and baseline data gathering to inform consideration of alternatives and eventual site selection. The multi-disciplinary team must also develop a vision, considering construction and operation and 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** – An iterative process with analysis of 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 Environmental Impact Assessment (EIA) process and show how the proposed development will deliver positive outcomes and create a new and distinctive place. Engagement and consultation with statutory parties, affected persons, local communities and independent design panels should inform the project’s design evolution and this should be explained.
- **Co-ordinate** – Further iteration to refine choices for details and parameters. This should incorporate consultation responses, independent design input and ensure that design principles are being met. 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** – This stage must set out how the project’s good design is secured and will be delivered, including ongoing design advice and community engagement. Applicants should be clear about the influence procurement decisions could have and that any differences with future consenting authorities are aired. Examining authorities will expect designs to be at a detailed level where the outcomes of the analysis, program and vision are defined. Clarity must be provided for how design elements with less certainty at application stage will be decided and secured post-consent.

2.4.65 The guidance note also draws attention to the EIA process and highlights how EIA is an important decision-making tool and can help to achieve good design outcomes. EIA should inform the design process, and its influence on the design should be clearly articulated in the Environmental Statement.

2.4.66 Annex A of the guidance sets out ‘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 the site to inform good design;
- response to main significant adverse effects identified in the EIA;
- vision for the completed development and its surrounds;
- design skills;
- design development (including consideration of emerging design principles, design choices, flexibility and evolution, 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;
- compliance with National Policy Statements;
- application of design principles and how they are secured; and
- consideration of the NIC four principles of good design.

3. Stage 1 Consultation Feedback

3.1 Context

3.1.1 National Grid held a non-statutory (Stage 1) consultation between May and September 2024. The aim of the Stage 1 consultation was to:

- introduce National Grid Electricity Transmission (NGET) and the Project proposals;
- explain the need to build new electricity transmission infrastructure in the region;
- outline the work carried out to identify the emerging preferred overhead line route corridor and the graduated swathe which provided an indication of the emerging preference for siting of the Project infrastructure at the time of Stage 1 consultation;
- ensure stakeholders had the opportunity to provide feedback on the proposals, including where within the corridor infrastructure could be located; and
- outline next steps for the Project following the Stage 1 consultation.

The Consultation Corridor

3.1.2 An overview of the emerging preferred route corridor and graduated swathe was presented as part of the Stage 1 consultation and provided in the Project Background Document accessible at the following link: [download \(nationalgrid.com\)](#).

3.1.3 The emerging preferred corridor and the associated graduated swathe was split into six sections to make it easier for people to give feedback about any particular areas that they may wish to comment on.

3.2 Responses to the Stage 1 Consultation

3.2.1 A total of 2,643 feedback submissions from local communities, stakeholders and other consultees were received during the Stage 1 consultation period. These included paper response forms, online response forms, emails and letters.

Consideration of Consultation Feedback

3.2.2 The Stage 1 consultation followed the approach set out in National Grid's Stage 1 Consultation Strategy published in 2024 and provided in Appendix A of the Stage 1 Consultation Feedback Report (Ref 8).

3.2.3 A range of both face-to-face and online events were held and promoted to provide opportunities for all stakeholders and communities to engage with the development of the Project proposals. The consultation also offered opportunities to provide feedback on the proposals at an early stage of the Project development.

- 3.2.4 The feedback received during consultation has been carefully reviewed and taken into account, informing ongoing surveys, technical work on the engineering design and the environmental impact assessment process.
- 3.2.5 Feedback that contained requests for changes or considerations relevant to design elements of the Project were identified as design change requests (DCRs) and carefully considered in the context of environmental and socio-economic constraints and opportunities, engineering feasibility and cost, and planning policy considerations. Following this consideration, each DCR was either taken forward as a design change as part of the development of the proposals or, following balanced and informed assessment, a decision was taken not to consider it further.
- 3.2.6 The process of considering the proposed changes and requests comprised an initial filter for benefit and feasibility, 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.
- 3.2.7 The current draft proposals will be subject to ongoing review in response to all feedback and further engineering and environmental assessment work and surveys.
- 3.2.8 Further detail on the consideration of proposed design changes received from the Stage 1 consultation feedback is provided in the Stage 1 Consultation Feedback Report.

4. Review of Previous Development Stages

4.1 Context

- 4.1.1 The development of any project evolves and is updated as knowledge about the project and its potential location grows or changes. In addition, previous preliminary assumptions and/or decisions are the subject of constant checking and backchecking as part of the consideration and engagement process. Any description of the assessment and rationale for non-final decisions (particularly at non-statutory stages of a potential project) must be understood in that context.
- 4.1.2 This chapter provides a backcheck and review, following the non-statutory (Stage 1) consultation in 2024, of the previous stages of the Project's design development as set out in the:
- Strategic Options Report, March 2024 (SOR 2024) (Ref 5); and
 - Corridor Preliminary Routeing and Siting Study, March 2024 (CPRSS) (Ref 7).
- 4.1.3 In reviewing these decisions, consideration has been given to the feedback received from the Stage 1 consultation as set out in the Stage 1 Consultation Feedback Report (Ref 8).

4.2 Strategic Proposal

Background

- 4.2.1 The SOR 2024 sets out the needs case for the Project and describes how a strategic options appraisal exercise, which led to the identification of a preferred Strategic Proposal, was undertaken.

Strategic Proposal Review

- 4.2.2 National Grid undertook a review of the conclusions of the SOR 2024 as part of the ongoing strategic options assessment and decision-making process involved in promoting new transmission projects. This review is described in the updated Chesterfield to Willington Strategic Options Report, 2026 (SOR 2026) (Ref 6), which was prepared to inform the Stage 2 consultation.
- 4.2.3 The SOR 2026 confirms that the needs case, set out in section 3 of the SOR 2024, remains valid and that without reinforcement, the transmission system across the B8 system boundary will have insufficient capacity to meet system requirements. The SOR 2026 explains the concept of system boundaries and shows the location of the B8 system boundary.
- 4.2.4 Following the consideration of options to meet system need, the SOR 2026 confirms that the proposed connection between Chesterfield and Willington remains the optimum option to meet the needs case. This option remains the most advantageous of the options considered when balancing cost, technical performance, constructability and environmental and socio-economic effects.

4.3 Corridor Preliminary Routeing and Siting Study (CPRSS)

Introduction

- 4.3.1 Following the initial identification of the Strategic Proposal, a routeing and siting exercise was undertaken in accordance with National Grid's Approach to Consenting for major infrastructure projects (Ref 4) and reported in the CPRSS (Ref 7). The CPRSS describes the identification and appraisal of several corridor options and concludes with the identification of an emerging preferred corridor (the CPRSS EPC). The CPRSS EPC, together with a graduated swathe indicating which parts of the CPRSS EPC were considered more or less likely to host the Project, was consulted on at the Stage 1 consultation in 2024.
- 4.3.2 A further backcheck and review exercise has been undertaken to identify whether there have been any changes since the Stage 1 consultation that may have a material effect on the conclusions of the CPRSS. This backcheck and review exercise considered whether the changes set out below would have resulted in a different outcome to the CPRSS.

Legislative and Policy Context

- 4.3.3 There have been no material changes to either the Planning Act 2008 (Ref 3) or the Electricity Act 1989 (Ref 1).
- 4.3.4 A revision to the National Planning Policy Framework (NPPF) (Ref 22) was published in December 2024, after the completion of the Stage 1 consultation, but contains no changes that are material to the conclusions of the CPRSS. As set out in **Chapter 2 Relevant Legislation and Planning Policy Context** of this report, the UK government has published draft updates to the Overarching National Policy Statement for Energy (EN-1) (Ref 12), National Policy Statement for Renewable Energy Infrastructure (EN-3) (Ref 14) and National Policy Statement for Electricity Networks Infrastructure (EN-5) (Ref 13), which were subject to consultation between 24 April 2025 and 29 May 2025. The position at the time of authoring is that the approved updated NPSs have not yet been published and the policy position remains unchanged.

Backcheck and Review of the Corridors Presented in the CPRSS

- 4.3.5 The overarching design assumptions set out in Chapter 2 of the CPRSS (Ref 7), stated that, in accordance with the presumption set out in National Policy Statement EN-5, the Project will be developed as an overhead line. This assumption is unchanged, as is the assumption regarding the overhead line being supported by steel lattice pylons.
- 4.3.6 All alternative corridors discounted in the CPRSS were reconsidered as part of the backcheck and review process. The backcheck and review also considered whether additional information acquired from technical and environmental surveys and studies undertaken after the Stage 1 consultation could have a material effect on the selection of the EPC described in the CPRSS. The outcome of this process agreed with the conclusions of the Options Identification and Selection stage of the CPRSS, with the exception of the primarily technical issues outlined below. Where appropriate, the section numbers of the relevant part of the EPC, as set out in Chapter 7 of the CPRSS, are provided in brackets.

Technical considerations

- 4.3.7 With regard to the technical assumptions underpinning the selection of the EPC, the following relevant information has been subject to further consideration or has emerged from engineering studies since the Stage 1 consultation.

Topography

- 4.3.8 There are sections of steep terrain present along the route which introduce sharp elevation changes averaging 15–23 per cent, specifically immediately west of the A61 north of Mickley (Sections C3a and C3b), along approximately 3 km of the River Amber valley east of the Midland Main Line (Section C3b), north west of the B6013 crossing and south of the Alfreton Brook (Sections C3b and C3c). Landform across the width of the section running along the eastern side of the River Amber valley falls significantly across a horizontal distance of approximately 375 m, from approximately 160 m Above Ordnance Datum (AOD) between the A61 at the top of the valley side down to approximately 102 m AOD near the railway line in the valley floor (Section C3b). This introduces significant additional technical complexity to design and construction of temporary accesses in this area and preparation of work areas for construction of the overhead line pylons which would necessitate extensive earthworks operations.

Construction access

- 4.3.9 Poor access availability from the A61 significantly constrains accessibility to the River Amber valley section. It is anticipated that a long section of haul road, approximately 5 km in length, would be required from an existing agricultural access adjacent to The Amber Hotel, Toadhole Furnace (Sections C3b and C3c). Furthermore, if installation of further access points from the B6013 is unviable due to highway restrictions, a temporary bridge or large culvert structure would be required to cross Alfreton Brook to enable access to a section of the overhead line route north of Alfreton Brook from the A615.

Geotechnical

- 4.3.10 Recorded artificial ground is present along the EPC broadly correlating with historic surface mining areas, but most prevalent immediately east and south of Danesmoor and along the River Amber valley (Sections C3a and C3b). Site investigations would be required to confirm ground conditions through these parts of the route. There may potentially be a requirement for ground remediation and/or improvement works and piled foundations to facilitate construction. Whilst this issue was understood at the time of the identification of the EPC, it is necessary to reconsider the level of constraint it represents in combination with the topographic constraints described above.

Pinch-points (bottlenecks)

- 4.3.11 A pinch-point narrower than 120 m width is located on Parkhouse Road, north west of Lower Pilsley between a property, an existing 132 kV overhead line and the settlement of North Wingfield (Sections C5a and C3a). This area is further constrained by an industrial area used for aggregate and soils processing, recorded historical landfill and Locko Brook. A second pinch-point approximately 80 m in width is present between Higham Fisheries and an agricultural building (Section C3b) where routing of the EPC follows lower slopes along the eastern side of the River Amber valley to avoid steeper gradients closer to the ridgeline near the B6013 and settlement of Higham.

Construction / delivery issues

- 4.3.12 The extensive earthworks associated with installation of temporary access and working areas for an overhead line route along the River Amber valley would likely require additional temporary construction areas for the processing of soils and bedrock material.
- 4.3.13 Installation of temporary scaffold protection for the A61 highway crossing (Sections C3a and C3b) to facilitate overhead line stringing works is anticipated to be highly complex given the steep topography immediately west of the road which will require ground preparation (benching) as part of the temporary works design to ensure stability of slope and structure. At least one pylon is likely to be a pull through position during overhead line stringing due to the sloped terrain.

Overall technical consideration

- 4.3.14 The development of an overhead line route alignment within Sections C3a and C3b of the EPC presents significant engineering challenges, particularly those associated with terrain and the recorded mining legacy. It would be preferable from a technical perspective to avoid this type of terrain if possible. This would be likely to necessitate a deviation outside the existing EPC.

Environmental considerations

- 4.3.15 With regard to the environmental assumptions underpinning the selection of the EPC, surveys and studies undertaken after the Stage 1 consultation did not provide any information that would challenge the findings of the CPRSS or the selection of the EPC. However, it is noted that the technical considerations described in relation to Sections C3a and C3b, above, could have the potential to give rise to greater levels of environmental effects than were expected at the time of the CPRSS. Further consideration of these environmental effects is provided in **Chapter 5 Review of the Corridor Presented at Stage 1 Consultation** of this document.

Stage 1 Consultation Feedback

- 4.3.16 As described in **Chapter 3 Stage 1 Consultation Feedback** of this report, a total of 2,643 feedback submissions from local communities, stakeholders and other consultees were received during the Stage 1 consultation period. These included paper response forms, online response forms, emails and letters.
- 4.3.17 All of the feedback received during the Stage 1 consultation has been carefully reviewed and considered, alongside additional information obtained by National Grid following the publication of the CPRSS referenced above, including ongoing technical work on the engineering design, and further environmental and socio-economic assessment and survey work. A summary of all feedback received and National Grid's responses is presented in the Stage 1 Consultation Feedback Report (Ref 8).
- 4.3.18 This feedback was carefully considered in the context of environmental and socio-economic constraints and opportunities, engineering feasibility and cost, and planning policy considerations as part of the design change request process described in **Chapter 3 Stage 1 Consultation Feedback** of this report. The feedback has helped National Grid to optimise the route and identify efficiencies where possible. How this process was implemented in relation to the Stage 1 consultation feedback is described in **Chapter 5 Review of the Corridor Presented at Stage 1 Consultation** of this report.

4.4 Conclusion

- 4.4.1 The review of previous development stages described above confirmed that the Strategic Proposal, the legislative and policy context and the overarching Project design assumptions (i.e. that the connection would consist of an overhead line supported by steel lattice pylons) that informed the identification and selection of the EPC taken forward to Stage 1 consultation, remain valid.
- 4.4.2 The backcheck and review of the corridors presented in the CPRSS confirmed that the appraisals of those corridors remained valid with the exception of some of the technical assumptions made in relation to Refined Corridor Sections C3a and C3b, which form part of the EPC between North Wingfield/Lower Pilsley and Alfreton. In these areas, additional engineering studies undertaken after the Stage 1 consultation indicated that routeing a new transmission connection through this area would be more technically difficult than had previously been assumed due to the nature of the terrain, accessibility and the recorded mining history. From a technical perspective, it was concluded that it would be preferable to avoid routeing through these sections if a preferable alternative was identified.
- 4.4.3 As described above, the feedback received from the Stage 1 consultation included suggestions that the Project should be routed away from Pilsley and Lower Pilsley and away from the River Amber valley.
- 4.4.4 In the light of this feedback and the new information regarding the anticipated technical difficulties and consequent potential environmental impact implications with routeing through Sections C3a and C3b of the EPC, it was decided that the decision to include Sections C3a and C3b in the EPC should be revisited and alternative options considered for this part of the route. This process is described in **Chapter 5 Review of the Corridor Presented at Stage 1 Consultation** of this report.

5. Review of the Corridor Presented at Stage 1 Consultation

5.1 Introduction

5.1.1 This chapter provides an overview of the Project decisions relating to the emerging preferred corridor (EPC) and graduated swathe since the publication of the Corridor Preliminary Routeing and Siting Study (CPRSS) (Ref 7). This includes the decision to progress an alternative routeing option between Astwith and Alfreton in response to the outcome of the backcheck and review of previous development stages, described in **Chapter 4** of this document. The chapter consists of the following sections:

- a summary of the work undertaken by National Grid, following the non-statutory (Stage 1) consultation to identify a potential overhead line route alignment within the EPC, referred to in this chapter as the Preliminary Preferred Alignment;
- a discussion of the factors which influenced the decision to consider alternative routeing options partially outside the boundary of the EPC presented at the Stage 1 consultation in the area between Astwith and Alfreton;
- a description of the alternative routeing options between Astwith and Alfreton;
- a summary of the appraisal of the technical, cost, environmental, and socio-economic performance of the Preliminary Preferred Alignment versus the alternative routeing options identified;
- a description of the outcome of the options appraisal;
- a summary of preferred alignment routeing outside of the EPC; and
- a summary of preferred alignment routeing outside of the CPRSS graduated swathe.

5.2 Development of the Preliminary Preferred Alignment

5.2.1 Following the selection of the EPC in 2024, National Grid took its emerging proposals forward to Stage 1 consultation and began the process of identifying a Preliminary Preferred Alignment within the EPC.

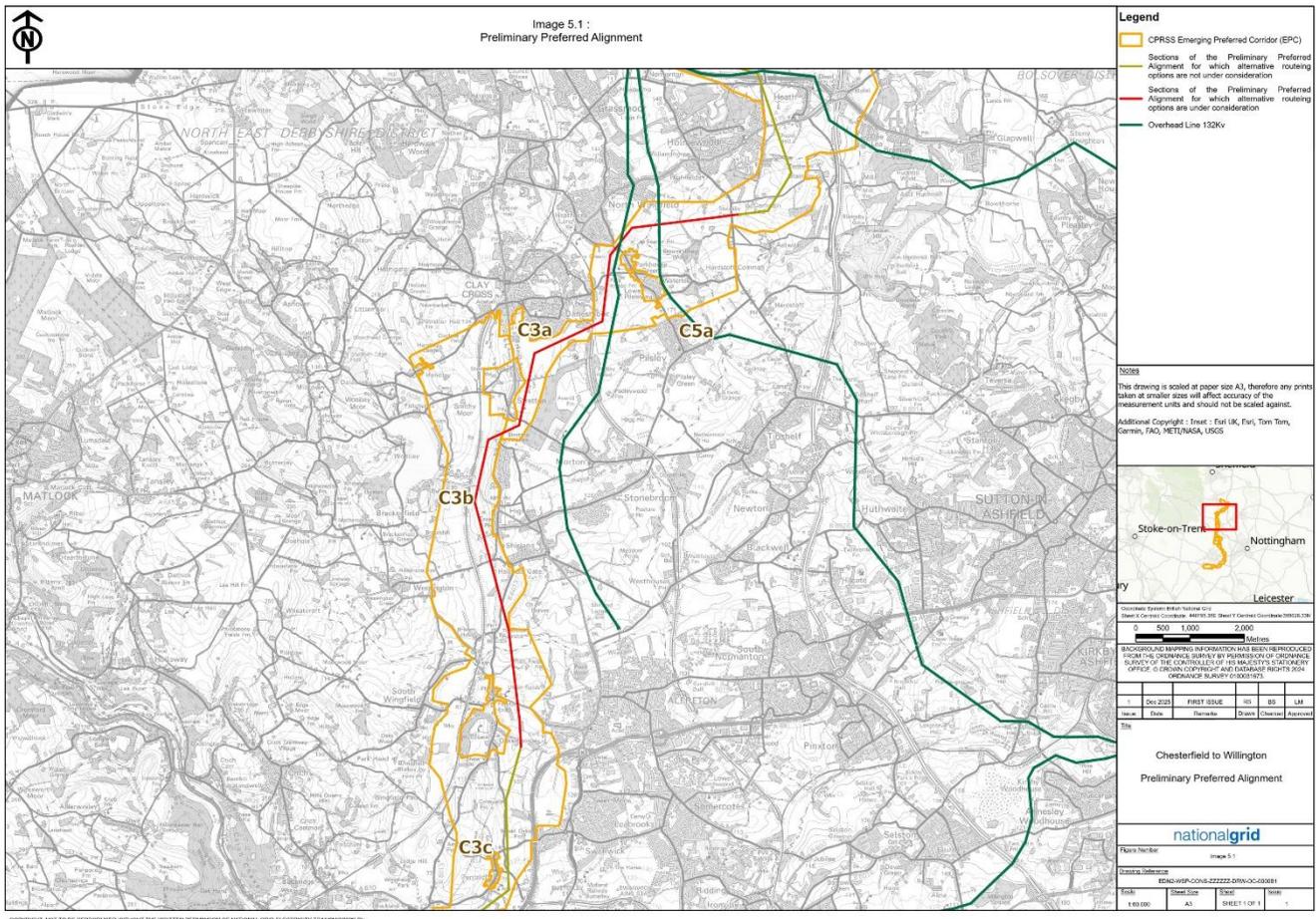
5.2.2 The process of identifying the Preliminary Preferred Alignment drew upon feedback received from the Stage 1 consultation and upon information from surveys, design studies and assessments undertaken after the selection of the EPC.

5.2.3 The development of the Preliminary Preferred Alignment sought to avoid environmental features and technical constraints and other sensitive areas, with environmental and technical specialists working together to identify a technically feasible alignment that would also minimise environmental impact. The area of the EPC within which the alignment might be routed was refined through the removal of settlements (in accordance with the Holford Rules (Ref 20) and the National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) (Ref 13)) and the removal of any areas that would be unfeasible for an engineered solution (e.g. areas that have insufficient clearance between constraints for routeing).

5.3 The Need to Consider Alternative Routeing Options Between Astwith and Alfreton

- 5.3.1 As described in **Chapter 4** of this report, the backcheck and review of previous development stages of the Project confirmed that the preferred strategic option of ‘Chesterfield to Willington’ as set out in the Strategic Options Report during the Strategic Proposal stage, and the appraisals of the corridors presented in the CPRSS as part of the Options Identification and Selection stage remain valid with the exception of some technical assumptions made in relation to Refined Corridor Sections C3a and C3b, which form part of the EPC between North Wingfield/Lower Pilsley and Alfreton. In these areas, additional engineering studies undertaken after the Stage 1 consultation indicated that routeing through this area would be more technically difficult than had previously been assumed, due to the nature of the terrain, accessibility and the recorded mining history. From a technical perspective, it was concluded that it would be preferable to avoid routeing through these sections if a preferable alternative could be identified.
- 5.3.2 Also, as described in **Chapter 4** of this report, Stage 1 consultation feedback included responses relating to the design of this part of the EPC.
- 5.3.3 These included suggestions that the Project should be routed away from Pilsley and Lower Pilsley and concerns about the Project’s potential negative impact on the River Amber valley and suggested re-routeing of it to bypass the area entirely.
- 5.3.4 The section of the Preliminary Preferred Alignment under consideration extends from the northernmost point at which any of the alternative routeing options diverge from it to the southernmost point at which any of the alternative routeing options rejoin it. In the north, this is a point approximately 750 m north west of Astwith and in the south this is a point near Alfreton, approximately 1 km west of the junction of the A38 and A61, and approximately 500 m east of Oakerthorpe. The section of the Preliminary Preferred Alignment under consideration is approximately 12.9 km in length.
- 5.3.5 Topography along the route of the Preliminary Preferred Alignment is undulating, with an average elevation of 122 m Above Ordnance Datum (AOD), and peaks at 164 m AOD. Overall, the Preliminary Preferred Alignment has an average gradient of approximately 3.7 per cent, but there are some sections of steep terrain where gradients average between 15 per cent and 23 per cent.
- 5.3.6 **Image 5.1** shows the route of the Preliminary Preferred Alignment in relation to the EPC, with the section of the Preliminary Preferred Alignment subject to alternative option consideration in this chapter shown in red. Appendix B, **Figure 5B-1** shows the same information in relation to environmental constraints and features.

Image 5.1: Preliminary Preferred Alignment



5.4 Description of the Alternative Routing Options Between Astwith and Alfreton

5.4.1 In identifying potential alternative routing options, consideration was given to all of the refined corridors appraised in the CPRSS that had the potential to host an alignment that either avoided or reduced the use of the Preliminary Preferred Alignment between Astwith and Alfreton. This section of the Preliminary Preferred Alignment is located within CPRSS refined corridor Sections C3a and C3b, which are described in Chapter 7 of the CPRSS and shown on **Image 5.2**, **Image 5.3** and **Image 5.4** of this report. CPRSS Refined Corridors 4 and 6 were therefore not considered as both diverge from Refined Corridor 3 at points to the south of Alfreton and do not, therefore, have the potential to offer alternative route options between Astwith and Alfreton. Consideration was given to the more westerly refined corridors identified in the CPRSS, Refined Corridors 1 and 2, as neither of these would utilise refined corridor Sections C3a and C3b. However, as described in the CPRSS, both Refined Corridor 1 and Refined Corridor 2 have the potential to impact major areas of the highest amenity value (i.e. the Peak District National Park in Section C1c and Derwent Valley Mills World Heritage Site (WHS) in Sections C2c to C2f). Both of these refined corridors were therefore discounted given no feasible alternative routing options through these corridors could be established without impacting major areas of the highest amenity value, which would be in direct contravention of national planning policy. All of the refined corridor sections that were discounted are shown on CPRSS Figure 7.1.

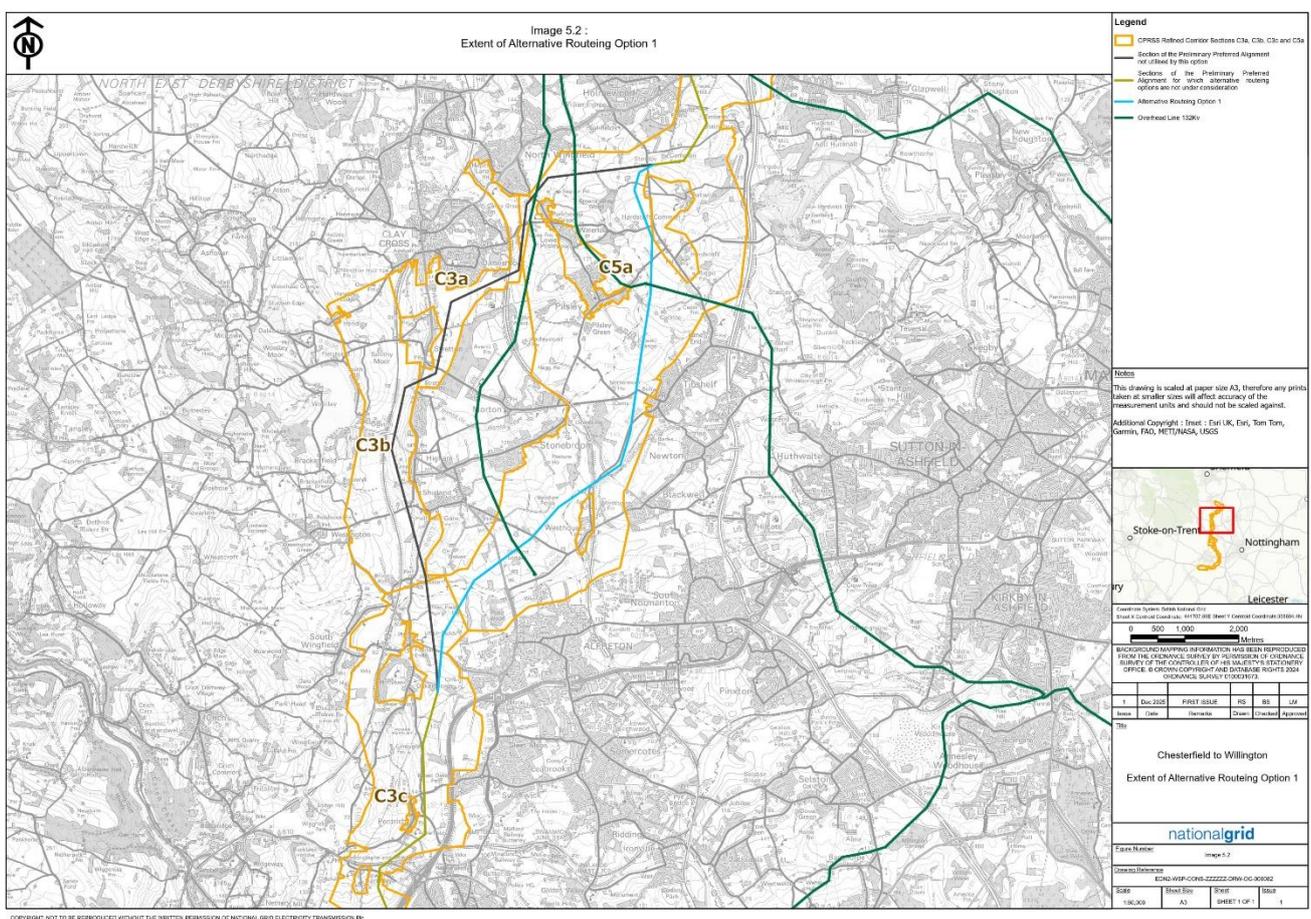
- 5.4.2 Consideration was therefore given to CPRSS Refined Corridor 5, as this corridor does have the potential to host alternative alignments that would either avoid or reduce the use of the Preliminary Preferred Alignment through refined corridor Sections C3a and C3b. Refined Corridor 5 consists of a single section, Refined Corridor Section C5a (henceforth referred to as Section C5a). The northern part of Section C5a was included in the EPC and hosts the Preliminary Preferred Alignment between Chesterfield Substation and the point at which it enters Section C3a in the vicinity of Lower Pilsley and North Wingfield. The parts of Section C5a to the south of this point were discounted by the CPRSS as, on the basis of the information available at that time, it was considered that avoiding the potential visual impacts associated with crossing the more exposed upland ridge around the east of Astwith and Hardstoft on balance outweighed the technical challenges associated with finding a path between the settlements of North Wingfield and Lower Pilsley, or Lower Pilsley and Pilsley. The decision to discount the southern part of Section C5a was also influenced by consideration of the onward opportunities of utilising the River Amber valley through Section C3b, as it could afford the possibility of following existing linear infrastructure (i.e. the Midland Main Line railway) and vegetation which may mitigate some of the potential visual impacts associated with an overhead line. It was therefore decided to identify potential alternative alignments within Section C5a that could be used to test whether this previous judgment in relation to the balance remained valid in the light of the additional information that has become available since the completion of the CPRSS.
- 5.4.3 This process identified two options (Options 1 and 2) for an alternative to the Preliminary Preferred Alignment that are within Section 5A and avoid or reduce the challenges associated with the parts of the Preliminary Preferred Alignment within Sections C3a and C3b. The process also identified a third option (Option 3) which, whilst not avoiding the technical challenges identified above, might potentially lessen environmental impacts by routeing outside the EPC to utilise the opportunity for close parallel routeing afforded by an existing 132 kV overhead line.
- 5.4.4 The three alternative routeing options identified are described in broad terms below. In these descriptions, 'length of route' refers to the length of the connection (including parts of the Preliminary Preferred Alignment, if applicable) between the most northerly point at which any option diverges from the Preliminary Preferred Alignment (i.e. Option 1, approximately 750 m to the north west of Astwith) and the most southerly point at which any option rejoins the Preliminary Preferred Alignment (i.e. Option 1, approximately 500 m east of Oakerthorpe). This approach allows direct comparison of the length of connection that would be required between these points for each of the options under consideration. For reference, the length of the Preliminary Preferred Alignment between these points is approximately 12.9 km.

Alternative Routeing Option 1

- 5.4.5 Option 1 diverges from the Preliminary Preferred Alignment at a point approximately 750 m north west of Astwith, from where it progresses in a broadly southerly direction for approximately 5.6 km, passing to the west of Astwith, Hardstoft and Tibshelf and to the east of Pilsley. From a point approximately 1 km south of Tibshelf, Option 1 has a broadly south westerly direction for approximately 5.5 km, passing to the north west of Blackwell and Westhouses and to the south east of Stonebroom and Shirland. It rejoins the Preliminary Preferred Alignment near Alfreton at a point approximately 1 km west of the junction of the A38 and A61, and approximately 500 m east of Oakerthorpe.

- 5.4.6 The length of the route is approximately 11.5 km.
- 5.4.7 Topography along Option 1 has an undulating landform, which has an average elevation of 130 m AOD and peaks at 182 m AOD, with an average gradient of approximately 3.6 per cent. The highest elevations are encountered in the northern part of the route, where the option runs broadly parallel to the B6039 between Astwith and Hardstoff.
- 5.4.8 Option 1 avoids the River Amber valley and the area of Lower Pilsley.
- 5.4.9 **Image 5.2** shows the route of Alternative Routing Option 1 in relation to the Preliminary Preferred Alignment and the EPC. **Appendix B, Figure 5B-2** shows the same information in relation to environmental constraints and features.

Image 5.2: Extent of Alternative Routing Option 1

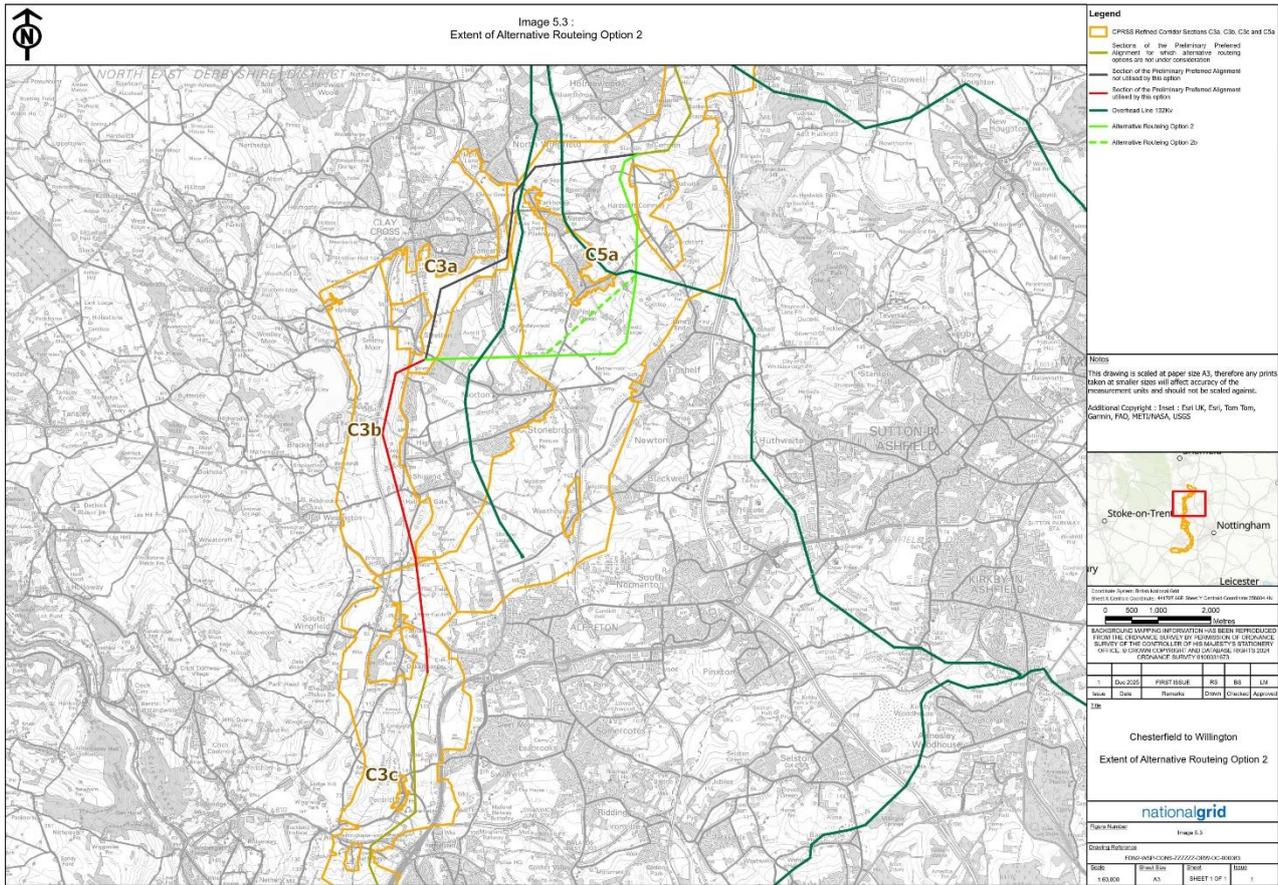


Alternative Routing Option 2

- 5.4.10 Option 2 diverges from the Preliminary Preferred Alignment at a point approximately 750 m north west of Astwith, from where it progresses in a broadly southerly direction for approximately 3.7 km, passing to the west of Astwith, Hardstoff and Lane End and to the east of Pilsley. From a point approximately 500 m north west of Tibshelf, Option 2 has a westerly direction for approximately 3.8 km, passing to the north of Stonebroom and Morton. It rejoins the Preliminary Preferred Alignment at a point approximately 250 m east of Stretton.

- 5.4.11 A sub-option for Option 2 (referred to as Sub-option 2b) would introduce an approximately 2.3 km long section on a south westerly alignment to the south east of Pilsley. This sub-option would effectively remove the 'corner' of Option 2 nearest to Tibshelf. In the appraisals that follow, reference is only made to Sub-option 2b where there is a difference between the performance of the sub-option and main option. Unless stated, all references in this document to Option 2 refer to both the main option and Sub-option 2b.
- 5.4.12 The length of the route is approximately 14.1 km. The length of the sub-option would be approximately 13.4 km.
- 5.4.13 Topography along the Option 2 alignment has an undulating landform, which has an average elevation of 131 m AOD and peaks at 182 m AOD, with an average gradient of approximately 3.6 per cent. There are sections of steeper terrain present where routeing is common with the Preliminary Preferred Alignment. Landform across the width of the section running along the eastern side of the River Amber valley falls significantly from approximately 160 m AOD at the A61, which follows the top of the valley side, down to approximately 102 m AOD near the railway line in the valley floor. The highest elevations are encountered in the northern part of the route, where the option runs broadly parallel to the B6039 between Astwith and Hardstoft.
- 5.4.14 Option 2 avoids the area of Lower Pilsley.
- 5.4.15 **Image 5.3** shows the route of Alternative Routeing Option 2 and Sub-option 2b in relation to the Preliminary Preferred Alignment and the EPC. **Appendix B, Figure 5B-3** shows the same information in relation to environmental constraints and features.

Image 5.3: Extent of Alternative Routing Option 2

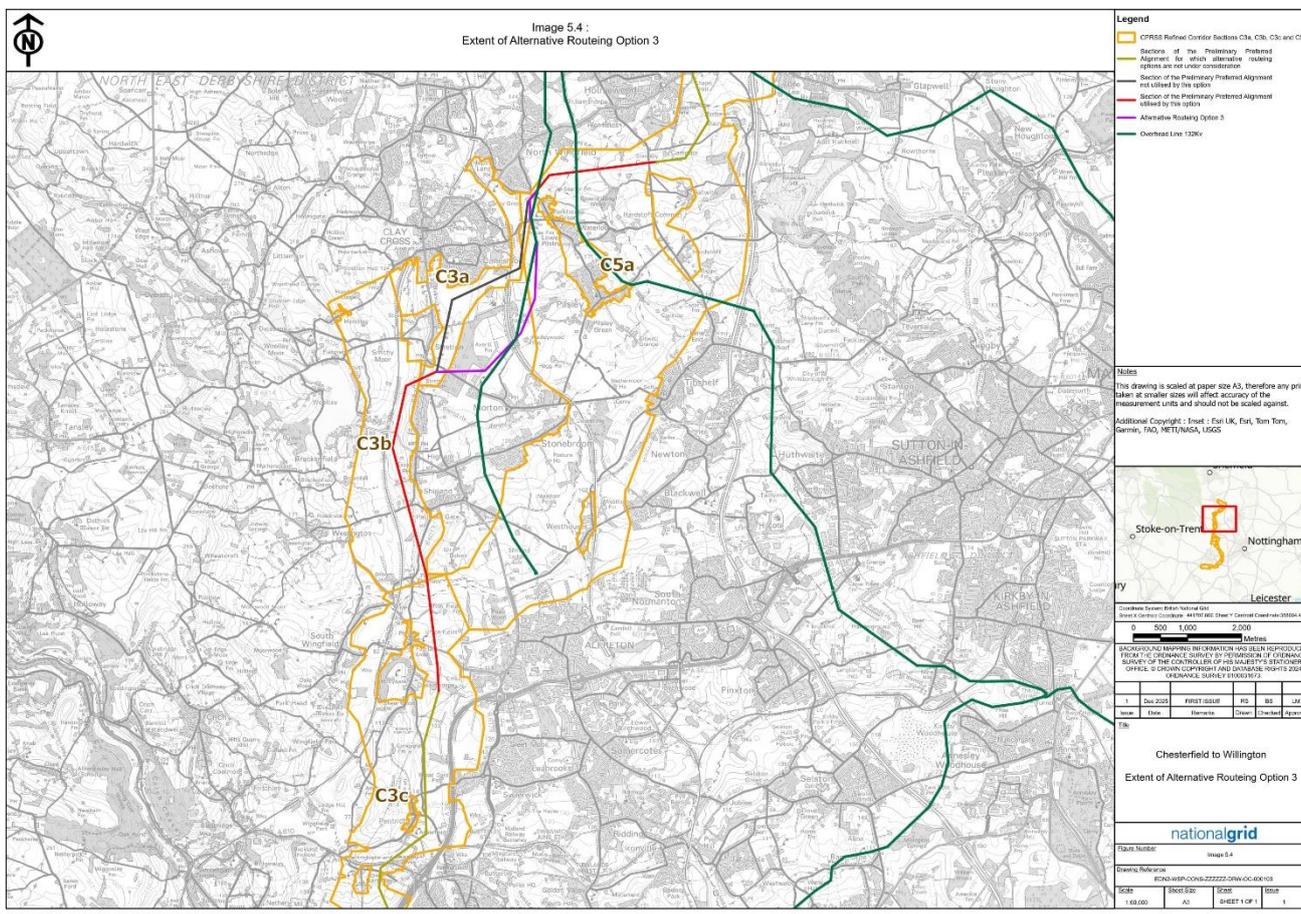


Alternative Routing Option 3

- 5.4.16 Option 3 diverges from the Preliminary Preferred Alignment at a point near Parkhouse Road as it passes between Lower Pilsley and North Wingfield, from where it progresses in a broadly southerly direction for approximately 3.5 km, passing to the west of Lower Pilsley and to the east of Danesmoor. Option 3 is coincident with Option 2 over a distance of approximately 900 m to the east of Stretton and rejoins the Preliminary Preferred Alignment at a point approximately 250 m east of Stretton.
- 5.4.17 The length of the route is approximately 13.3 km.
- 5.4.18 Topography along the Option 3 alignment has an undulating landform, which has an average elevation of 124 m AOD and peaks at 146 m AOD, with an average gradient of approximately 3.6 per cent. There are sections of steeper terrain present where routing is common with the Preliminary Preferred Alignment. Landform across the width of the section running along the eastern side of the River Amber valley falls significantly from approximately 160 m AOD at the A61, which follows the top of the valley side, down to approximately 102 m AOD near the railway line in the valley floor. The highest elevations are found in the vicinity of Stretton where Option 3 rejoins the Preliminary Preferred Alignment.
- 5.4.19 Option 3 utilises the opportunity for close parallel routing afforded by an existing 132 kV overhead line.

5.4.20 **Image 5.4** shows the route of Alternative Routing Option 3 in relation to the Preliminary Preferred Alignment and the EPC. **Appendix B, Figure 5B-4** shows the same information in relation to environmental constraints and features.

Image 5.4: Extent of Alternative Routing Option 3



5.5 Comparative Appraisal of the Preliminary Preferred Alignment and Alternative Routing Options between Astwith and Alfreton

5.5.1 Following the identification of the alternative routing options, described above, National Grid undertook an appraisal of the technical, cost, environmental and socio-economic performance of each of these options in relation to that of the Preliminary Preferred Alignment. The appraisal of these options was undertaken in accordance with the process set out in Our Approach to Options Appraisal (Ref 25).

5.5.2 The summary below outlines the technical appraisals, and environmental topics where considerations were determined to be a potentially differentiating or influential factor in the routing selection. It should be noted that where references are made to heritage assets within the Landscape and Visual appraisals, these are made in relation to the potential for the presence of such assets to indicate increased levels of landscape value or visual receptor sensitivity. The appraisal of such features as heritage assets *per se* is provided in the Historic Environment appraisals.

Technical Appraisal

Preliminary Preferred Alignment

- 5.5.3 Within the River Amber valley, across a horizontal distance of approximately 375 m, ground elevations fall significantly from approximately 160 m AOD near the A61 at the top of the valley side to approximately 102 m AOD in the valley floor. This change in elevation would introduce significant technical challenge as a result of more complex civil engineering works to install temporary construction accesses and preparation of work areas for construction of the overhead line pylons which would necessitate extensive cut and fill operations.
- 5.5.4 A number of local roads along the River Amber valley section of the route are considered unsuitable for construction access due to narrow road widths, tight geometry and fixed height/weight restrictions. This would result in an increase in temporary haul road requirements and it is anticipated that approximately 14.25 km of off-line temporary haul road would be required to provide access to the route during the construction phase. This would include a relatively long haul road section (approximately 5 km) to provide access to the River Amber valley section.
- 5.5.5 The Preliminary Preferred Alignment crosses the 132 kV overhead line between Chesterfield and Pinxton to the north east of Lower Pilsley and crosses the 132 kV overhead line between Chesterfield and Alfreton to the north west of Lower Pilsley. Approximately 4.8 km of diversionary works (inclusive of both overhead line removal and installation of underground cabling) would be required with up to four Cable Sealing End pylons. Horizontal directional drilling is not expected to be required for installation of the underground cabling.
- 5.5.6 The Preliminary Preferred Alignment passes in close proximity to the local National Grid Electricity Distribution (NGED) Substation south of Danesmoor. Whilst the Preliminary Preferred Alignment is able to avoid interaction with the substation, this, in turn, has the potential to result in increased interaction with the nearby settlement of Danesmoor and with adjacent woodland.
- 5.5.7 Recorded artificial ground broadly correlates with historic surface mining areas and is most prevalent immediately east and south of Danesmoor and along the River Amber valley. The Preliminary Preferred Alignment intersects four areas of Flood Zones 2 and 3 and is in close proximity to historic landfill sites at Parkhouse Road near Lower Pilsley and at Strathfield Farm within the River Amber valley.
- 5.5.8 A pinch-point (a pinch-point, also known as a bottleneck, is an area where, whilst the routing of an overhead line is technically feasible, an alignment would be in close proximity to technical constraints) less than 120 m in width is located north west of Lower Pilsley between a residential property, a 132 kV overhead line and the settlement of North Wingfield. This pinch-point is further constrained by an aggregate and soils processing plant, recorded historical landfill and Locko Brook. A second pinch-point approximately 80 m in width is present near Higham Fisheries where the alignment follows the lower slopes of the eastern side of the River Amber valley.
- 5.5.9 There are approximately 2.9 hectares (ha) of woodland along the route of the Preliminary Preferred Alignment that may require felling and compensatory planting. These are located primarily around Oakerthorpe Brook and throughout Alfreton golf course.

Alternative Routeing Option 1

- 5.5.10 Option 1 traverses more elevated terrain than the Preliminary Preferred Alignment, but is considered favourable from a technical perspective given that the maximum gradients are less severe. There are isolated areas where slopes exceed 15 per cent to the north west of Tibshelf and at the embankment west of the Erewash Valley Railway Line. However, these would not introduce the greater complexity civil engineering works or necessitate the extensive cut and fill operations associated with the steeper gradients encountered along the Preliminary Preferred Alignment.
- 5.5.11 It is anticipated that approximately 11.35 km of off-line temporary haul road would be required to provide access to the route during the construction phase. The Erewash Valley Railway Line precludes continuous construction access between Tibshelf and Westhouses for large Heavy Goods Vehicles (HGVs) due to a low-bridge on the B6025.
- 5.5.12 Option 1 crosses the 132 kV overhead line between Chesterfield and Pinxton to the north west of Tibshelf and crosses the 132 kV overhead line between Chesterfield and Alfreton to the north of Alfreton, within approximately 0.6 km of the existing 132 kV/33 kV NGED Substation on the 132 kV overhead line route between Chesterfield and Alfreton. Approximately 4.3 km of diversionary works (inclusive of both overhead line removal and installation of underground cabling) would be required with up to three Cable Sealing End pylons. Horizontal directional drilling is not expected to be required for installation of the underground cabling.
- 5.5.13 Whilst Option 1 and the Preliminary Preferred Alignment would both require diversionary works for the 132 kV overhead line routes, Option 1 would be simplified in comparison to those required for the Preliminary Preferred Alignment due to the proximity of Option 1 to the substation.
- 5.5.14 The Erewash Valley Railway is on a raised embankment at the likely overhead line crossing point for Option 1 and this would necessitate taller structures to maintain statutory electrical safety clearances and taller netted scaffold protection structures during construction.
- 5.5.15 Recorded artificial ground, broadly correlating with historic surface mining areas, is present along the Option 1 alignment, but the extent is reduced by approximately 50 per cent in comparison to the Preliminary Preferred Alignment. Option 1 would not be in proximity to any recorded historic landfill sites. The Option 1 alignment intersects areas of four Flood Zones 2 and 3, but is not in proximity to any recorded historic landfill sites.
- 5.5.16 There is a pinch-point of approximately 120 m width between residential properties on Park Lane between Westhouses and Shirland.
- 5.5.17 There are approximately 2.6 ha of woodland along the route of the Option 1 alignment that may require felling and compensatory planting. These are located primarily around Oakerthorpe Brook and Alfreton golf course.

Alternative Routeing Option 2

- 5.5.18 In common with the Preliminary Preferred Alignment, within the River Amber valley, across a horizontal distance of approximately 375 m, ground elevations fall significantly from approximately 160 m AOD near the A61 at the top of the valley side to approximately 102 m AOD in the valley floor. This change in elevation would introduce significant technical challenge as a result of greater complexity civil

engineering works to install temporary construction accesses and preparation of work areas for construction of the overhead line pylons which would necessitate extensive cut and fill operations. Gradients exceed 15 per cent at the point at which the Option 2 alignment would cross the Erewash Valley Railway Line, given it runs through a cutting, but would not affect overhead line routeing design.

- 5.5.19 As with the Preliminary Preferred Alignment, a number of local roads along the River Amber valley section of the Option 2 route are considered unsuitable for construction access due to narrow road widths, tight geometry and fixed height/weight restrictions. This would result in an increase in temporary haul road requirements and it is anticipated that approximately 14.9 km of off-line temporary haul road would be required to provide access to the route during the construction phase. This would include a relatively long haul road section (approximately 5 km) to provide access to the River Amber valley section. The Erewash Valley Railway Line precludes continuous access between Pilsley and Stretton.
- 5.5.20 Option 2 crosses the 132 kV overhead line between Chesterfield and Pinxton to the north west of Tibshelf and crosses the 132 kV overhead line between Chesterfield and Alfreton to the north west of Morton. Approximately 5 km of diversionary works (inclusive of both overhead line removal and installation of underground cabling) would be required with up to four Cable Sealing End pylons and likely a horizontal directional drilling section under the Erewash Valley Railway Line.
- 5.5.21 Recorded artificial ground along the Option 2 alignment broadly correlates with historic surface mining areas, but the extent is reduced in comparison to the Preliminary Preferred Alignment. The Option 2 alignment intersects areas of two Flood Zones 2 and 3 and directly oversails Morton Road Historic Landfill site over a distance of approximately 400 m, as a result of which there is a risk of groundwater impacts from leaching contaminants and encountering human health hazards during intrusive works.
- 5.5.22 In common with the Preliminary Preferred Alignment, a pinch-point approximately 80 m in width is present near Higham Fisheries where the alignment follows the lower slopes of the eastern side of the River Amber valley.
- 5.5.23 There are approximately 5 ha of woodland in close proximity to the Option 2 alignment that may require felling and compensatory planting. These are located around Oakerthorpe Brook and throughout Alfreton golf course and in the vicinity of Morton Road, to the east of Stretton.

Alternative Routeing Option 3

- 5.5.24 In common with the Preliminary Preferred Alignment, within the River Amber valley, across a horizontal distance of approximately 375 m, ground elevations fall significantly from approximately 160 m AOD near the A61 at the top of the valley side to approximately 102 m AOD in the valley floor. This change in elevation would introduce significant technical challenge as a result of greater complexity civil engineering works to install temporary construction accesses and preparation of work areas for construction of the overhead line pylons which would necessitate extensive cut and fill operations. The gradient exceeds 25 per cent at the point at which the Option 3 alignment would cross the Erewash Valley Railway Line, given it runs through a cutting, but would not affect overhead line routeing design.

- 5.5.25 As with the Preliminary Preferred Alignment, a number of local roads along the River Amber valley section of the Option 3 route are considered unsuitable for construction access due to narrow road widths, tight geometry and fixed height/weight restrictions. This would result in an increase in temporary haul road requirements and it is anticipated that approximately 14.25 km of off-line temporary haul road would be required to provide access to the route during the construction phase. This would include a relatively long haul road section (approximately 5 km) to provide access to the River Amber valley section. The Erewash Valley Railway Line precludes continuous access between Pilsley and Stretton.
- 5.5.26 Option 3 crosses the 132 kV overhead line between Chesterfield and Pinxton to the north east of Lower Pilsley and crosses the 132 kV overhead line between Chesterfield and Alfreton as it passes between North Wingfield and Morton. Approximately 10 km of diversionary works (inclusive of both overhead line removal and installation of underground cabling) would be required with up to four Cable Sealing End pylons and likely a horizontal directional drilling section under the Erewash Valley Railway Line.
- 5.5.27 Recorded artificial ground along the Option 3 alignment broadly correlates with the historic surface mining areas and is present along a greater length of the route than is the case for any of the options under consideration, including the Preliminary Preferred Alignment.
- 5.5.28 Option 3 would directly oversail Morton Road Historic Landfill over a distance of approximately 400 m, as a result of which there would be a risk of groundwater impacts from leaching contaminants and encountering human health hazards during intrusive works. Option 3 is also in close proximity to the boundaries of the historic landfill sites off Parkhouse Road and at Strathfield Farm Historic Landfill within the River Amber valley.
- 5.5.29 In common with the Preliminary Preferred Alignment, a pinch-point less than 120 m in width is located north west of Lower Pilsley between a residential property, a 132 kV overhead line and the settlement of North Wingfield. This pinch-point is further constrained by an aggregate and soils processing plant, recorded historical landfill and Locko Brook. A second pinch-point approximately 80 m in width is present near Higham Fisheries where the alignment follows the lower slopes of the eastern side of the River Amber valley.
- 5.5.30 There are approximately 6 ha of woodland in close proximity to the Option 3 alignment that may require felling and compensatory planting. These are located around Oakerthorpe Brook and throughout Alfreton golf course and in the vicinity of Morton Road, to the east of Stretton.

Overall technical appraisal

- 5.5.31 The Preliminary Preferred Alignment is technically feasible. However, it does present significant engineering challenges particularly with respect to the inherent terrain and characteristics of the surrounding local road network. It would be preferable from a technical perspective to avoid routing through these sections if a more plausible alternative could be identified. The Preliminary Preferred Alignment is also subject to pinch-points in the vicinity of Lower Pilsley.

- 5.5.32 Of the alternative routeing options under consideration, both Option 1 and Option 2 are located substantially to the east of Lower Pilsley and thereby avoid the challenges associated with pinch-points located in that area. Whilst Option 1 would encounter a pinch-point between Shirland and Westhouses, this is considered to represent less of a technical constraint than those encountered by the Preliminary Preferred Alignment and Option 3 in the vicinity of Lower Pilsley.
- 5.5.33 With regard to the significant engineering challenges associated, primarily, with the River Amber valley, these are avoided only by Option 1. As a result, the Preliminary Preferred Alignment, Option 2 and Option 3 would each necessitate:
- long sections of off-line temporary haul road, particularly within the River Amber valley given the restrictions to construction access present in that area;
 - extensive cut and fill operations for the installation of access and working areas along the River Amber valley, which may likely require additional temporary construction areas for processing bedrock material; and
 - the installation of temporary scaffold protection for the A61 highway crossing to facilitate overhead line stringing works, which is anticipated to be highly complex given the steep topography immediately west of the road before the route enters the River Amber valley.
- 5.5.34 Whilst sections of temporary haul road are required for Option 1 the extent of these are expected to be reduced by comparison to the other options assessed given it would not necessitate the approximately 5 km long haul road within the River Amber valley required by all the other options.
- 5.5.35 Similarly, whilst Option 1 would be likely to require some cut and fill operations for civil engineering earthworks, especially to the north west of Tibshelf where gradients exceed 10 per cent, these would be much reduced in scale and extent in comparison to the other proposed routes. Option 1 would avoid the necessity for extensive cut and fill areas within the River Amber valley and the earthworks likely to be required for the installation of temporary scaffold protection for the A61.
- 5.5.36 Option 1 would also necessitate the felling of a smaller extent of woodland than the other options under consideration, being likely to require the felling of approximately 2.6 ha of woodland as opposed to approximately 2.9 ha for the Preliminary Preferred Alignment, approximately 5 ha for Option 2 and approximately 6 ha for Option 3.
- 5.5.37 As shown in **Table 5.1**, Option 1 is the shortest of the options under consideration.

Table 5.1: Length of all route options under consideration between Astwith and Alfreton

Route Option	Length
Preliminary Preferred Alignment	12.9 km
Alternative Routeing Option 1	11.5 km
Alternative Routeing Option 2	14.1 km
Alternative Routeing Sub-option 2b	13.4 km
Alternative Routeing Option 3	13.3 km

- 5.5.38 Given the above, it is likely that Option 1 would have a shorter construction period than the other options under consideration.
- 5.5.39 Option 1 is considered technically feasible, gives rise to the fewest technical challenges and is the shortest and most direct of the options under consideration. Option 1 is therefore the preferred option from a technical perspective.

Environmental Appraisal – Landscape and Visual

Preliminary Preferred Alignment

- 5.5.40 It is considered that the Preliminary Preferred Alignment would be unlikely to result in significant landscape or visual effects on either the Derwent Valley Mills WHS or the Amber Valley Special Landscape Area (SLA) due to the large separation distance between it and these assets.
- 5.5.41 In common with Options 1 and 2, the northernmost part of the section of the Preliminary Preferred Alignment is located approximately 1.6 km west of Hardwick Hall Registered Park and Garden (RPG) and approximately 2.6 km from the hall itself. There are a number of important views to and from this heritage asset and Zones of Theoretical Visibility (ZTV) mapping produced for this analysis indicates that the Preliminary Preferred Alignment would be visible from several areas within the RPG.
- 5.5.42 The Preliminary Preferred Alignment would be located within 250 m of four conservation areas (Astwith, Higham Old Village, Hallfield Gate, and Amber Mill and Toad Hole) and could potentially result in significant effects on the setting of, and views from, these areas.
- 5.5.43 The Preliminary Preferred Alignment is likely to have adverse impacts upon the landscape character and on views within and towards the section of the River Amber valley between Stretton and Oakerthorpe. Whilst this section is not subject to any statutory or non-statutory landscape/visual designation, it is considered to be a relatively sparsely developed section of landscape and therefore of high sensitivity, as evidenced in the Areas of Multiple Environmental Sensitivity (AMES) study (Ref 26) which identifies this area as containing areas of primary and secondary environmental sensitivity. As indicated within The Landscape Character of Derbyshire (Ref 27), the Derbyshire Peak Fringe and Lower Derwent Character Area, crossed by the Preliminary Preferred Alignment, is a transitional landscape between the Derbyshire Coalfield in the east and the Peak District to the north west. This landscape underwent limited industrialisation and remains largely in pastoral use. The severity of these impacts is likely to be greater than was envisaged at the time of the selection of the EPC, due to the requirements for extensive civil engineering works to facilitate installation of accesses and work areas for construction of the overhead line in this area during the construction phase of the Project that were identified during the development of the Preliminary Preferred Alignment.
- 5.5.44 The Preliminary Preferred Alignment would cross two existing 132 kV overhead lines (the CH route between Chesterfield and Alfreton, and the HR route between Chesterfield and Pinxton) in the vicinity of North Wingfield and Lower Pilsley. As the 132 kV overhead lines would be less than 800 m apart at the point at which the Preliminary Preferred Alignment would intersect them, there is potential for these crossings to result in a degree of 'wirescape'. However, this potential may be reduced as it is likely that the 132 kV overhead line circuits would be diverted and undergrounded at these locations in order to facilitate the crossings.

- 5.5.45 The Preliminary Preferred Alignment would run parallel to the more westerly of the two 132 kV overhead lines (the CH route) for a distance of approximately 1.2 km between Lower Pilsley and Danesmoor. The potential for this to result in a degree of 'wirescape' in this area may be reduced through a carefully designed close parallel alignment where practicable either side of the section of the existing 132 kV overhead line diverted and undergrounded, which would limit the geographical extent of the visibility of overhead lines in this area. However, the differences in scale between the Preliminary Preferred Alignment and the 132 kV overhead line may limit the effectiveness of such an approach.
- 5.5.46 The Preliminary Preferred Alignment may also result in the felling of areas of woodland in the vicinity of Oakerthorpe Brook and throughout Alfreton golf course.
- 5.5.47 With regard to the extensive engineering works that are likely to be required during the construction phase as a result of the steep topography as the Preliminary Preferred Alignment enters the River Amber valley, it is unlikely that any effective mitigation would be available in relation to the landscape and visual impacts that would arise as a result of such works.
- 5.5.48 The Preliminary Preferred Alignment is likely to result in adverse impacts on landscape character, including loss of vegetation, localised changes to landform and perceptual qualities such as tranquillity and sense of wildness. In addition the visual amenity of residents at settlements such as North Wingfield, Danesmoor, Lower Pilsley, Stretton, Mickley, Higham and Shirland would also be affected. It would run close to and cross the Five Pits Trail and potentially affect views from that trail and the Chesterfield Round Walk. In addition there are several Public Rights of Way within the River Amber valley from which views of the Preliminary Preferred Alignment are likely to be available. Impacts upon these visual receptors could be reduced or reduced slightly by minimising the removal of structural vegetation and micro-siting of the alignment.

Alternative Routeing Option 1

- 5.5.49 Option 1 is approximately 1.4 km shorter than the Preliminary Preferred Alignment and is the most direct of all the options under consideration.
- 5.5.50 It is considered that Option 1 would be unlikely to result in significant landscape or visual effects on either the Derwent Valley Mills WHS or the Amber Valley SLA due to the large separation distance between it and these assets.
- 5.5.51 At its closest point, Option 1 would be the same distance from Hardwick Hall RPG (approximately 1.6 km) and Hardwick Hall itself (approximately 2.6 km) as the Preliminary Preferred Alignment and Option 2. However, as it runs south, Option 1 would be relatively close to Hardwick Hall RPG over a longer distance than the Preliminary Preferred Alignment, being located within 3 km of the RPG for approximately 3 km of its length. ZTV mapping produced for this analysis indicates that Option 1 would be visible from some areas within the RPG.
- 5.5.52 Option 1 would be located within 500 m of three conservation areas (Astwith, Hardstoft and Tibshelf). The alignment of this option utilises a central route through the area identified as Section C5a in the CPRSS and is therefore located further away from Stainsby, including the fields used for Stainsby Festival at the eastern edge of the corridor, the Stainsby defended manorial complex including site of chapel and Stainsby Conservation Area adjacent to the eastern boundary of the section, as well as Hardwick Hall RPG, and Hardwick and Rowthorne Conservation Area further to the east.

- 5.5.53 Part of the Option 1 route would be located on elevated land between Astwith and Tibshelf, with few screening elements. This option is likely to increase the impact on views from and the setting of Hardwick Hall to the east.
- 5.5.54 The Option 1 alignment would be routed further away from the River Amber valley, notably the section between Stretton and Oakerthorpe which is considered to be of relatively high landscape value. In addition, the section of Option 1 between Tibshelf and Oakerthorpe is within a shallow valley where woodland would provide some screening.
- 5.5.55 Option 1 crosses existing 132 kV overhead lines to the south of Hardstoft (the HR route) and to the north of Alfreton (the CH route), which could result in a degree of 'wirescape' in these areas, though the potential for this may be reduced as it is likely that the 132 kV overhead line circuits would be diverted and undergrounded at the point of intersection with Option 1.
- 5.5.56 Three non-designated woodlands may be affected by Option 1. Avoidance or micro-siting should be considered to reduce the impacts on the three areas of woodland and in terms of reducing impacts arising from potential wirescape.
- 5.5.57 Option 1 would pass within 500 m of several settlements including Hardstoft, Pilsley, Tibshelf and Westhouses.

Alternative Routeing Option 2

- 5.5.58 It is considered that Option 2 would be unlikely to result in significant landscape or visual effects on either the Derwent Valley Mills WHS or the Amber Valley SLA due to the large separation distance between it and these assets.
- 5.5.59 At its closest point, Option 2 would be the same distance from Hardwick Hall RPG (approximately 1.6 km) and Hardwick Hall itself (approximately 2.6 km) as the Preliminary Preferred Alignment and Option 1. However, as it runs south, Option 2, like Option 1, would be relatively close to Hardwick Hall RPG over a longer distance than the Preliminary Preferred Alignment, being located within 3 km of the RPG for approximately 3 km of its length. ZTV mapping produced for this analysis indicates that Option 2 would be visible from some areas within the RPG.
- 5.5.60 Option 2 would be located within 500 m of three conservation areas (Astwith, Hardstoft and Tibshelf).
- 5.5.61 In common with Option 1, part of the Option 2 alignment would be located on elevated land between Astwith and Tibshelf, with few screening elements. This option is likely to increase the impact on views from and the setting of Hardwick Hall to the east.
- 5.5.62 The section of the Option 2 alignment between Tibshelf and Stretton is within lower lying land where woodland would provide some screening. In order to maintain statutory electrical safety clearances, a sizeable area of non-designated woodland to the east of Stretton, close to where Option 2 reconverges with the Preliminary Preferred Alignment, would need to be felled. Avoidance or micro-siting should be considered to reduce the impacts on the area of woodland.
- 5.5.63 Option 2 would cross existing 132 kV overhead lines to the south of Hardstoft (the HR route) and to the east of Stretton (the CH route), which is likely to result in some 'wirescape' in these areas, though the potential for this may be reduced as it is likely that the 132 kV overhead line circuits would be diverted and undergrounded at the point of intersection with Option 2.

- 5.5.64 In common with the Preliminary Preferred Alignment, Option 2 is likely to have adverse impacts upon the landscape character and on views within and towards the section of the River Amber valley between Stretton and Oakerthorpe. These impacts would be the same as those described in relation to the Preliminary Preferred Alignment, above.
- 5.5.65 This option would be within 500 m of several settlements including Hardstoft, Pilsley Tibshelf, Morton and Stretton.

Alternative Routeing Option 3

- 5.5.66 It is considered that Option 3 would be unlikely to result in significant landscape or visual effects on either the Derwent Valley Mills WHS or the Amber Valley SLA due to the large separation distance between it and these assets.
- 5.5.67 Option 3 diverges from the Preliminary Preferred Alignment further to the west than Options 1 and 2. Thus, whilst the northernmost part of Option 3 (i.e. the part that is common to all options) would be as close to Hardwick Hall RPG as Options 1 and 2, a much smaller section of Option 3 would be located in relatively close proximity to Hardwick Hall RPG than would be the case for those other options. The impact of Option 3 on Hardwick Hall RPG would therefore be the same as described in relation to the Preliminary Preferred Alignment, above.
- 5.5.68 Option 3 would be located within 250 m of four conservation areas (Astwith, Higham Old Village, Hallfield Gate, and Amber Mill and Toad Hole)
- 5.5.69 In common with the Preliminary Preferred Alignment and Option 2, Option 3 is likely to have adverse impacts upon the landscape character and on views within and towards the section of the River Amber valley between Stretton and Oakerthorpe. These impacts would be the same as those described in relation to the Preliminary Preferred Alignment, above.
- 5.5.70 The southern part of the Option 3 alignment would bisect woodland to the south of Padley Wood and this option would involve the removal of some of these trees.
- 5.5.71 Option 3 would cross an existing 132 kV overhead line to the north east of Lower Pilsley (the HR route), which is likely to result in some 'wirescape' in this area, though the potential for this may be reduced as it is likely that the 132 kV overhead line circuits would be diverted and undergrounded at the point of intersection with Option 3. Option 3 would also cross an existing 132 kV overhead line (the CH route) to the north west of Lower Pilsley and would run parallel to this overhead line for approximately 3.5 km, before diverging from it to the north of Morton. Substantial 132 kV overhead line diversionary works (removal and undergrounding) would be required, including the need for horizontal directional drilling under the Erewash Valley Railway Line. The potential of 'wirescape' in this area may be reduced through a carefully designed close parallel alignment where practicable either side of the section of the existing 132 kV overhead line diverted and undergrounded, which would limit the geographical extent of the visibility of overhead lines in this area. However, the differences in scale between Option 3 and the 132 kV overhead line may limit the effectiveness of such an approach.

Overall appraisal – landscape and visual

- 5.5.72 With regard to potential impacts on views to and from Hardwick Hall RPG, all options under consideration would be in closest proximity to this heritage asset at the point at which Options 1 and 2 diverge from the Preliminary Preferred Alignment. All options would be likely to have intervisibility with the RPG from this location. However, as the options continue, the Preliminary Preferred Alignment and Option 3 turn west, away from the RPG, whilst Options 1 and 2 track southwards, remaining in relatively close proximity as they cross more elevated land. Options 1 and 2 therefore have a greater potential to give rise to impacts on views to and from Hardwick Hall RPG; however, it is considered that mitigation may be possible to reduce such impacts.
- 5.5.73 With regard to potential adverse impacts upon the landscape character and on views within and towards the section of the River Amber valley between Stretton and Oakerthorpe, only Option 1 avoids this area. Field observations and engineering studies undertaken during the development of the Preliminary Preferred Alignment have indicated that the steep gradients in this area would give rise to additional landscape and visual effects during the construction phase of the Project due to the need for extensive engineering works that are likely to result in extensive loss of vegetation, localised changes to landform and the introduction of overhead line within steep sided valley, characteristic for the Derbyshire Peak Fringe and Lower Derwent Character Area, whilst resulting in impacts on views and visual amenity.
- 5.5.74 Where impacts cannot be avoided or mitigated by careful routeing, mitigation measures that may be available in relation to all of the options have been considered in accordance with National Grid's mitigation hierarchy. In particular, consideration has been given to the potential benefits to be gained through the use of alternative pylon designs (i.e. lower height pylons) in relation to the sections of the options within the River Amber valley (relevant to the Preliminary Preferred Alignment, Option 2 and Option 3) and to sections of options that cross the more elevated ground between Astwith and Hardstoft (relevant to Option 1 and Option 2). The use of lower height lattice pylons could reduce the prominence of the new line in views and within the wider landscape and could also have some benefit in reducing impacts upon the setting of heritage assets in the area. However, it is considered that the use of low height lattice pylons would not be so advantageous as to reduce the likely level of significance of these effects and that the greater width of such pylons could result in higher levels of effect being sustained by receptors in closer proximity to them. As none of the options pass through any nationally designated landscape, undergrounding part of the connection is not considered to be appropriate or necessary, in line with national planning policy. As a result, the use of standard height steel lattice pylons remains the preferred approach.
- 5.5.75 On balance, and taking into account the landscape and visual impacts likely to arise during the construction phase of the Project due to the extensive engineering works required in the River Amber valley, it is considered that options routed within the River Amber valley between Stretton and Oakerthorpe are likely to result in a greater level of adverse landscape and visual effects than options that avoid that area. Whilst the options routed outside the River Amber valley would result in a greater level of visual effect in views to and from Hardwick Hall, it is considered that these are outweighed by the adverse landscape effects likely to be sustained by the Derbyshire Peak Fringe and Lower Derwent Character Area and the accompanying adverse visual effects in that area. Option 1 is therefore the preferred option from a landscape and visual perspective.

Environmental Appraisal – Historic Environment

Preliminary Preferred Alignment

- 5.5.76 In common with all options under consideration, to the north of Astwith, the Preliminary Preferred Alignment is within 1.6 km of the boundary of Hardwick Hall RPG and approximately 2.6 km from Hardwick Hall (Grade I) listed building and Hardwick Old Hall Scheduled Monument. A 'Hardwick Setting Study' produced for the National Trust in 2016 (Ref 28) provides a description of elements of the setting of Hardwick Hall, including views of and from the hall that were judged to contribute to its heritage significance. The study identifies the prominence of the house in views to it and the contribution of outward views as these are described as being intended to impress visitors. Of the options under consideration, the Preliminary Preferred Alignment generally maximises the distance from Hardwick Hall. Views of Hardwick Hall from the west and views to the west and north west from Hardwick Hall are noted as contributing to its heritage significance and visibility of the overhead line in these views would affect this. Analysis indicates theoretical visibility of Preliminary Preferred Alignment pylons from the west facing slopes within Hardwick Hall RPG and these are also likely to be visible from the hall roof.
- 5.5.77 The Preliminary Preferred Alignment is in relatively close proximity to a number of conservation areas and other listed buildings. The Preliminary Preferred Alignment is located a minimum of 325 m to the west of Stainsby Conservation Area and Scheduled Monument. Pylons would be likely to be visible from Stainsby Conservation Area to the west, but they would not be seen in the important panoramic views which are identified in the conservation area appraisal and which are to the north, east and south east. The Preliminary Preferred Alignment generally maximises the distance from Hardstoft and Astwith Conservation Areas and largely avoids the important views which are identified in the conservation area appraisals, which are generally to the east.
- 5.5.78 Within the River Amber valley, the Preliminary Preferred Alignment is in relatively close proximity to Amber Mill and Toad Hole, Hallfield Gate and Higham Old Village Conservation Areas. The AMES study (Ref 26) also identifies this area as containing areas of primary and secondary environmental sensitivity. The extent of identified historic sensitivity contributed to this, with the sensitivity identified on the basis of Historic Landscape Character Assessment data and archaeological designations.
- 5.5.79 Ogston Hall (Grade II*) listed building and associated listed buildings and non-designated gardens and parkland occupy an elevated location approximately 800 m west of the Preliminary Preferred Alignment within the River Amber valley. There is potential for a significant effect to Ogston Hall due to change in its setting, which appears to include views across the valley.
- 5.5.80 Within the River Amber valley there are also listed structures which are associated with the railway line, which was built in 1836–40 as the North Midland Railway, and a small number of more isolated listed farmhouses.
- 5.5.81 The use of lower height pylons for the Preliminary Preferred Alignment within the River Amber valley may reduce visibility somewhat and could be considered as part of potential mitigation subject to topographical constraints in this area. However, the greater width of such pylons could result in higher levels of impact in some cases and so they would generally be unlikely to notably reduce the potential for significant impacts.

5.5.82 The Preliminary Preferred Alignment follows relatively closely that of Ryknield Street Roman Road and will intersect with it at two locations. There may be an elevated potential for the presence of archaeological remains of Roman date in proximity to the route of the road.

5.5.83 Due to the large separation distance, this option would have no impact on the setting of the Derwent Valley Mills WHS.

Alternative Routeing Option 1

5.5.84 In common with all options under consideration, to the north of Astwith, Option 1 is within 1.6 km of the boundary of Hardwick Hall RPG and approximately 2.6 km from Hardwick Hall (Grade I) listed building and Hardwick Old Hall Scheduled Monument. Whilst the Preliminary Preferred Alignment and Option 3 turn west from this point, Option 1 continues in a southerly direction across the elevated ground to the west of Astwith and Hardstoft. The Hardwick Setting Study identifies this area as a 'visually significant ridgeline', broadly along the line of the B6039 to the west of Hardwick Hall, which helps to define 'key' inward and outward views. Two viewpoints in the Hardwick Setting Study are from the B6039, a short distance east of the Option 1 route. There are no identified 'key' views from further to the west, in which Hardwick Hall would be seen beyond the Option 1 alignment. Views to the west and north west from Hardwick are also noted as contributing to its heritage significance and the 'visually significant ridgeline' along the line of the B6039 is a feature in this. Visibility of Option 1 along the ridgeline in these views would therefore be considered to affect the setting of Hardwick Hall.

5.5.85 Analysis indicates theoretical visibility of Option 1 from the west facing slopes within Hardwick Hall RPG and Conservation Area and it is likely that there would be greater visibility from the upper floors of the hall and from the roof. The number of locations within the Hardwick Hall complex from which Option 1 may be visible is only slightly greater compared to the Preliminary Preferred Alignment and this does not notably affect the identified key viewpoints. However, it may be that Option 1 would occupy a wider field of view from the hall, including along the ridgeline. The use of lower height pylons for Option 1 may reduce visibility somewhat and could be considered as part of potential mitigation. However, the greater width of such pylons could result in higher levels of impact in some cases and so they would generally be unlikely to notably reduce the potential for significant impacts. Compared to the Preliminary Preferred Alignment, Option 1 would increase the length of overhead line which may be visible from Hardwick Hall and this does imply that there would be a greater degree of impact.

5.5.86 North of Tibshelf, Option 1 passes within approximately 65 m of Hardstoft Conservation Area and approximately 165 m of Astwith Conservation Area. The conservation area appraisals for both identify the settlements as being located on a sandstone ridge overlooking the River Doe Lea to the east and emphasise land to the south and east, with historic and visual connection to Hardwick Hall. Whilst Option 1 would be visible from the western edges of both conservation areas, the appraisals identify no 'key views' from these areas.

5.5.87 Option 1 avoids the section of the River Amber valley between Stretton and Oakerthorpe and would therefore have no impact on the setting of Ogston Hall (Grade II*) listed building and its associated listed buildings and non-designated gardens and parkland. By being located away from this section of the River Amber valley, Option 1 also avoids the Amber Mill and Toad Hole, Hallfield Gate and Higham Conservation Areas. Unlike any of the other options under consideration, Option 1 also avoids the areas of primary and secondary environmental sensitivity identified in the AMES study (Ref 26).

- 5.5.88 There are no known heritage assets that would be expected to experience a significant adverse impact along the Option 1 route south of Tibshelf. Also, there would be no interaction with the line of Rykniel Street Roman Road within Option 1.
- 5.5.89 Due to the large separation distance, this option would have no impact on the setting of the Derwent Valley Mills WHS.

Alternative Routeing Option 2

- 5.5.90 In common with all options under consideration, to the north of Astwith, Option 2 is within 1.6 km of the boundary of Hardwick Hall RPG and approximately 2.6 km from Hardwick Hall (Grade I) listed building and Hardwick Old Hall Scheduled Monument. Whilst the Preliminary Preferred Alignment and Option 3 turn west from this point, Option 2, like Option 1, continues in a southerly direction across the elevated ground to the west of Astwith and Hardstoft. The likely impacts of Option 2 upon heritage assets within the Hardwick Hall complex would be the same as those described in relation to Option 1, above.
- 5.5.91 To the north of Tibshelf, the impact of Option 2 on the Hardstoft and Astwith Conservation Areas would also be the same as described in relation to Option 1.
- 5.5.92 West of Tibshelf, Option 2 is relatively unconstrained from a historic environment perspective. Option 2 would reconverge with the Preliminary Preferred Alignment at Stretton and impacts upon heritage assets to the south of this point, within the River Amber valley would be the same as those described in relation to the Preliminary Preferred Alignment, above. As with the Preliminary Preferred Alignment, Option 2 is in relatively close proximity to Amber Mill and Toad Hole, Hallfield Gate and Higham Old Village Conservation Areas and is within the area of historic sensitivity identified in the AMES study (Ref 26). Also as with the Preliminary Preferred Alignment, there is potential for a significant effect to Ogston Hall (Grade II*) listed building due to change in its setting, which appears to include views across the valley.
- 5.5.93 Potential impacts on listed structures associated with the railway line, which was built in 1836–40 as the North Midland Railway, and interaction with the line of Rykniel Street Roman Road would be the same for Option 2 as for the Preliminary Preferred Alignment.
- 5.5.94 The use of lower height pylons for the Preliminary Preferred Alignment within the River Amber valley may reduce visibility somewhat and could be considered as part of potential mitigation subject to topographical constraints in this area. However, the greater width of such pylons could result in higher levels of impact in some cases and so they would generally be unlikely to notably reduce the potential for significant impacts.
- 5.5.95 Of the options under consideration, Option 2 is the least preferred from a historic environment perspective as it is in close proximity to Hardwick Hall for a greater part of its length than either the Preliminary Preferred Alignment or Option 3 and, unlike Option 1, also has the potential to result in a significant effect to Ogston Hall in the River Amber valley.
- 5.5.96 Due to the large separation distance, this option would have no impact on the setting of the Derwent Valley Mills WHS.

Alternative Routeing Option 3

- 5.5.97 In common with all options under consideration, to the north of Astwith, Option 3 is within 1.6 km of the boundary of Hardwick Hall RPG and approximately 2.6 km from Hardwick Hall (Grade I) listed building and Hardwick Old Hall Scheduled Monument. Option 3 generally maximises the distance from Hardwick Hall. Analysis indicates that there would be theoretical visibility of Option 3 pylons from the west facing slopes within Hardwick Hall RPG and these are also likely to be visible from the hall roof.
- 5.5.98 Option 3 is in relatively close proximity to a number of conservation areas and other listed buildings and is a minimum of 325 m to the west of Stainsby Conservation Area and Scheduled Monument. As with the Preliminary Preferred Alignment, pylons would be likely to be visible from Stainsby Conservation Area to the west, but they would not be seen in the important panoramic views which are identified in the conservation area appraisal and which are to the north, east and south east. Option 3 generally maximises the distance from Hardstoft and Astwith Conservation Areas and largely avoids the important views which are identified in the conservation area appraisals, which are generally to the east.
- 5.5.99 Within the River Amber valley, Option 3 is in relatively close proximity to Amber Mill and Toad Hole, Hallfield Gate and Higham Old Village Conservation Areas, and is within the area of historic sensitivity identified in the AMES study (Ref 26). Also as with the Preliminary Preferred Alignment, there is potential for a significant effect to Ogston Hall (Grade II*) listed building due to change in its setting, which appears to include views across the valley.
- 5.5.100 Potential impacts on listed structures associated with the railway line, which was built in 1836–40 as the North Midland Railway, and interaction with the line of Rykniel Street Roman Road would be the same for Option 3 as for the Preliminary Preferred Alignment. This option would have no impact on the setting of the Derwent Valley Mills WHS.
- 5.5.101 The use of lower height pylons for the Preliminary Preferred Alignment within the River Amber valley may reduce visibility somewhat and could be considered as part of potential mitigation subject to topographical constraints in this area. However, the greater width of such pylons could result in higher levels of impact in some cases and so they would generally be unlikely to notably reduce the potential for significant impacts.

Overall appraisal – historic environment

- 5.5.102 At their closest point, to the north of Astwith Conservation Area, all options under consideration would be within 1.6 km of the boundary of Hardwick Hall RPG and approximately 2.6 km from Hardwick Hall (Grade I) listed building and Hardwick Old Hall Scheduled Monument. However, from this point, whilst the Preliminary Preferred Alignment and Option 3 would turn west, away from Hardwick, Options 1 and 2 would continue in a southerly direction across the elevated ground to the west of Astwith and Hardstoft Conservation Areas. As a result, Options 1 and 2 would increase the length of overhead line which may be visible from Hardwick Hall and this implies that these options would give rise to a greater degree of impact to the setting of this heritage asset than would arise from the Preliminary Preferred Alignment or Option 3.

- 5.5.103 There is potential for the Preliminary Preferred Alignment, Option 2 and Option 3 to give rise to significant effects on the setting of Ogston Hall (Grade II*) listed building as all three of these options are located within the River Amber valley, approximately 800 m to the east of this heritage asset. Option 1 is the only option under consideration that avoids this section of the River Amber valley and would have no impact on Ogston Hall (Grade II*) listed building.
- 5.5.104 Option 2 is the least preferred option from a historic environment perspective as it would result in a greater impact on both Hardwick Hall and Ogston Hall (Grade II*) listed building. Option 1 is less preferred than the Preliminary Preferred Alignment and Option 3 as, whilst it would have no impact on the setting of Ogston Hall (Grade II*) listed building, it would result in a greater degree of impact to Hardwick Hall (Grade I) listed building and associated heritage assets than would the Preliminary Preferred Alignment or Option 3. From a historic environment perspective, there is no material difference between the impact associated with the Preliminary Preferred Alignment and Option 3 and these options are marginally preferred options from this perspective.
- 5.5.105 There are no notable potential historic environment adverse or beneficial effects associated with adopting the Option 3 route in comparison to the Preliminary Preferred Alignment.
- 5.5.106 Where impacts cannot be avoided or mitigated by careful routeing, mitigation measures that may be available in relation to all of the options have been considered in accordance with National Grid's mitigation hierarchy. In particular, consideration has been given to the potential benefits to be gained through the use of alternative pylon designs (i.e. lower height pylons) in relation to the sections of the options within the River Amber valley in the setting of Ogston Hall (Grade II*) listed building (relevant to the Preliminary Preferred Alignment, Option 2 and Option 3) and to sections of options that cross the elevated ground ridgeline broadly along the line of the B6039 which features in identified outward views to the west of Hardwick Hall (relevant to Option 1 and Option 2). The use of lower height lattice pylons could have some benefit in reducing impacts upon the setting of heritage assets in the area. However, the greater width of such pylons could result in higher levels of impact in some cases and so they would generally be unlikely to notably reduce the potential for significant impacts. As none of the options pass through any nationally designated landscape, undergrounding is not considered to be appropriate or necessary, in line with national planning policy. As a result, the use of standard height steel lattice pylons remains the preferred approach.

Environmental Appraisal – Ecology

Preliminary Preferred Alignment

- 5.5.107 The Preliminary Preferred Alignment within the EPC broadly avoids the majority of key biodiversity features present within the corridor and has taken account of the need to protect as far as reasonably practicable areas of ecological value including ancient woodland, Habitats of Principal Importance (HPI) and the avoidance or reduction of watercourse crossings. As shown on **Image 5.1**, the Preliminary Preferred Alignment within the River Amber valley has been located to the eastern side of the EPC and thereby maintains a buffer from the Ogston Reservoir Site of Special Scientific Interest (SSSI) located beyond the EPC to the west.

- 5.5.108 The Preliminary Preferred Alignment avoids direct impacts to HPI woodland until reaching Alfreton golf course and woodland bordering Oakerthorpe. This woodland is majority designated as HPI Deciduous Woodland with a contiguous area within the EPC also designated as Local Nature Reserve (LNR).
- 5.5.109 The Preliminary Preferred Alignment is located less than 1 km to the east of Ogston Reservoir SSSI. This SSSI is specifically cited for supporting a range of bird species, particularly during the summer and passage periods, but also supporting assemblages during the breeding and wintering periods. The bird assemblages utilise a variety of habitats encompassed by the SSSI boundary, including grassland, wetland, woodland and the reservoir itself. Siting of the route further away from this location would be potentially beneficial in terms of avoidance of impacts to birds flying to and from the reservoir. Owing to the steep topography, construction of the Preliminary Preferred Alignment within the section of the River Amber valley between Stretton and Oakerthorpe would be likely to require extensive earthworks activities as well as approximately 5 km of temporary haul road. This will increase the volume and extent of construction presence temporarily within the area in proximity to the SSSI which has the potential to influence movement of birds to and from the reservoir. Potential impact/effect pathways could be associated with noise and visual disturbance arising from construction. Given the topography of the area, once constructed, the pylons may present an obstruction to bird movements to and from the SSSI with birds required to navigate this additional infrastructure. Mitigation measures such as bird diverters would require further investigation through the spans here.

Alternative Routeing Option 1

- 5.5.110 The Option 1 route would not directly interact with any statutory or non-statutory designated sites and no such sites are located within 100 m of the alignment.
- 5.5.111 At its closest point, Option 1 is located approximately 3.7 km from the Ogston Reservoir SSSI, which is located within less than 1 km of the Preliminary Preferred Alignment. Construction of the Option 1 alignment is unlikely to greatly influence bird movements to and from the SSSI given its distance.
- 5.5.112 A part of Option 1 is close to an area of Open Mosaic Habitat on Previously Developed Land (OMHPDL) to the south of Alfreton Road near Westhouses, which is a HPI. It is assumed that with careful micro-routeing, both direct and indirect impacts to this feature could be avoided or minimised where practicable. This habitat is difficult to compensate and would need to be factored into any Biodiversity Net Gain assessment and offsetting requirements.
- 5.5.113 Option 1 spans Meadow Farm Local Wildlife Site (LWS), which is identified as HPI – Good Semi Improved Grassland. There is potential for one of the Option 1 pylons to be located just outside of the LWS boundary, potentially within the riparian zone of Morton Brook tributary and careful siting will be required to prevent or limit oversailing of the LWS and/or impacts to the watercourse. At its southern end, Option 1 passes through several parcels of HPI Deciduous Woodland, rejoining the route adjacent to Alfreton golf course, which would impact woodland contiguous with Oakerthorpe LNR.
- 5.5.114 Where possible, the Option 1 route would avoid or microsite around blocks of trees/woodland, particularly those designated as HPI Deciduous Woodland, to reduce the volume of woodland trees requiring removal. As far as reasonably practicable, pylons should not be sited within 10 m of watercourse banks/riparian

zones. Where Option 1 reconnects with the Preliminary Preferred Alignment, the volume of tree removal would be reduced as much as practically possible given the woodland, designated as HPI, is also contiguous with Oakerthorpe LNR. However, it would not be possible to completely avoid impacts to woodland in this area.

Alternative Routeing Option 2

- 5.5.115 Where the Option 2 route runs west, south of Pilsley, it skirts the edge of the Morton Colliery LWS, as well as passing through large tracts of woodland listed as HPI Deciduous Woodland. Option 2 would bisect a large tract of woodland located east of Stretton before rejoining the Preliminary Preferred Alignment. Option 2 should be microsited north of the LWS to avoid direct impacts to the LWS habitats. Woodland and tree loss is likely to be unavoidable for the route east of Stretton, where the overhead line would require the removal of a corridor of woodland to facilitate construction and maintenance of the overhead line.
- 5.5.116 The Option 2 route is slightly beneficial in comparison to the Preliminary Preferred Alignment in that its northern section is sited further away from Ogston Reservoir SSSI. However, Option 2 reconverges with the Preliminary Preferred Alignment parallel to the northern end of the SSSI and the potential impact of this option upon the SSSI would therefore be as described in relation to the Preliminary Preferred Alignment above.
- 5.5.117 The diagonal Sub-option 2b passes through a parcel of HPI Deciduous Woodland to the east of Pilsley and, whilst representing a shorter route, is less preferred than the primary Option 2 route.

Alternative Routeing Option 3

- 5.5.118 The Option 3 route would directly impact the Padley Wood Poultry Farm LWS, bisecting the woodland block here. The woodland is designated as HPI Deciduous Woodland and is contiguous with a parcel of ancient woodland to the west and woodland that is covered by the Padley Wood LWS. Subject to confirmation through survey, it may be that the woodland which Option 3 passes through could also be considered ancient woodland given its contiguous nature. The route would also span further HPI Deciduous Woodland bounding the railway line, associated with the Padley Wood LWS. It is unlikely that Option 3 could avoid impacts to the LWS, or the HPI Deciduous Woodland that may also qualify as ancient woodland given it is contiguous with ancient woodland. As far as practicable, impacts to other trees/woodlands should be avoided or else microsited around.
- 5.5.119 Whilst the Option 3 route initially maintains a greater separation to the Ogston Reservoir SSSI before reconverging with the Preliminary Preferred Alignment, its northern section is located closer to the SSSI than Options 1 or 2. In common with Option 2, Option 3 reconverges with the Preliminary Preferred Alignment to the north of the SSSI and the impact of this option upon the SSSI would therefore be as described in relation to the Preliminary Preferred Alignment, above.

Overall appraisal – ecology

- 5.5.120 Ogston Reservoir SSSI is specifically cited for supporting a range of bird species, with seasonal variations and fluctuations in numbers and species cited within the SSSI citation. Owing to the steep topography, construction of the Preliminary Preferred Alignment within the section of the River Amber valley between Stretton

and Oakerthorpe will require extensive earthworks activities, which would increase the volume and extent of construction presence within the area in proximity to the SSSI. Whilst overall temporary in nature, the extensive earthworks and construction required would have the potential to influence the movement of birds to and from the reservoir and/or surrounding habitats. Potential impact/effect pathways could be associated with noise and visual disturbance arising from construction.

- 5.5.121 The requirement for such extensive engineering activities within the River Amber valley during the construction phase of the Project was identified after the selection of the EPC and increases the potential for the SSSI to sustain adverse impacts. As a result, the siting of the route further away from this location would be potentially more beneficial in terms of avoidance of impacts to birds flying to and from the reservoir than was considered in the CPRSS.
- 5.5.122 The Option 1 route is beneficial in comparison with the Preliminary Preferred Alignment in that it would not directly interact with any statutory or non-statutory designated sites and no such sites are located within 100 m of the alignment. Option 1 is the only one of the alternative routeing options under consideration that avoids the section of the River Amber valley adjacent to Ogston Reservoir SSSI. Whilst HPI OMHPDL is present, this could be micrositied around or else construction of pylons designed as such to prevent direct impacts to the habitat type itself. It is considered likely to be possible to microsite around woodland blocks/banks of trees or else reduce woodland/tree loss across this route and the impacts to HPI Deciduous Woodland are much the same as would be experienced with the Preliminary Preferred Alignment, primarily associated with the Oakerthorpe area.
- 5.5.123 Option 1 provides a greater degree of separation from the SSSI than either the Preliminary Preferred Alignment or Options 2 and 3, whilst avoiding the potential for impacts of a comparable magnitude in other areas. Option 1 is therefore the preferred option from an ecology perspective.

Environmental Appraisal – Water Environment

Overall appraisal – water environment

- 5.5.124 With regard to Environment Agency (EA) Main River crossings, all four options under consideration cross Alfreton Brook in the area to the south of Shirland Golf and Country Club. The Preliminary Preferred Alignment and Options 2 and 3 have a common alignment at this point, while Option 1 crosses the brook approximately 800 m further east. Option 1 is generally further away from other EA Main Rivers than the Preliminary Preferred Alignment and Options 2 and 3.
- 5.5.125 Where the Preliminary Preferred Alignment and Options 2 and 3 run parallel to the River Amber, they share a common alignment, which is located in Flood Zone 1. However, the impacts of climate change could draw more of the alignment into Flood Zones 2 and 3 and hydraulic modelling would need to be undertaken to confirm this.
- 5.5.126 With regard to other Flood Zones, considered from north to south:
- The Preliminary Preferred Alignment crosses the River Rother Flood Zone at a point where it is less than 100 m in width.
 - The Preliminary Preferred Alignment and Option 3 both run parallel to the Locko Brook Flood Zone over a distance of approximately 250 m and cross this Flood Zone at a point where it is less than 100 m in width.

- Option 1 has two crossings of the Morton Brook Flood Zone and runs parallel to this Flood Zone for approximately 300 m.
 - All options cross the Alfreton Brook Flood Zone at points where the Flood Zone is less than 200 m in width.
 - All options cross the Oakerthorpe Brook Flood Zone at a point where it is less than 100 m in width.
- 5.5.127 Where Option 1 crosses Morton Brook, the Project is likely to require flood mitigation, to be determined at detailed design, likely informed by hydraulic modelling. Option 2 is approximately 800 m from Morton Brook.
- 5.5.128 The Preliminary Preferred Alignment and Options 2 and 3 run parallel to the reservoir flood risk zone attributed to Ogston Reservoir between Stretton and Alfreton Brook. All four options cross this zone at Alfreton Brook, although the Option 1 crossing is further east.
- 5.5.129 All options cross catchments containing Water Framework Directive (WFD) water bodies. It is difficult to ascertain whether or not Options 1, 2 or 3 present an increase in risk to WFD water bodies compared with the Preliminary Preferred Alignment. This would need to be investigated through engagement with the EA, potentially site walkovers and the undertaking of a WFD screening and scoping exercise. In view of this uncertainty, potential risk to WFD waterbodies has not been considered to be a differentiating factor for the purposes of this water environment appraisal.
- 5.5.130 Parts of the alignments of all options fall within a surface water drinking water safeguard zone, with Option 1 being located within this zone for almost its entire length. In all cases, this would require mitigation measures to be put in place. These would need to be confirmed with the EA.
- 5.5.131 The Preliminary Preferred Alignment and Options 2 and 3 are located in close proximity to Higham Farm Fishery, which is a sensitive water feature, and would make mitigation requirements more intensive.
- 5.5.132 Option 2 is in close proximity to a series of artificial ponds in Morton, the function of which is unclear and which would require further investigation. Option 3 is close to Hallgate Pond, used by Williamthorpe Angling Club, which would need to be assessed and any impacts mitigated.
- 5.5.133 Due to their proximity to high risk flood zones from multiple sources, consultation and robust assessment of impacts would be required for all options under consideration. Mitigation steps would need to be agreed with the EA, Lead Local Flood Authority and any other relevant statutory bodies.
- 5.5.134 The additional studies and assessments required to provide a greater understanding of potentially affected hydrological features and the standard mitigation measures that would be included in the Construction Environmental Management Plan are likely to be common to all options.
- 5.5.135 All the options under consideration are considered to be feasible and there is no preferred option from a water environment perspective.

Socio-Economic Appraisal

Overall appraisal – socio-economic

- 5.5.136 There would be impacts to the communities of Tibshelf, Westhouses and Blackwell as a result of Option 1. Similarly, the communities of Lower Pilsley, North Wingfield, Danesmoor and Higham would be impacted by the Preliminary Preferred Alignment and Options 2 and 3. With regard to the interaction of the options under consideration with schools in these communities, Option 1 is located approximately 100 m to the west of Tibshelf Community School and approximately 250 m south east of Westhouses Primary School. Option 2 passes within 600 m of Morton Primary Academy, and approximately 600 m west of Mickley Infant School. Option 3 passes within 500 m of Park House School. Alfreton Park School, with special educational needs provision, is within 650 m of all of the options, with Option 1 being closest, at approximately 500 m west of the school.
- 5.5.137 In terms of recreational amenities, all options intersect the Five Pits Trail once at differing points. Option 1 interacts with Doe Hill Country Park, whilst Morton Playground and Mickley Lane Pump Track are both within 500 m of Option 2. Shirland Golf and Country Club is also located in close proximity to Options 2 and 3.
- 5.5.138 There are a number of businesses including farms, wedding venues and B&Bs within 500 m of each of the options. Alfreton golf course is also impacted by all the options. For Option 3, a 132 kV overhead line through an operational solar farm would need to be dismantled.
- 5.5.139 The Preliminary Preferred Alignment and Options 2 and 3 pass in close proximity to Higham Farm Fishery in the floor of the River Amber valley to the west of Higham. Impacts should be minimised through careful siting.
- 5.5.140 With regard to aviation, the Preliminary Preferred Alignment is located within 300 m of an unlicensed helipad at Stretton Manor Barn.
- 5.5.141 With regard to all options under consideration, no changes to planning allocations have been identified since the original review that informed the selection of the EPC within which the Preliminary Preferred Alignment is located.
- 5.5.142 No active applications for planning consent for developments that might preclude the development of any of the options under consideration have been identified. At the time of writing, the route of the Preliminary Preferred Alignment is partially covered by a planning application (reference AVA/2022/0141) for 240 residential units which is pending a decision.
- 5.5.143 All the options under consideration are considered to be acceptable from a socio-economic perspective. Due to the proximity of each option to existing recreational and community facilities and local businesses, there is no preferred option from a socio-economic perspective.

Cost Appraisal

- 5.5.144 Historic outturn data of the capital expenditure for previous National Grid projects indicates that capital expenditure increases in relation to the length of a proposed overhead line connection. As shown in **Table 5.1**, Alternative Routeing Option 1 is the shortest of the options under consideration, with a length of 11.5 km in comparison to 12.9 km for the Preliminary Preferred Alignment. The lengths of all other options would be in excess of 13 km. It is therefore highly likely that the capital expenditure required for Option 1 would be less than that required for any of the other options.

- 5.5.145 As Option 1 is the shortest and most direct of the routes and would give rise to the fewest technical challenges, it is also likely that it would have a shorter construction period than the other options under consideration.
- 5.5.146 Option 1 is therefore considered to be the preferred option from a cost perspective.

Overall Appraisal

- 5.5.147 The findings of the individual discipline appraisals of the Preliminary Preferred Alignment and the three alternative routing options are summarised below.

Technical appraisal

- 5.5.148 One of the primary drivers for seeking an alternative to the Preliminary Preferred Alignment was the significant engineering challenges associated with the inherent terrain and characteristics of the local road network in the River Amber valley area between Stretton and Oakerthorpe. The Preliminary Preferred Alignment is also subject to significant pinch-points in the vicinity of Lower Pilsley.
- 5.5.149 Of the alternative routing options under consideration, only Options 1 and 2 avoid the challenges associated with the pinch-points in the vicinity of Lower Pilsley and only Option 1 avoids the section of the River Amber valley between Stretton and Oakerthorpe.
- 5.5.150 Option 1 is considered least technically complex, and gives rise to the fewest constructability challenges. It is also the shortest and most direct of the options under consideration. **Option 1** is therefore the preferred option from a technical perspective.

Environmental appraisal – landscape and visual

- 5.5.151 Taking into account the landscape and visual impacts likely to arise during the construction phase of the Project due to the extensive engineering works required in the River Amber valley and the high value placed on that landscape by stakeholders, it is considered that, on balance, options routed within the River Amber valley between Stretton and Oakerthorpe are likely to result in a greater level of landscape and visual effects than options that avoid that area. Whilst the options routed outside the River Amber valley would result in a greater level of visual effect in views to and from Hardwick Hall, it is considered that these are outweighed by the adverse landscape effects likely to be sustained by the Derbyshire Peak Fringe and Lower Derwent Character Area and the accompanying adverse visual effects in that area. **Option 1** is therefore the preferred option from a landscape and visual perspective.

Environmental appraisal – ecology

- 5.5.152 Option 1 is the only one of the alternative routing options under consideration that avoids the section of the River Amber valley adjacent to Ogston Reservoir SSSI. Option 1 provides a greater degree of separation from the SSSI than either the Preliminary Preferred Alignment or Options 2 and 3, whilst avoiding the potential for impacts of a comparable magnitude in other areas. **Option 1** is therefore the preferred option from an ecology perspective.

Environmental appraisal – historic environment

- 5.5.153 Option 2 is the least preferred option from a historic environment perspective as it would result in a greater impact on the Grade I listed Hardwick Hall (and associated heritage assets) and impact Ogston Hall (Grade II*) listed building. Option 1 is less preferred than the Preliminary Preferred Alignment and Option 3 as, whilst it would have no impact on the setting of the Ogston Hall, it would result in a greater degree of impact to Hardwick Hall and associated heritage assets than would the Preliminary Preferred Alignment or Option 3. From a historic environment perspective, there is no material difference between the impact associated with the **Preliminary Preferred Alignment** and **Option 3** and these options are the marginally preferred options from this perspective.

Environmental appraisal – water environment and socio-economic appraisal

- 5.5.154 All the options under consideration are considered to be feasible and there is no preferred option from either a water environment or a socio-economic perspective.

Cost appraisal

- 5.5.155 Option 1 has the lowest projected capital expenditure costs for both the construction of the new 400 kV connection and for diversionary works to the 132 kV distribution network. **Option 1** is therefore the preferred option from a cost perspective.

Overall appraisal

- 5.5.156 Due to the significant engineering challenges associated with the inherent terrain and characteristics of the local road network in the River Amber valley area between Stretton and Oakerthorpe, the technical appraisal resulted in a strong preference for Alternative Routeing Option 1, as this is the only option under consideration that would avoid this area. The preference for Alternative Routeing Option 1 was supported by the environmental appraisals for landscape and visual and ecology and by the cost appraisal. Whilst the environmental appraisal for historic environment identified a marginal preference for the Preliminary Preferred Alignment and Option 3, no barriers to the overall preference for Option 1 were identified by the environmental appraisals for historic environment and water environment or the socio-economic appraisal. The onward opportunities of utilising the River Amber valley through Section C3b are also now outweighed by the potential environment harm that would be likely to arise from the extensive engineering works now known to be necessary for an alignment in this area. It is considered that **Alternative Routeing Option 1** is the best performing option overall, as it represents the optimal balance between minimising environmental impact and minimising technical challenge.

5.6 Conclusion

- 5.6.1 In identifying the EPC, within which the Preliminary Preferred Alignment is located, the CPRSS determined that from a point to the south of Holmewood, turning in a westerly direction towards Clay Cross (i.e. into Section C3a) would be preferential to continuing in a southerly direction (i.e. staying within Section C5a). However, additional information gained from Stage 1 consultation feedback and from engineering and environmental studies undertaken since the selection of the EPC has led to several of the factors that influenced that selection to be reconsidered.

- 5.6.2 There is a relatively elevated upland area within Section C5a to the west of Astwith and Hardstoft, with a consequently increased potential for the overhead line to result in greater landscape and visual impacts should it be located in that area. At the time of the selection of the EPC, it was considered that, on balance, avoiding these potentially greater landscape and visual impacts outweighed the technical challenges associated with finding a route between the settlements of North Wingfield, Lower Pilsley and Pilsley and then routing within the River Amber valley. However, whilst a more easterly alignment, avoiding the upland ridge, is still preferred from a historic environment perspective because of potential impacts on the setting of Hardwick Hall, such an alignment is no longer preferred from a landscape and visual perspective because of the landscape and visual impacts likely to arise from the extensive engineering works now known to be necessary for a more easterly alignment. In addition, such engineering works may also increase the impact of an alignment within the River Amber valley between Stretton and Oakerthorpe on breeding bird populations associated with the Ogston Reservoir SSSI. As a result, following a multi-disciplinary design change control process, and in light of feedback received during the Stage 1 consultation and further multi-disciplinary review and assessment, the balance of environmental and technical considerations in choosing between a more westerly alignment, across the more elevated upland area, and a more easterly alignment, in the River Amber valley, is now reversed.
- 5.6.3 Routing westward into Section C3a instead of due south past Astwith and Hardstoft was also considered to facilitate an alignment located further away from Stainsby, including the fields used for Stainsby Festival, at the eastern edge of Section C5a. The Stainsby defended manorial complex and Stainsby Conservation Area are both adjacent to the eastern boundary of Section C5a and Hardwick Hall RPG, and Hardwick and Rowthorne Conservation Area are located further to the east. However, whilst Option 1 is likely to give rise to greater impacts on the setting of Hardwick Hall than the Preliminary Preferred Alignment, by utilising the central rather than easterly part of Section C5a, Option 1 minimises potential impacts on the other potential receptors identified in this area.
- 5.6.4 The onward opportunities of utilising the River Amber valley through Section C3b was also considered to be an advantage of choosing to route through Section C3a, as it could afford the possibility of following existing linear infrastructure (i.e. the Midland Main Line railway) and vegetation which may mitigate some of the potential visual impacts associated with an overhead line. This consideration is now outweighed by the potential environment harm that would be likely to arise from the extensive engineering works now known to be necessary for an alignment in this area.
- 5.6.5 A route through Section C3a would avoid the southern part of Section C5a, immediately to the north of Alfreton. This area contains several potential constraints, including a sewage treatment plant, the Meadow Lane Solar Farm and a proposed residential development west of Chesterfield Road. An existing NGED Substation north of the Alfreton sewage treatment plant and the potential for wirescape associated with the presence of several existing overhead lines would also be avoided. However, in developing the Option 1 alignment, it has been demonstrated that these constraints can be avoided.
- 5.6.6 Given that the balance of environmental harm likely to arise from an alignment crossing the elevated upland area to the west of Astwith and Harstoft and that likely to arise from an alignment within the River Amber valley between Stretton and Oakerthorpe is now reversed, and in light of the results of the appraisal of the Preliminary Preferred Alignment and the three alternative routing options set out above, it is confirmed that Alternative Routing Option 1 is now the preferred option for the routing in that section of the corridor. Details of the changes made to the Preliminary Preferred Alignment as a result of this decision are provided in **Chapter 7** of this report.

6. Design Evolution

6.1 Overview

- 6.1.1 This chapter outlines the overarching technical, planning and environmental considerations that have informed the design evolution of the proposed alignment and substation siting.
- 6.1.2 These considerations form the basis of National Grid's development of the design described in **Chapter 7** from the non-statutory (Stage 1) consultation corridor and amendments described in **Chapter 5**.

6.2 National Grid's Approach to Routeing and Siting

- 6.2.1 **Chapter 2** sets out in detail the legislation and planning policy context relevant to the design of the Project. 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 and Horlock Rules (Ref 20, Ref 21), also described in **Chapter 2**, are used as two sets of guidelines for National Grid's routeing and siting approach.
- 6.2.2 National Grid employs the Holford and Horlock Rules as the basis of the approach to overhead line routeing and substation siting, and these have underpinned the development of the proposed alignment and substation layout described in **Chapter 7**.
- 6.2.3 In addition, a range of technical, planning and environmental factors have been taken into consideration when developing the design for the Project. The design seeks to avoid planning designations and environmental features wherever it is reasonably practicable, within technical parameters and other limitations, while remaining in compliance with the Holford and Horlock Rules.
- 6.2.4 This chapter outlines the principles, considerations, and constraints that have guided the evolution of the Project's design, in conjunction with the relevant legislation and planning policy discussed in **Chapter 2**. **Chapter 7** provides a detailed explanation of how these factors have shaped the proposed alignment and substation siting presented during the statutory (Stage 2) consultation.

6.3 Design Principles and Technical Considerations

Overhead Line Considerations

- 6.3.1 This section sets out, in the context of developing the overhead line permanent infrastructure within the 'EPC' presented at Stage 1 consultation, and outside of it where necessary, the design principles considered for the Project. It also outlines the technical principles and parameters generally applied in respect to overhead line routeing and pylon siting and how this has progressed to the overhead line design presented at the Stage 2 consultation.

The graduated swathe

- 6.3.2 The Stage 1 consultation presented a ‘graduated swathe’ within the emerging preferred corridor (EPC) – coloured shading of varying intensity to indicate areas considered more likely (darker colour) and less likely (lighter colour) for locating the proposed infrastructure at that point in time following early optioneering. The width of the corridor generally allowed for a degree of flexibility to alter the alignment.
- 6.3.3 At the time of producing the graduated swathe, an engineering assessment was undertaken to test the feasibility of overhead line routeing options within the corridor. The initial linear feasibility study at this stage was conducted in accordance with National Grid’s Approach to Consenting (Ref 4), see section 1.3, and a route alignment for the new transmission connection comprising wholly or largely of overhead line was considered feasible.

Indicative centreline of an overhead line

- 6.3.4 The Holford Rules (Ref 20) are applicable to the development of an indicative centreline of an overhead line route alignment within a wider corridor. The Holford Rules were first set out in 1959 and subsequently reviewed by National Grid in 1992. Paragraph 2.9.16 of the National Policy Statement (NPS) for Electricity Networks Infrastructure (EN-5) (Ref 13) states that the Holford Rules ‘should be embodied in the applicants’ proposals for new overhead lines.’ They have become accepted within the electricity transmission industry as a good practice basis for overhead line routeing. National Grid employs the Holford Rules to inform the design and routeing of all new overhead line projects, including this Project. The Holford Rules set out, at a general level, and in the absence of any other overriding constraints, the design principles that should be applied in developing permanent overhead line infrastructure.
- 6.3.5 The process of developing an indicative centreline for an overhead line route, therefore, firstly begins with an analysis of known constraints within the corridor. The constraint types when designing or redesigning an overhead line route can generally be broken up into the following categories:
- technical constraints;
 - constructability constraints;
 - service/outage constraints;
 - economic constraints;
 - environmental constraints; and
 - socio-economic constraints.
- 6.3.6 This section does not seek to address the considerations of those constraints and how they have influenced the design (which is instead set out in detail in **Chapter 7**) but sets out the principles generally applied in respect to technical considerations for overhead line routeing.
- 6.3.7 When developing the indicative centreline of an overhead line route, prior to the siting of pylons along the alignment, a number of parameters to reach an appropriate design solution are considered, which are in turn considered compatible with the Holford Rules. From a technical perspective, such parameters are considered to include the following:

- Long straight sections of overhead line, avoiding sharp changes of direction where feasible, are preferred to avoid the need for more angle pylons. This has visual benefits as angle pylons are typically bulkier; financial benefits given they are typically more expensive to construct; and construction benefits as angle pylons are more technically challenging to construct. For example, a pylon with a sharp angle of deviation usually requires more steelwork, larger foundations and larger pylon working areas for construction activities, resulting in more materials and longer durations to construct. Additionally, more angles on an indicative centreline of an overhead line alignment will increase the overall route length, increasing cost and overhead line presence. Whilst long straight sections are preferred, in some instances sharper angles may be required to navigate existing constraints, such as to increase a separation distance from a residential property, or to avoid other sensitive environmental features.
- Perpendicular oversailing of major crossings such as main roads, railways and significant watercourses is preferred where possible to limit the length of the span across that feature and extent of temporary works for protection of these assets during constraints.
- Where the indicative centreline of an overhead line route is situated between constraints, an assessment balancing the effects on those constraints and their relative importance is undertaken, promoting equidistant routeing where the effects are comparable.
- Interactions with major buried utility assets, such as high-pressure gas pipelines, generally are considered and avoided where possible when developing the overhead line route and siting of pylons, noting the additional complexities involved in mitigating any residual impacts on such assets during construction and operation of the permanent infrastructure.
- Generally, where practicable, the indicative centreline of an overhead line alignment would seek to avoid routeing in close parallel with other linear metallic features, such as buried metallic pipelines and railway lines over prolonged distances for electrical safety, to reduce the risk of induced voltages occurring on those assets. National Grid generally seeks to maintain a 50 m lateral separation distance between the overhead line and other linear metallic features (below or above ground). Such risks can be mitigated with cathodic protection measures, but such measures would increase Project cost, add technical complexities and often involve third party agreements with the asset owner of the feature.
- Wherever practicable, National Grid's preferred approach is the avoidance of direct oversail of residential properties during routeing of new infrastructure, and National Grid also seeks to avoid oversailing any non-domestic buildings as far as possible, with a preference for avoiding built-up areas altogether.
- When developing the indicative centreline of an overhead line route, National Grid is also cognisant of other factors associated with the construction of that overhead line. Enough space should be retained either side of the indicative centreline to allow for a Limit of Deviation (see section 8.8) and to facilitate construction of the overhead line including the associated temporary works (see **Chapter 8**), as well as future maintenance during its operational service life.

Close parallel of overhead line opportunities

- 6.3.8 The supplementary note to Holford Rule 6 (Ref 20), which is in turn endorsed by paragraph 2.9.16 of NPS EN-5 (Ref 13), states '*arrange wherever practicable, parallel or closely related routes with pylon types, spans and conductors for synchronicity to form a coherent appearance*'. The impact of which is to reduce the magnitude of landscape and visual effects and the concentration of overhead line and wirescapes in the landscape. National Grid recognises that close paralleling of an existing overhead line has the potential to reduce the overall extent of environmental impacts arising from the Project by avoiding the spread of impacts to receptors currently unaffected by existing overhead lines, albeit this may well intensify the degree of impact on receptors already affected.
- 6.3.9 The minimum separation distance between overhead lines is determined by technical and safety constraints and would typically be approximately 1.5 times the pylon height, but could vary subject to site constraints. Whilst the maximum distance at which the benefits of close paralleling might be achieved depends on local factors, this is considered to be approximately 200 m in most circumstances. Beyond 200 m, it is considered that the benefits associated with close paralleling begin to be outweighed. This larger separation distance increases the possibility of encircling receptors such as residential properties.
- 6.3.10 Technical challenges associated with the design, construction and operation of an overhead line also influence the feasibility and effectiveness of routeing in close parallel, 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. Opportunities for close paralleling have been considered from the early design stages on the Project. However, there are relatively few locations within the proposed alignment where there are opportunities for long sections of close parallel with an existing overhead line. This is because opportunities are largely dictated by the existence of existing overhead lines within the study area, as well as other constraints that are to be avoided.

Pylon siting

- 6.3.11 Following the refinement of an indicative centreline of an overhead line route, National Grid 'sites' pylons along the centreline of the overhead line alignment.
- 6.3.12 Pylons are used to regulate the statutory clearances. Statutory clearance for an overhead line refers to the legally required minimum distance that must be maintained between the live conductors and other structures, objects, or the ground. This clearance is put in place to ensure safety and to allow for proper maintenance and operation of the overhead line. Minimum clearances can vary depending on the parameters influencing the line design such as the operating voltage of the overhead line, conductor type, the surrounding terrain and any constraints within the vicinity of that overhead line. The required height of the pylon is, therefore, influenced by the sag profile of the conductor and the span distance between adjacent pylons. Pylons need to be sufficiently tall to ensure that statutory clearances from the bottom conductors are achieved in all weather conditions and for the maximum permissible operating temperature. Steel lattice pylon heights are adjusted by adding extension panels, each typically adding around 3 m in height per extension panel.

- 6.3.13 Appropriate pylon siting, from a technical perspective, is considered to include the following:
- An average span length of 350 m, to balance the presence of pylon within the landscape and to regulate the statutory clearances. In some rarer instances subject to detailed design assessment, a longer span length may be required to oversail features or reduce the number of pylons in a section. In these instances, the sum of adjacent spans must not exceed 800 m.
 - For traditional lattice pylon, a change in direction of up to 90 degrees can be achieved. However, for the reasons set out above, long straight sections, avoiding the need for angle pylon, are preferred.
 - Careful siting of individual pylons is adopted to avoid or minimise direct and indirect impacts on protected habitats (including considering conductor swing, to avoid or minimise loss of vegetation), as far as reasonably practicable. Conductor swing refers to the expected movement of the conductors (wires) of an overhead line due to external factors such as wind and temperature changes, causing the distance between the conductors and other structures (such as buildings, trees, or other conductors) to vary and change.
 - Maintaining appropriate stand-off distances of watercourses to avoid direct effects where practicable and allowing enough space for the construction of pylon working areas.

Substation Considerations

- 6.3.14 Chesterfield Substation forms a connection between existing overhead lines running from Brinsworth and Chesterfield, and Chesterfield and High Marnham. Built in the mid-1960s these lines currently operate at a voltage of 275 kV; however, they are capable of operating at a higher voltage of 400 kV and have necessary consents to do so. Upgrading the operating voltage would allow more power to flow along this route to achieve greater power transfers between the North and the Midlands using the existing overhead line infrastructure.
- 6.3.15 The National Energy System Operator (NESO)⁴ has identified a need to enhance the capability of the transmission system in the Yorkshire and East Midlands areas. This included the consideration of the potential consumer benefits of upgrading the Brinsworth to Chesterfield, and Chesterfield to High Marnham circuits and has consequently recommended that the upgrading should proceed. This is explained in more detail in NESO's Network Options Appraisal Refresh published in 2022 (Ref 29), where the separate Brinsworth to Chesterfield and Chesterfield to High Marnham projects are referenced by the code 'EDEU'.
- 6.3.16 The electrical equipment and plant at the existing Chesterfield Substation site is not designed to operate at 400 kV and does not have sufficient capacity to accommodate new customers requiring a connection to the electricity network. National Grid have therefore identified the need for development of a new 400 kV substation at or near

⁴ The Energy Act 2023 set the legislative framework for an independent system planner and operator to help accelerate Great Britain's energy transition. Therefore, what was formerly known as the Energy System Operator (ESO) is now called the National Energy System Operator, taking a whole system view, beyond electricity, inclusive of all energy sources and uses.

the existing 275 kV / 132 kV Chesterfield Substation site, as part of the upgrading of existing overhead line circuits.

- 6.3.17 It is currently anticipated that the new Chesterfield Substation will be consented and delivered as part of a separate National Grid project, Chesterfield to High Marnham, distinct from this Project. However, it is possible that it will be decided to also include the new Chesterfield Substation works as part of the development consent order (DCO) application for this Project to provide an alternative consenting mechanism to remove reliance on that separate planning application/consent and so mitigate against the risk of delay to the delivery of the Project.
- 6.3.18 This section sets out the technical principles generally applied in respect to siting and configuration of permanent infrastructure for the new Chesterfield Substation and how this has progressed to the substation design presented at the Stage 2 consultation.
- 6.3.19 The new 400 kV substation to be built at Chesterfield Substation will connect the new overhead line route and customers to the wider transmission network.
- 6.3.20 Initial design for this substation has been developed in accordance with National Grid standards and specifications, which will ensure that the new site can be constructed, operated and maintained safely.
- 6.3.21 The Horlock Rules (Ref 21) are also relevant in this context. The Horlock Rules provide guidelines for the siting and design of new substations, or substation extensions, to avoid or reduce the environmental effects of such developments. Paragraph 2.9.18 of NPS EN-5 (Ref 13) states that the Horlock Rules '*should be embodied in applicants' proposals for the infrastructure associated with new overhead lines.*' They facilitate consideration of the environment and amenity during the design and siting of new substation infrastructure. These were considered during the identification of potential locations for the proposed Chesterfield Substation and have influenced its siting and design.
- 6.3.22 It is the intention that the proposed substation will be a gas insulated switchgear (GIS) substation rather than an air insulated switchgear (AIS) substation. AIS technology uses atmospheric air as an insulation medium between the electrical equipment in the substation, whereas GIS technology seals electrical equipment in pressured chambers filled with insulating gas (traditionally sulphur hexafluoride (SF6) which is an extremely potent greenhouse gas, although alternative non-SF6 insulation gases are becoming increasingly available). AIS technology usually requires a larger footprint than GIS, with substation equipment typically located outdoors and requiring greater separation distances between each other to maintain electrical isolation, whilst for GIS, equipment is usually much closer together and enclosed within a building. For new substations, GIS is typically only implemented where there are significant space constraints or in areas where atmospheric pollution may impact outdoor AIS equipment (for example, due to nearby industry or in marine environments). Despite a larger land take for AIS, GIS is generally considered to have a greater impact on views and landscape character due to the height and scale of the building surrounding the equipment.

Substation sizes (footprint)

- 6.3.23 The size of the proposed substation is determined by its technical requirements, which include:
- number of customers to be connected;
 - capacity of customer connections;

- mode of connection to the existing transmission network (i.e. number of overhead line or underground cable connections); and
- selection of AIS or GIS technology, as outlined above.

6.3.24 A greater number or capacity of customer connections, or a more complex connection to the existing transmission network, will generally result in a larger footprint.

Substation siting

6.3.25 As stated above, the siting of the proposed substation within its siting area has been developed in accordance with the Horlock Rules (Ref 21). Rules 7 to 11 are particularly relevant as they establish some technical design parameters.

6.3.26 In addition, several technical factors, compatible with the Horlock Rules, have influenced the proposed siting and design of the substation:

- preference for level, open areas free from existing above or below-ground infrastructure; this reduces the potential scope of enabling works (including groundworks and diversion of existing infrastructure);
- where applicable, proximity to existing overhead line infrastructure if connections are required into them, to reduce the extent of new overhead line required;
- where transformers are required to connect into the local distribution network, proximity to the connection point to the wider distribution network to minimise the amount of lower voltage cables or overhead lines required;
- consideration given to the nature of the surrounding road network and its capacity to support construction and operational traffic; and
- sufficient space surrounding the substation for overhead line and underground cable connections.

6.3.27 Further details regarding the substation design requirements that have influenced the development of the proposed siting location are outlined below to provide a technical basis for the siting narrative in **Chapter 7**.

New Chesterfield Substation

6.3.28 The proposed development would comprise a new 400 kV GIS substation (non-SF6) and associated works, comprising:

- approximately 13 bays with spacing for four future bays;
- approximately six overhead line gantries;
- standard substation plant, including circuit breakers, disconnectors, earth switches, instrument transformers, Cable Sealing Ends (CSEs), surge arrestors, and busbars (not necessarily an exhaustive list);
- three 400 / 275 kV 1100 MVA Interbus transformers and 24 CSE cables;
- GIS Hall Building including the site office, welfare, portable relay room (PRR), telecoms room, LVAC room, workshop and battery room with approximate dimensions of 76 m in length, 25 m width and 15 m height; security fencing;
- lighting columns;
- CCTV surveillance;
- a new permanent access route for vehicular traffic;

- temporary construction compounds, welfare and laydown areas; and
 - landscaping, drainage features and Biodiversity Net Gain areas.
- 6.3.29 The new Chesterfield Substation is proposed to be accessed from the strategic road network (SRN) via the nearest A roads (A617 and A632) on the local road network.
- 6.3.30 To facilitate construction of the new 400 kV substation site, works will involve temporary diversions to modify the configuration of the existing Brinsworth to Chesterfield and Chesterfield to High Marnham overhead electricity lines forming part of the 4ZV route, currently connecting to the existing 275 kV substation site.
- 6.3.31 It is envisaged that CSE Compounds will be required as part of the design for temporary diversion of the 4ZV route due to site constraints as well as modifications to the existing 132 kV overhead line which is anticipated to be undergrounded into the existing 132 kV substation.
- 6.3.32 The construction works will involve the connection of new overhead line proposed for this Project into the new 400 kV substation. The detail of the overhead line works is presented in **Chapter 7**.

Substation design considerations

- 6.3.33 The specific design considerations of the new substation are set out in **Chapter 7**, including how the design proposed responds to the local environment and socio-economic considerations, as well as feedback from Stage 1 consultation.

6.4 Pylon Type Considerations

- 6.4.1 Whilst the vast majority of transmission lines in Britain use lattice steel pylons with three sets of cross arms, alternative pylon types have been approved for use which may achieve the technical performance required for the Project. These pylon types are set out below. The choice of pylon design for overhead lines should be considered on a project-by-project basis. This section of the report provides information on the characteristics of the ‘traditional’ lattice pylon, low height lattice pylon and the T-pylon, including their construction, operation and maintenance. The overhead line design for the new transmission connection must factor in both:
- the conductor system, which must be capable of carrying sufficient electrical power to meet system design requirements for operation at 400 kV; and
 - the pylon type, which needs to be able to support the conductor bundles (wires) and an earth wire.

Conductor Options

- 6.4.2 The overhead wires that transport the electrical power are known as conductors and these are usually installed in a set (or bundle) on both sides of the pylon. Overhead lines can have different conductor types, in terms of size (diameter), current carrying capacity, and the number combined to form a bundle. At 400 kV, conductor bundles can be twin (two), triple (three), or quad (four).
- 6.4.3 The type of conductor selected depends largely on the required rating of the overhead line (the maximum amount of electrical power that the new line needs to be capable of transmitting). Conductor choice also dictates the range of pylon designs

available, as not all are compatible with or capable of carrying heavier conductor bundles.

Pylon Options

Design characteristics

- 6.4.4 The main type of pylon used by National Grid on the National Electricity Transmission System (NETS) in England and Wales is steel lattice pylons with three sets of cross arms (as shown first in **Image 6.1**). Alternative pylon types, such as steel monopole (similar to a modern wind turbine), have been approved for use, which may achieve the technical performance required for the Project; however, at this stage of the Project, the starting assumption is that steel lattice overhead lines will be used (in accordance with National Grid's guidance and national planning policy). In previous projects, the visual benefits of utilising standard lattice steel pylons have been recognised, especially when siting a new overhead line close to existing lines that use the pylon type. In proximity to the Project, this is the case where 132 kV or 275 kV overhead lines are present including at both substations, around Pilsley, Alfreton and between Locko Park and Dale Abbey. The current assumption is to use lattice steel pylons. The type of pylons proposed for the Project is determined through feedback from consultation, information from surveys and ongoing design studies and assessment.
- 6.4.5 Whilst there are differences between the steel lattice and T-pylon designs, they share a number of technical characteristics. These include the following:
- They are above ground structures built on permanent foundations.
 - They can (typically) support two discrete electrical circuits (one on either side of the structure).
 - They are capable of supporting the weight of the required conductor bundles under a wide range of conditions.
 - The height of the structures can be adapted to suit different terrains and physical obstacles (such as river/road crossings) to ensure statutory electrical safety clearance distances from the conductors are maintained, although it should be noted that low height pylons can be subject to height extension limitations.
- 6.4.6 For standard height steel lattice pylons, each of the three arms supports a conductor bundle on either side of the pylon body and the top of the pylon supports an earth wire, as illustrated on **Image 6.1**. Low height lattice pylons comprise just two sets of cross arms: a wider lower cross arm and a standard width upper crossarm. The lower crossarms each support two bundles of conductors, meaning four bundles are arranged in a horizontal configuration beneath this pair of cross arms. The upper cross arm supports just one conductor bundle on each side of the pylon body in the same way that a standard lattice pylon does.
- 6.4.7 By contrast, the T-pylon design connects all three conductor bundles for each circuit together in an inverted triangle configuration using solid insulated bars. With suspension from a 'T' shaped cross beam, this forms a diamond shape. One of these diamond configurations (comprising all three bundles of conductors) is suspended from each side of the structure with a separate earth wire at the top of the diamond for each side of the pylon above the conductors.
- 6.4.8 For traditional steel lattice pylons, where an overhead line changes direction, and where lines terminate at substations, stronger tension structures (tension pylons) are required. These have larger foundations, heavier steelwork and larger footprints than

the suspension pylons used where an overhead line runs in a straight line. Taller and heavier pylons with larger footprints may also be required to negotiate more complex terrain.

- 6.4.9 As with the traditional lattice pylons, where an overhead line changes direction, and where lines terminate at substations, stronger and heavier T-pylons (with an additional supporting member to restrain the diamond to the main structure) are required. T-pylons are shorter than traditional lattice pylons whilst maintaining statutory clearances.
- 6.4.10 Low height lattice pylons are also lower in height but wider than traditional lattice pylons and are generally used over relatively short straight sections of an overhead line route. Low height lattice pylons may be incorporated into a design to mitigate specific circumstances; for example, this may be considered on a case-by-case basis in the vicinity of airfields or to reduce the visual effect of the overhead line where landscape character and the distribution and orientation of local viewpoints afford this opportunity.
- 6.4.11 Steel lattice pylon heights are adjusted by adding extension pieces, each typically adding around 3 m. For a typical T-pylon height extensions are limited to 3 m for suspension pylons and 7 m for tension structures.

Construction

- 6.4.12 As construction methods for traditional steel lattice pylons and T-pylons are similar, this section of the report provides a brief comparison of the main differences in construction. In summary:
- Although construction work areas for both the T-pylon and lattice pylon are similar in size, T-pylon work areas require a fully stoned and compacted level work area for delivery of the large tubular sections of pylon. Earthworks to level out sloping terrain would be required for all T-pylons.
 - In general foundation installation is similar, utilising common piling or concreting techniques; however, the T-pylon requires a level, compressed surface to facilitate installation of a specialist transition piece between the foundation plinth and the base flange on the lowest shaft section of the pylon structure.
 - Both pylon types are erected by mobile crane; however, use of a secondary mobile crane is more commonly required for T-pylons to aid lifting of shaft sections and components by tailing the loads.
 - Since the exterior of T-pylon structures cannot be climbed, specialised Mobile Elevated Work Platforms (MEWPs) are used for access to the diamonds for the installation of conductors and fittings during the stringing works. This requires a suitable access route to the pylon location and a level work area; subject to site conditions both may need be left *in situ* for future maintenance and defect repairs during operation.
 - Conductors and fittings should be installed soon after the construction of the T-pylon to reduce the impact of weather induced fatigue. Additional temporary works are necessary to restrain the T-pylon structure until it is strung and therefore a more critical, sequenced construction programme is required. Lattice can be erected in advance of conductor installation with less risk of fatigue, allowing greater flexibility in the construction program with a lower risk of delay.

Operation and maintenance

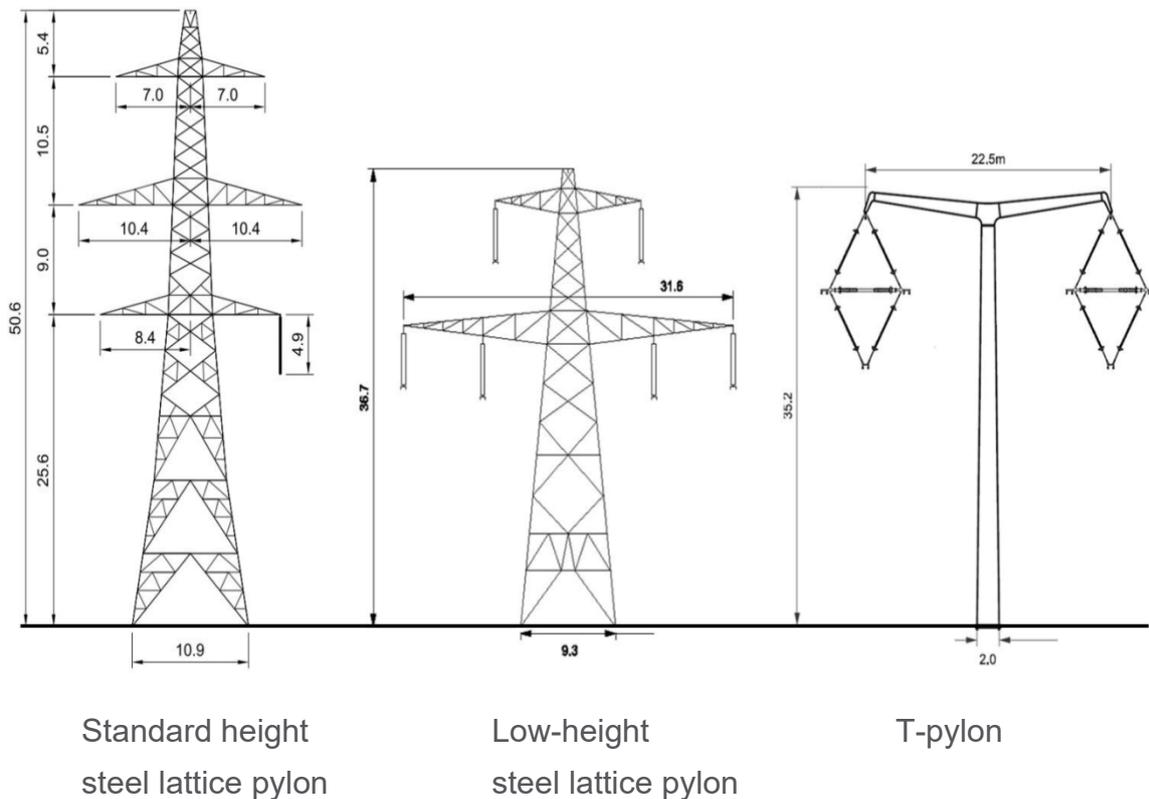
- 6.4.13 The overhead line would be made up of a variety of materials, including concrete and steel for the foundations, steelwork for the pylon and composite conductors such as aluminium alloy. All these materials have an expected lifespan, which would vary depending on how the overhead line was used and where it is located.
- 6.4.14 Typically, pylon steelwork and foundations have a life expectancy of approximately 80 years; the conductors have a life expectancy of approximately 40 to 60 years; and the insulators and fittings have a life expectancy of approximately 25 to 40 years. Theoretically it may be possible for the lifespan of the overhead line components to extend beyond the anticipated service life, depending on its condition, the environment to which it is exposed, refurbishments and transmission network requirements. Given the overhead conductors and fittings have a shorter life expectancy than the pylon structures themselves, reconductoring will be required during the overall lifespan of the Project infrastructure.
- 6.4.15 For pylons, maintenance operations include painting, replacement of corroded or damaged steelwork members, replacement of insulator and conductor fittings, pylon furniture repairs or replacement and other activities. Painting of the structures typically occurs approximately every 20 years and is based on a condition assessment. Painting of the crossarms and some sections of the pylon bodies requires the circuits to be switched out. Pylon inspection is currently conducted by helicopter or drone as well as occasional line walks. Helicopters and drones can travel swiftly between structures and hold steady during pylon inspection whilst taking HD resolution video for subsequent analysis, but timing of operations are dictated by prevailing weather conditions. Furthermore, use of drones is typically limited to Visual Line of Sight, therefore physical access to land along the overhead line route corridor is still required.
- 6.4.16 All lattice pylons on the network are climbable so many activities can be carried out without heavier duty equipment such as specialised MEWPs or mobile cranes.
- 6.4.17 Bespoke and conventional maintenance and defect rectification procedures, manuals and methodologies for steel lattice pylons are widely available within National Grid. These procedures have been developed over many years and are compliant with National Grid's safety requirements and UK legislation, covering not only structures but also insulators, conductor systems and other overhead line components.
- 6.4.18 For the T-pylon, challenges may be anticipated when carrying out maintenance, defect rectification or refurbishment works on these lines, including painting, insulator and conductor and fitting replacement. Maintenance works are especially intricate due to the complex nature of the insulator arrays installed. Due to access requirements repair times could be increased and may need longer outages.
- 6.4.19 Access using conventional methods such as climbing will not be possible and MEWPs will be required to access overhead line components for repair and/or replacement. A permanent access may therefore be required to be left *in situ* to each individual T-pylon site.

Conductor options available to the Project

- 6.4.20 For the Project, it is expected that the aluminium alloy (AAAC) conductor type needed to meet the rating requirements for the new 400 kV overhead line circuits is a triple bundle of 37 mm diameter (Araucaria) conductor. This conductor system has been identified at this stage due to its high current carrying capacity which can

accommodate the levels of power flow expected on the new overhead line circuits once in operation on the NETS. Only the larger standard lattice steel designs (both standard height and low height) and T-pylons are capable of supporting this conductor bundle. Newer conductor types constructed with composite material cores may also be considered for the Project as the design progresses. If it is appropriate to use these newer conductor types then a slightly lighter form of pylon design could potentially be utilised throughout as a more lightweight solution of twin conductor bundles could be sufficient. However, based on design work conducted to date, it is assumed that a triple bundle of Araucaria AAAC will be used on this Project to provide maximum possible capacity and flexibility in the design. Routing and siting, as well as environmental studies for Stage 2 consultation, have been carried out on this basis. Further detail on the final choice of conductor system will be provided as part of the development consent order (DCO) application, whilst further detail on the selection of pylon design for this stage of the Project based on the use of a triple AAAC conductor can be found in **Chapter 7**.

Image 6.1: Pylon types available to the Project



6.5 Planning and Environmental Considerations

- 6.5.1 Planning and environmental features have been considered throughout the routing and siting process. A buffer was applied to some of these features where practicable when developing the EPC and the graduated swathe presented in the Corridor Preliminary Routing and Siting Study (Ref 7) at Stage 1 consultation.
- 6.5.2 These features have continued to be considered as part of on-going design development, survey work and assessments informing the proposed alignment described in **Chapter 7**. As a first principle, the design of the Project has sought to avoid interaction with the planning and environmental constraints outlined below wherever practicable.
- 6.5.3 There are instances where some features cannot be avoided entirely, due to technical limitations or conflicting constraints. **Chapter 7** highlights how the proposed alignment has been developed in relation to planning and environmental constraints, and **Chapter 8** includes details of the Project's approach to temporary works and development of the draft Order Limits.
- 6.5.4 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), Air Quality Management Areas and Ecological Receptors;
 - 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. Further details regarding aviation considerations are described later in this section (see paragraph 6.5.6);
 - Ecology: Ancient woodland (including ancient and veteran trees), Statutory designated sites (Ramsar, Special Area of Conservation, Special Protection Area, Site of Special Scientific Interest, National Nature Reserves, Local Nature Reserves), non-statutory designated sites (Local Wildlife Sites, roadside nature reserves), Habitats of Principal Importance, Protected Species and Species of Principal Importance, and Important Bird Areas;
 - Socio-economic Activity: Businesses that operate as a commercial entity, renewable energy generation (wind farms, solar farms, etc.), community facilities (places of worship, education, hospitals, etc.), open space, development land allocations (identified through local plans, which includes mineral resource allocations), tourism accommodation and bed space, strategic visitor attractions, and Public Rights of Way and promoted recreational routes;
 - Agriculture, Soils, Geology and Hydrogeology: Geological Sites of Scientific Interest, Local Geodiversity Sites, Peaty Soils, Best and Most Versatile Land, Landfill Sites (historic and authorised), and Mining Legacy;
 - Health and Wellbeing: individual and clusters of residential properties, community facilities, parks, green open spaces, and promoted recreational routes;
 - Historic Environment: World Heritage Sites, scheduled monuments, listed buildings (Grade I, II* and II), Registered Parks and Gardens (Grade I, II* and II), conservation areas, non-designated heritage assets, and National Trust Inalienable Land;

- Landscape and Visual: National Parks, National Landscape (formerly known as Areas of Outstanding Natural Beauty), Important Landscape Areas, Special Landscape Areas, Residential Properties, National Trails, National Cycle Network, European Long-Distance Paths, Viewpoints, Recreational areas (e.g. country parks, Countryside and Rights of Way access land, Green Belt), and Outdoor Recreational Facilities (e.g. canals, caravan parks);
- Noise and Vibration: Residential Properties, Education Establishments (e.g. schools and colleges), and Buildings (other than residential properties e.g. retail, industrial estates, religious and healthcare buildings);
- Traffic and Transport: National and Local Cycle Network, Public Rights of Way, promoted and recreational routes, Railway Infrastructure, Navigable Waterways, Highway Network including local roads, classified road network and the SRN;
- Water: Statutory Main Rivers, Internal Drainage Board watercourses, ordinary watercourses, tidal and fluvial floodplains (including storage areas), flood defences, flood risk mapping, Water Framework Directive water bodies, Groundwater Dependent Terrestrial Ecosystems, primary and secondary aquifers, and Groundwater Source Protection Zones; and
- Existing Utility Assets: including but not limited to high pressure gas pipelines, existing high voltage overhead lines, substations / switching stations, telecommunications masts and other major utility buried assets such as carbon capture pipelines, fuel pipelines, water distribution mains / aqueducts, sewerage mains and high voltage electricity underground cables.

6.5.5 Environmental surveys, including ecological, historic environment, and landscape and visual surveys, commenced in 2024 and are ongoing. Design development to date has taken account of the available environmental survey data and sought to avoid constraints identified through survey. Where appropriate, further refinements to the design will be made ahead of the DCO application as new information is made available through environmental survey.

Aviation Considerations

6.5.6 To further understand potential aviation related impacts resulting from the Project, a study has been undertaken to identify all operational airfields within a 5 km search envelope of the EPC presented at Stage 1 consultation. Although impacts on aviation caused by the overhead line are not anticipated beyond 2 km away from any airfield, it is noted that several airfields outside of this 2 km area have provided feedback as part of the Stage 1 consultation. The search area was expanded to 5 km to ensure these airfields were also included in the assessment. This search area has also been subsequently updated based on the proposed overhead line alignment for Stage 2 consultation.

6.5.7 Six operational, or understood to be recently operational, airports, airfields or heliports were found to be located within this search area, each with varying characteristics and flight operations. Two of the aviation sites, East Midlands Airport and Derby Airfield are licensed; the former albeit located on the periphery of the search area has been factored into design development due to the significance of its operation to the local region. The remainder are unlicensed airfields which primarily operate light aircraft for recreational purposes.

6.5.8 For each of these airfields, a risk-based methodology has been implemented with the assistance of expert aviation consultants to understand the likely flightpaths of the aircraft which use them and how this could potentially interact with the Project. This analysis methodology has taken key parameters into account, including runway

length and surface type, types and performance of aircraft flown, typical take-off and approach procedures, and any notable characteristics of specific airfields which may impact the analysis.

- 6.5.9 Combined with guidance provided in the NPS (including the Overarching NPS for Energy (EN-1) (Ref 12) and NPS EN-5 (Ref 13)) and publications from the Civil Aviation Authority related to safeguarding (including CAP 168: Licensing of Aerodromes (Ref 30), CAP 738: Safeguarding of Aerodromes (Ref 31), CAP 793: Safe Operating Practices at Unlicensed Aerodromes (Ref 32), and CAP 760: Guidance on the Conduct of Hazard Identification, Risk Assessment and the Production of Safety Cases (Ref 33), as well as direct engagement with airfield operators where possible, this has informed a preliminary analysis of the potential impacts to operational aviation facilities within the 5 km search area.
- 6.5.10 This analysis has in turn been used to inform routeing and siting decisions in the development of the overhead line design. In the absence of any other limiting factors or conflicting constraints, the overhead line has been routed to provide the maximum feasible clearance for each airfield where practicable. However, where other factors have necessitated closer siting to operational airfields, clearances have been considered to understand whether safe operations can continue unaffected based on the information currently available. The impact of aviation on the routeing and siting of the Project where applicable is detailed in **Chapter 7**.
- 6.5.11 Initial assessment indicates that for the preferred alignment for the overhead line route described in **Chapter 7**, there would be no operational or safety impact on any of the six airfields and heliports evaluated, although analysis undertaken to date is preliminary in nature.
- 6.5.12 Whilst it has been used to guide decisions on routeing and siting, further engagement is required throughout the Stage 2 consultation period and up to the submission of the DCO with all relevant aviation facilities to inform more detailed assessments. Finalised outcomes of these assessments will be reported on as part of the Environmental Statement and DCO submission.

Solar Farm Considerations

- 6.5.13 As part of the route development process, National Grid has actively sought to avoid oversailing or directly impacting existing or consented solar farms wherever practicable, although the need to balance numerous conflicting constraints has sometimes required some impact on these sites following a thorough appraisal.
- 6.5.14 Oversailing a solar farm typically results in the clearance of land beneath and around the overhead line, due to the construction access and clearance requirements associated with high voltage infrastructure. National Grid's Technical Guidance Note (TGN) 287 (Ref 34) sets out detailed requirements for the development of solar installations in close proximity to overhead lines. Where a minimum clearance of 5.3 m from the lowest conductor can be maintained, the clearance of land beneath the conductors may be considered temporary, allowing for potential reinstatement of panels following construction. However, within the immediate footprint of a pylon, permanent removal of solar infrastructure should be assumed. This could result in a reduction of installed solar capacity, which may impact renewable energy generation and potentially lead to compensation for the solar operator to offset any lost revenue.

- 6.5.15 Construction and maintenance of overhead lines within solar installations is also more complex. Equipment such as cranes, low loaders, and heavy machinery used for pylon erection, stringing or line maintenance must navigate around or through the solar farm, which can disrupt solar panel placement and access roads. National Grid requires unrestricted access to its assets for routine maintenance and emergency repairs. This may require the temporary removal of panels if there is insufficient space to conduct necessary maintenance.
- 6.5.16 Earthing upgrades may be required for sections of the solar farm to ensure safe working conditions and mitigate against the possibility of induced voltages and micro shocks. Suitable earthing of the panels and supply cables will also help minimise damage to equipment in proximity to the pylons, if a rise in earth potential were to occur during electrical storms.
- 6.5.17 For these reasons, and in line with NPS EN-5 (Ref 13) and TGN 287 (Ref 34), National Grid has generally sought to develop the Preferred Alignment to route around existing or consented solar farms wherever a practicable alternative exists. However, in instances where the route passes through solar farms, this decision has been made after a thorough consideration of all relevant constraints. Routeing through solar sites was only pursued where alternative routes would introduce significant technical challenges, such as excessive complexity in the design, or may have resulted in substantial adverse effects on other sensitive receptors or environmental features, making them less viable. These factors have been carefully balanced in determining the final proposed alignment.

7. Development of the Proposed Route Alignment and Substation Siting

7.1 Introduction

- 7.1.1 This chapter describes the proposed route alignment⁵ and substation siting used to inform the development of the proposals subject to statutory (Stage 2) consultation, including definition of the Limits of Deviation and draft Order Limits as described in **Chapter 8**. The proposed alignment and substation siting presented in this chapter have been developed in response to feedback received at the non-statutory (Stage 1) consultation, further environmental and technical assessments, early stakeholder and landowner engagement, and a review of work undertaken to date.
- 7.1.2 This chapter outlines the design considerations and decisions made by National Grid to inform the proposed alignment and substation siting. All proposed changes to the preferred corridor and graduated swathe otherwise known as ‘design change requests’ identified during the Stage 1 consultation phase were considered. This chapter describes the design changes that were accepted and taken forward to inform the proposed alignment. This chapter also provides commentary on the siting and design considerations made in relation to the new Chesterfield Substation. The Stage 1 Consultation Feedback Report (Ref 8) provides details on all the Stage 1 consultation feedback which requested design changes (both those accepted as well as those not taken forward).
- 7.1.3 The images presented within this chapter show the proposed substation siting and overhead line alignment for the Project across the entirety of the route, from the proposed new Chesterfield Substation to the existing Willington Substation. The images included in this chapter have been produced to aid understanding of the development of the proposed alignment. These are not intended to show all the design elements and constraints associated with the Project. Scaled versions of the images are included in **Appendix C** of this report.

Pylon Structure Choice

- 7.1.4 The following factors, along with the pylon type considerations outlined in section 6.4 of this report, have been considered in arriving at a proposed pylon design for the new overhead line:
- landscape and visual;
 - historic environment;
 - biodiversity;
 - geology and hydrogeology;
 - hydrology and land drainage;

⁵ Throughout this chapter phrasing for the ‘proposed route alignment’ is interchangeable between the ‘preferred alignment’ or ‘proposed alignment’.

- socio-economic (civil and military aviation and defence interests, land use, and socio-economic considerations); and
- technical considerations.

7.1.5 The pylon type used for the Project will be determined through ongoing design studies, assessment and survey, coupled with feedback from consultation. The starting point for pylon design choice is standard height steel lattice pylons and this has been the basis for the development of the proposed overhead alignment. This is primarily because in most circumstances standard height steel lattice pylons offer greater flexibility in design, providing angle deviations up to 90 degrees, as opposed to other pylon types described in **Chapter 6 Design Evolution** which are limited to smaller angle deviations. Steel lattice pylon heights can be increased with the use of extensions where required to provide additional clearance above specific constraints or crossings. Standard height pylons also require a narrower corridor of vegetation clearance than other pylon types and generally less site preparation. This approach minimises temporary and permanent impacts not only on vegetation and biodiversity, but also reduces effects on other environmental features, land use, and socio-economic disruption. Developing the proposed overhead line design in this way, with a consistent starting point across the full route, also ensures that the overhead line has a consistent appearance across the majority of the route which helps to reduce the negative visual impacts that can arise with multiple designs in close proximity.

7.2 Chesterfield Substation Site and Design

7.2.1 Similar to the proposed overhead line, an optioneering process was completed to consider potential sites for the substation within a substation siting study area informed by the Horlock Rules (Ref 21). Siting of the proposed new Chesterfield Substation has been determined by the Chesterfield to High Marnham project which relates to a proposed uprating of existing 275 kV overhead lines on the 4ZV route to facilitate an increase in transmission load to 400 kV and the development of two new substations at Chesterfield and High Marnham which will help reinforce the National Electricity Transmission System (NETS). The study and decision-making process behind the siting of the new Chesterfield Substation has influenced in part the routing of the preferred alignment for this Project in route Section 1 (New Chesterfield Substation to Tibshelf).

7.2.2 A study area of 2 km radius around the existing 275 kV / 132 kV Chesterfield Substation site was defined for the substation site search. The key rationale for this being to remain in relatively close proximity to existing electricity transmission infrastructure and minimise the number of pylons and length of overhead lines that may need to be reconfigured for connection into the new site in line with the principles of the Horlock Rules. A minimum area requirement of 18 ha also formed part of the siting criteria to accommodate all temporary and permanent infrastructure associated with an air insulated switchgear (AIS) substation which by default in line with National Grid policy is usually the favoured technology choice for new substations over gas insulated switchgear (GIS) alternatives due to lower environmental impact and operational familiarity.

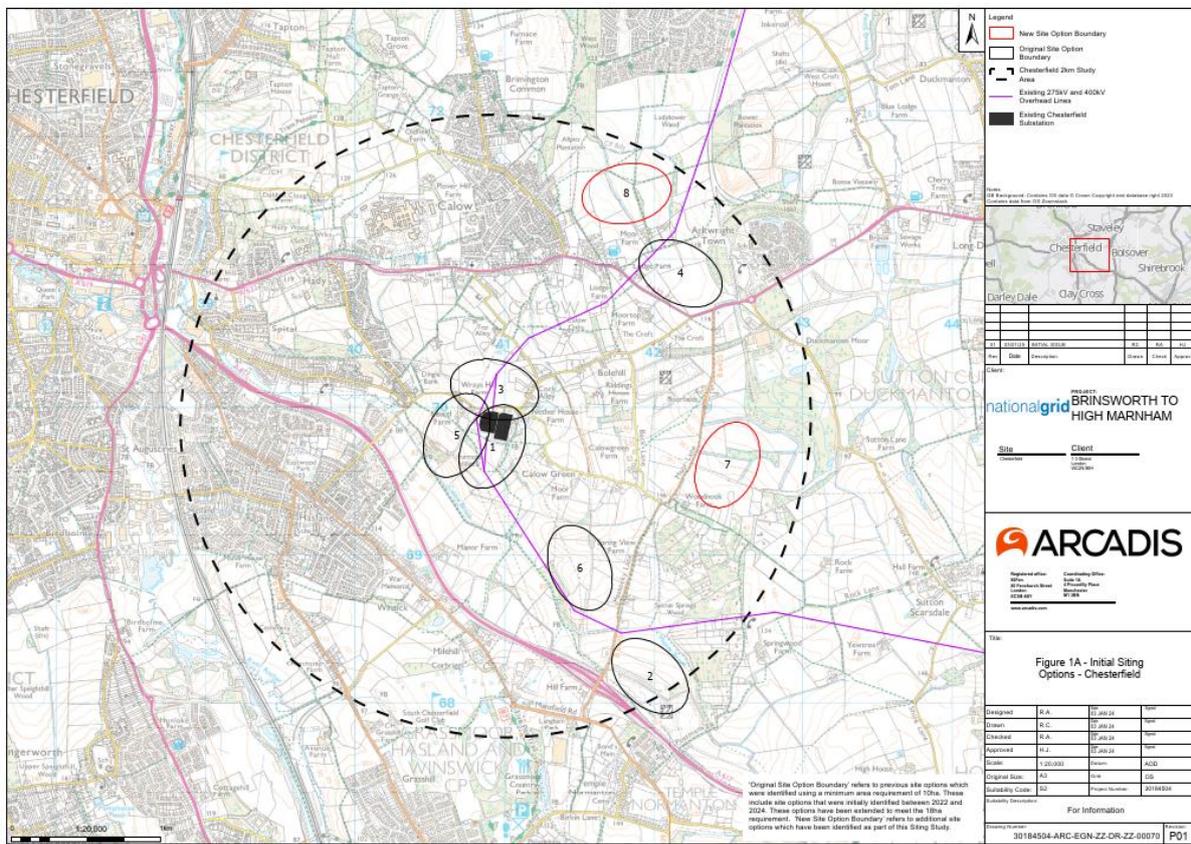
7.2.3 Other siting parameters included:

- maintaining close proximity to the local road network to avoid the need to construct new, long access roads;
- exclusion of extensive areas of Flood Zones 2 and 3;
- avoid or minimise effects on environmental and socio-economic constraints, including environmental designated statutory and non-statutory sites;
- avoidance of land identified in planning applications, commons and recreational areas, Crown land, National Trust land, and Countryside and Rights of Way (CRoW) land; and
- ideally located on flatter land to minimise elevation change across the site.

7.2.4 The siting area for this new substation is surrounded by several residential communities and receptors which introduce constraints to the location of the new infrastructure. These include Cock Alley to the east, Jubilee Cottages to the north, Wrays Hill Farm and Laurel Farm to the north west, and Southwood Chase and Manor House located to the south. In identifying the site of the new Chesterfield Substation, National Grid has sought to maximise the separation from these communities as far as practicable, balanced with other technical and environmental factors, to reduce as far as possible the potential amenity impacts to these receptors (in accordance with Horlock Rule 1 (Ref 21)).

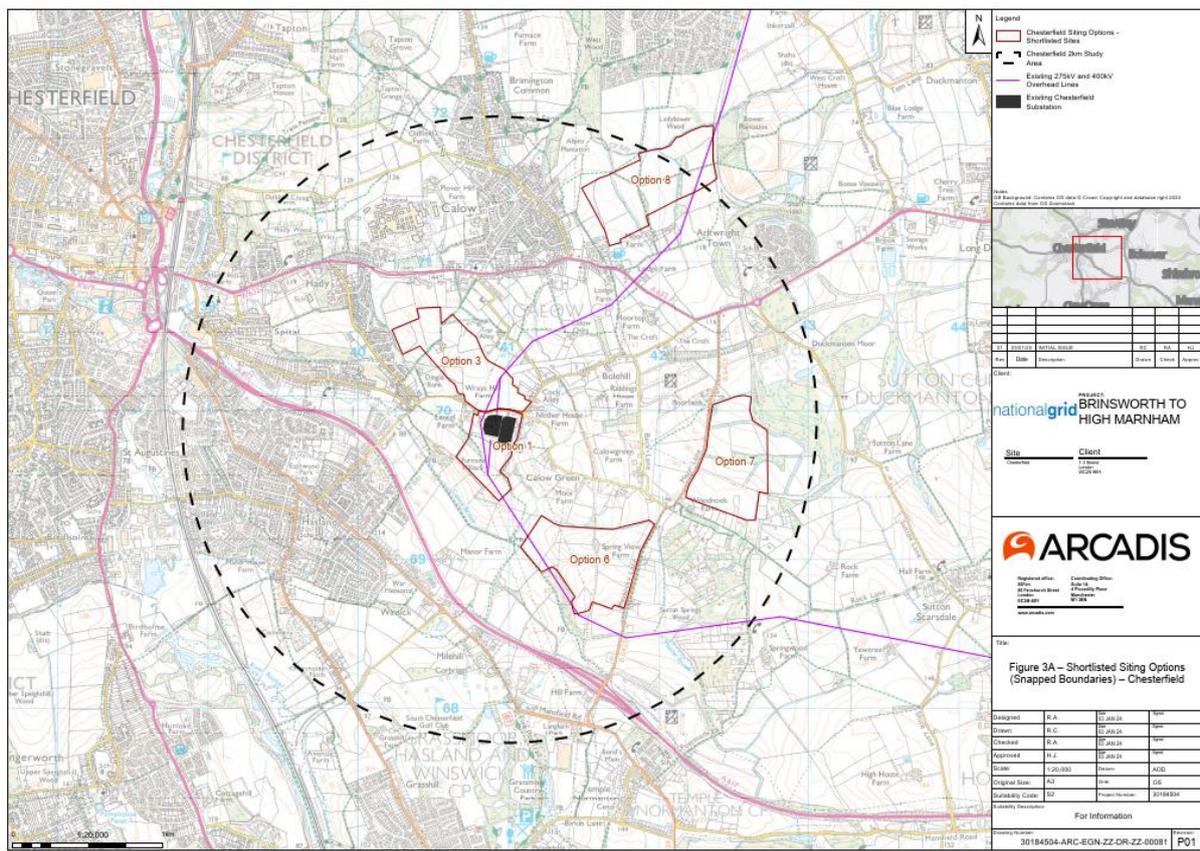
7.2.5 A long list of eight sites as shown in **Image 7.1** were identified within 2 km of the existing substation at Chesterfield. Each was appraised taking into account environmental, socio-economic, planning, technical and cost factors.

Image 7.1: New Chesterfield Substation – initial siting options



- 7.2.6 Site Options 1, 2, 4 and 5 were discounted as they would not meet the 18 ha requirement. Site Options 3, 6, 7 and 8 all met the AIS substation 18 ha requirement for temporary and permanent infrastructure and were shortlisted and taken forward for further appraisal. As four AIS options within 2 km of the existing Chesterfield Substation had been identified it was deemed unnecessary to expand the study area further to 5 km for brownfield sites.
- 7.2.7 Following review, Site Option 1 was reinstated. Whilst not deemed large enough for an AIS solution owing to the southern part of the proposed site overlapping an active planning application, the location did offer key opportunities and could accommodate a GIS (non-SF6) alternative within a smaller land footprint.
- 7.2.8 The shortlisted sites as shown in **Image 7.2** were then subject to more detailed evaluation following which Site Option 1 emerged as the preferred option taken forward into design development for the following key reasons:
- located on previously worked brownfield land associated with surface mining legacy on coal outcrops and is therefore considered to have a reduced impact in comparison to building on greenfield sites, although it is likely to add geotechnical risk;
 - shortest overhead line / underground cable diversions, lowering environmental impacts associated with construction phase;
 - immediate proximity to existing substation site, enables consolidation of electricity infrastructure and potential visual mitigation; and
 - location on National Grid owned land meaning no land acquisition is required for the permanent works.

Image 7.2: New Chesterfield Substation – shortlisted siting options



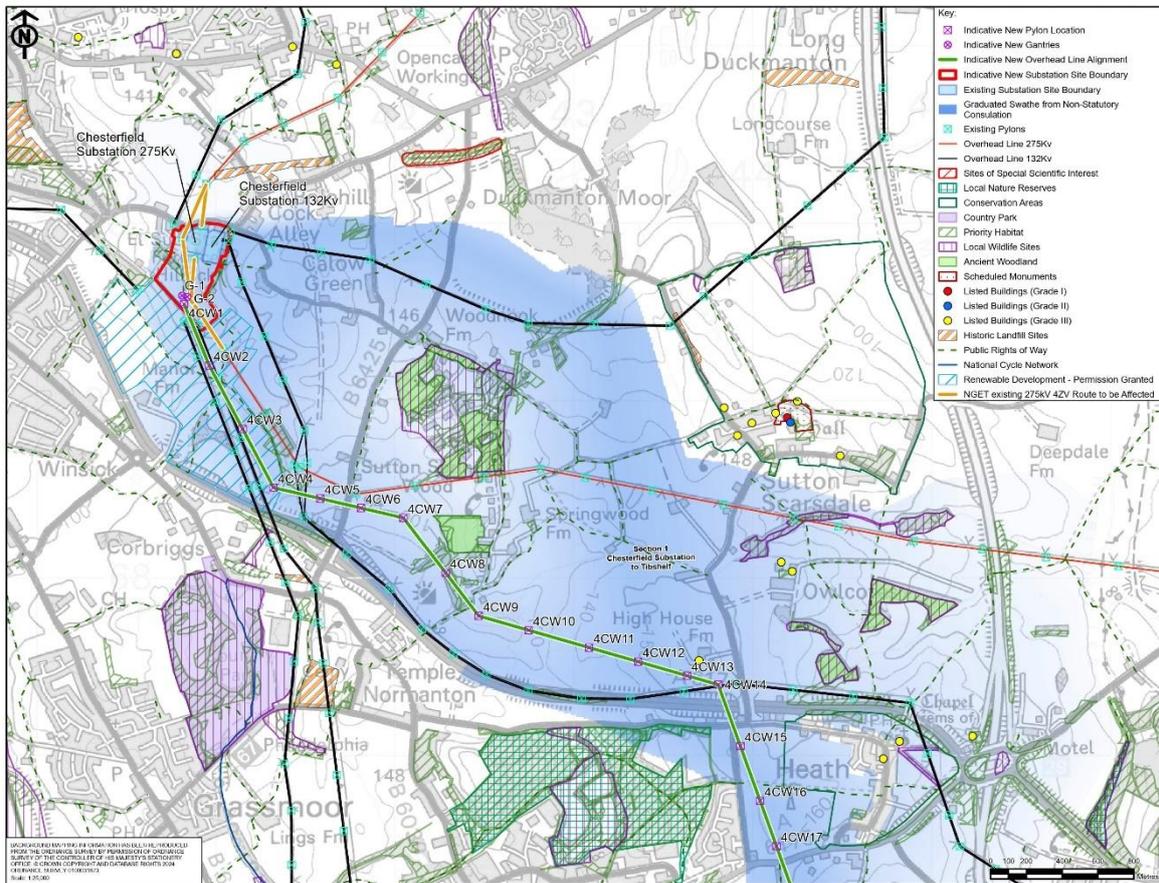
7.3 Section 1: New Chesterfield Substation to Tibshelf

Overview

- 7.3.1 Section 1 of the route is situated south east of Chesterfield located at the northernmost extent of the Project. Section 1 encompasses the land and works associated with the new Chesterfield Substation and covers an area extending from west of Hassocky Lane in a south easterly direction towards Heath, before turning south passing Stainsby, Astwith, and Hardstoft *en route* towards Tibshelf.
- 7.3.2 The section between Chesterfield Substation and Tibshelf would comprise the following permanent works:
- the proposed new Chesterfield 400 kV Substation located immediately south of the existing Chesterfield 275 kV / 132 kV Substation including modification of existing overhead lines on the NETS – see section 7.2;
 - approximately 11.5 km of new overhead line from the proposed new Chesterfield Substation to Tibshelf;
 - diversion of a number of 132 kV underground cables away from the working area; diversion is also required on the same cable sections for the Chesterfield to High Marnham project;
 - undergrounding and diversion of the existing National Grid Electricity Distribution (NGED) 132 kV overhead line CH Route – Chesterfield to Alfreton (Double Circuit), the first few spans on approach to Chesterfield Substation;
 - undergrounding and diversion of the existing NGED 132 kV overhead line HR Route – Chesterfield to Pinxton (Double Circuit), the first few spans on approach to Chesterfield Substation and an additional section to north east of Pilsley;
 - undergrounding and diversion of the existing NGED 132 kV overhead line CS Route – Chesterfield to Mansfield (Double Circuit), from the existing diamond crossing south east of Chesterfield Substation where it crosses beneath the 4ZV route to just east of Shire Lane; and
 - modification of other lower voltage overhead lines on the local distribution network.
- 7.3.3 Since the Stage 1 consultation, route Section 1 remains unchanged between the proposed new Chesterfield Substation until the B6039, south west of Holmewood Industrial Estate, with the preferred alignment staying within the emerging preferred corridor (EPC) identified. From there, the preferred alignment taken forward to Stage 2 consultation diverges from the EPC following an alternative corridor in a more southerly direction towards Tibshelf away from Lower Pilsley, Stretton and the River Amber valley as described within the appraisal in **Chapter 5 Review of the Corridor Presented at Stage 1 Consultation** of this report.

Proposed Overhead Line Alignment Between Chesterfield Substation and Heath

Image 7.3: Preferred alignment between Chesterfield Substation and Heath



7.3.4 The new Chesterfield 400 kV Substation is proposed to be sited immediately south of the existing Chesterfield 275 kV Substation and the existing 132 kV NGED Substation, west of Hassocky Lane (B6425), and in proximity of the A617, with the new overhead line connecting into the south west of this new substation. This is illustrated in **Image 7.3**. In developing the preferred alignment, several feasible overhead line routes were considered. The most feasible route, factoring in the various routing constraints, was identified extending south east from the proposed substation location, running parallel to the existing 275 kV 4ZV overhead line and then adjacent to the A617 towards Heath. This section of the existing 4ZV line is scheduled to be updated to 400 kV as part of the Chesterfield to High Marnham project.

7.3.5 This area presents a range of technical, environmental and socio-economic constraints including energy infrastructure and ecological designations including ancient woodland, Habitats of Principal Importance (HPI) and watercourses. These features were considered holistically and influenced the identification of a technically and environmentally preferred alignment that minimises adverse impacts where practicable while enabling efficient integration with the proposed substation design.

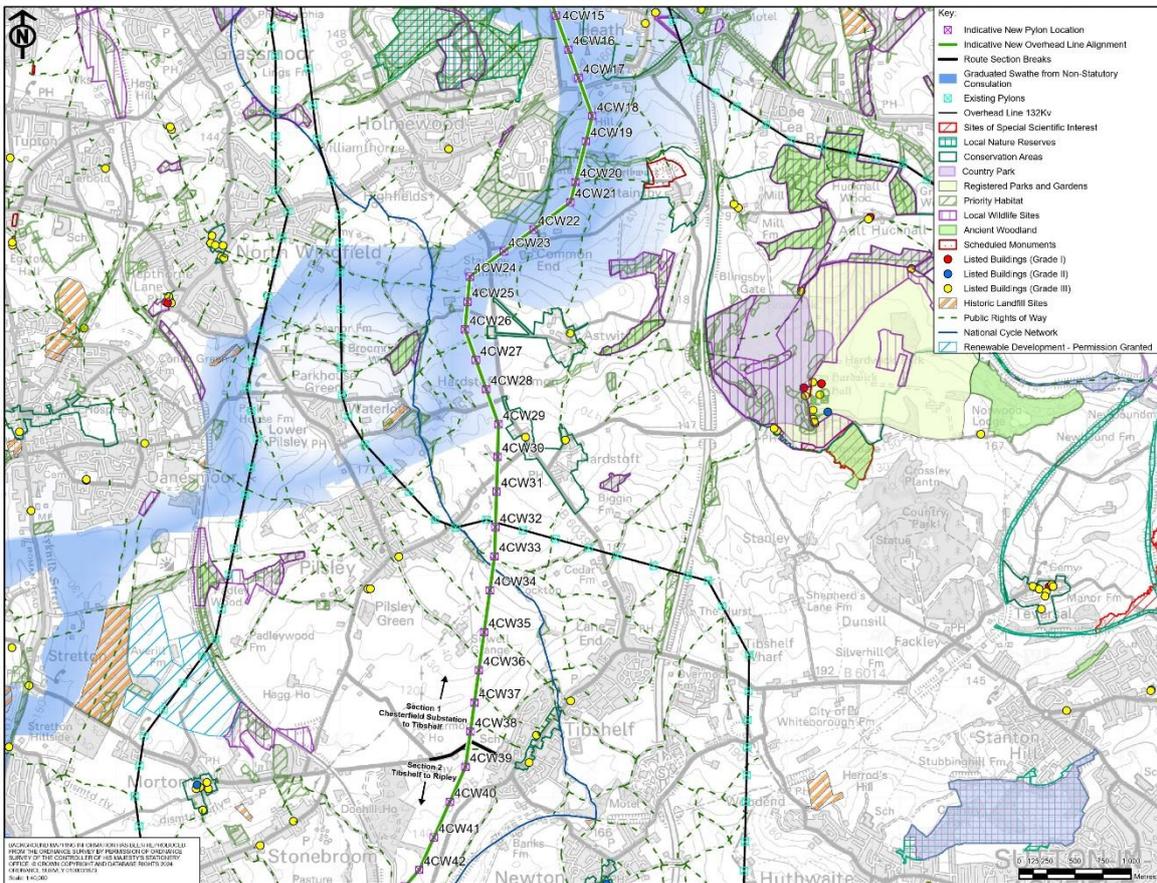
- 7.3.6 Feedback from the Stage 1 consultation indicated that the proposed alignment for the Project should be routed south of Calow towards the A617 which mirrored technical preference, as it offers an optimal solution in terms of engineering feasibility, constructability and operational efficiency, running south east from the proposed Chesterfield 400 kV Substation in parallel with the existing 275 kV 4ZV route (to be uprated to 400 kV) and adjacent to the A617 corridor, avoiding the settlement of Sutton Scarsdale and maintaining a direct corridor towards Junction 29 of the M1 in line with Holford Rule 3 (Ref 20). This alignment offers several key advantages: it aligns with existing infrastructure corridors, ensures compatibility with the proposed design for the new 400 kV Chesterfield Substation, and reduces technical complexity by avoiding the need for complex outages on the NETS as far as practicable, and diversions that would be associated with other routeing options. For example, by contrast, options to the north and east would require additional crossings of the 4ZV route and extensive system outages, which introduce more indirect routeing as well as greater cost, land, and visual impacts. While the proposed alignment does involve significant 132 kV diversion and undergrounding works, and crosses the proposed Hasland Solar Farm development immediately south of the proposed substation, these are considered more feasible in comparison to the technical challenges posed by alternative alignments.
- 7.3.7 Alternative routes to the east of Calow or closer to Sutton Scarsdale were considered, but would have introduced greater design risk due to interactions with designated heritage assets, ancient woodland and complex overhead line crossovers. Such alternatives would likely have required complex undergrounding, temporary diversions, or use of large terminal pylon structures or Cable Sealing End Compounds introducing additional land take, visual impact and engineering challenges.
- 7.3.8 The proposed alignment avoids mapped ancient woodland (part of the Ancient Woodland Inventory) to the north and south of Calow. However, it intersects woodland (also designated as HPI) contiguous with the designated ancient woodland area, and, subject to further assessment and survey, may require consideration as functionally linked ancient woodland and a designated Local Wildlife Site (LWS) (Sutton Springs Wood). The results of further ecological and arboricultural surveys will inform future micro-siting requirements to reduce impacts upon trees, watercourses and ecological receptors in this section, particularly near Muster Brook. Where habitat impacts cannot be avoided, particularly where woodland is assessed to constitute functionally linked ancient woodland, a bespoke mitigation strategy will be required to compensate for any losses of trees incurred. Where the woodland is not considered to be ancient woodland and impacts cannot be avoided, losses will be compensated through Biodiversity Net Gain (BNG) offsetting and delivery, as part of the Project's overall BNG delivery strategy. Given the inability to reinstate habitats like for like (i.e. to baseline condition) owing to the need for a maintenance corridor to be maintained for the overhead line, appropriate habitat types that will not interact with the operational Project (i.e. the power lines), will be explored for delivery on-site. Micro-siting the alignment further away from Sutton Spring Woods may be possible by routeing through a narrow corridor between the A617 and an existing solar farm. However, this is currently occupied by an existing 132 kV overhead line and therefore its use would be contingent on undergrounding and diversion of that apparatus. The restricted land take may also necessitate adoption of special methods of works during both construction (particularly pylon assembly/erection and stringing) and operation for maintenance purposes.

- 7.3.9 The proposed alignment crosses Muster Brook, and the route lies close, and at times runs parallel to riparian corridors (of both Muster Brook and Calow Brook). Preference has been given to siting pylons outside of flood and riparian zones where practicable, and the number of watercourse crossings has been minimised. Micro-siting and development of specific control and mitigation measures will be needed during construction to protect aquatic receptors and maintain hydrological integrity, particularly in sensitive areas.
- 7.3.10 The alignment in this section between Muster Brook and the A617 looks to balance a number of engineering and environmental constraints. This will be refined as part of ongoing design work to achieve the optimised route considering any stakeholder feedback as appropriate.
- 7.3.11 This section of the alignment lies within a Mining Remediation Authority (MRA) Development High Risk Area, with historic mining activity and known mine entries particularly north of the A617. Ground investigations will be undertaken to determine ground conditions and inform pylon foundation design, with the potential need for piled foundations in areas where superficial deposits are significant or shallow workings are present. This informed routeing and siting of the preferred alignment to avoid known hotspots of mining activity where possible based on data received from the MRA.
- 7.3.12 The alignment passes to the west of Heath village and its conservation area. It maintains a separation from the conservation area boundary and is over 700 m from the nearest listed building. The listed buildings and other non-designated buildings of historic interest are located along Main Road within the village and are relatively contained from the views within the linear arrangement of the village. Routeing east of Heath would encroach upon views from the Stainsby Conservation Area and increase visibility from Hardwick and Rowthorne Conservation Area, which includes Grade I listed Hardwick Hall and associated Registered Park and Garden (RPG), potentially impacting the setting of these assets. Consideration has been given to the potential benefits that may be gained through the use of alternative pylon designs (i.e. lower height pylons). Lower height lattice pylons may reduce the prominence of the new overhead line in views and within the wider landscape and could also have some benefit in reducing impacts upon the setting of heritage assets in the area. Further assessment is being undertaken to weigh up resultant impacts; however, it is considered that this would not be so advantageous as to reduce the likely level of significance of these effects and that the greater width of such pylons could result in higher levels of effect being sustained by receptors in closer proximity to them. As none of the options pass through any nationally designated landscape, undergrounding part of the connection is not considered to be appropriate or necessary, in line with national planning policy. As a result, the use of standard height steel lattice pylons remains the preferred approach.
- 7.3.13 Alternative routeing further east would also result in a longer, more indirect route that contradicts the Holford Rules and requires crossing the M1 motorway at least twice which introduces increased complexity.
- 7.3.14 The proposed alignment presents the most balanced location to cross the A617. It avoids direct interaction with ancient woodland parcels north of Heath and limits cumulative biodiversity impacts that would arise from routeing further east, such as more extensive vegetation clearance of woodland areas to create overhead line clearance corridors. Eastern alternatives would also increase proximity to sensitive sites like the Doe Lea LNR and HPI.

- 7.3.15 The proposed alignment avoids interaction with Williamthorpe LNR, which lies to the west of the overhead line alignment, ensuring there are no direct impacts to this extensive site.
- 7.3.16 Hydrologically, shifting the alignment east would bring it closer to ordinary watercourses and associated flood-prone areas, while movement north would increase exposure to fluvial flood zones.
- 7.3.17 Geotechnically, the entire area lies within a MRA Development High Risk Area, but re-routeing east would pass through more artificial ground and may encounter more complex conditions as a result. There are no recorded historic landfills within route Section 1.
- 7.3.18 Shifting the alignment further west to follow corridors of the existing 132 kV overhead lines exiting Chesterfield Substation over a longer distance is not considered a viable option for a variety of reasons. These include more significant interactions with built up areas including the settlements of Grassmoor, Temple Normanton and Williamthorpe, as well as other environmental constraints such as woodlands, LWS, and Grassmoor Country Park. Typically, a construction swathe of 70 m – 110 m is required for new-build overhead lines designed to operate at a system voltage of 400 kV. Routeing in closer parallel to the existing 132 kV overhead lines would have been preferential but is precluded by continuous bands of residential properties present along the A6175 (Williamthorpe Road) between North Wingfield and Holmewood. An alternative route through this area would result in Project infrastructure directly impacting and oversailing residential properties. This would also pose substantial design and constructability challenges requiring taller pylon structures to achieve statutory electrical safety clearances and highly technically complex methodologies to perform overhead line stringing works, as well as risk damage to properties in the process. Additionally, there would be associated visual, noise and social impacts on buildings in close proximity together with an increased construction phase impact.
- 7.3.19 Overall, the proposed alignment in this section offers the most direct feasible route better aligning with Holford Rule 3 and was developed to minimise interaction with major technical constraints and environmental features while maintaining constructability, network efficiency and cost effectiveness.

Proposed Overhead Line Alignment Between Heath and Tibshelf

Image 7.4: Preferred alignment between Heath and Tibshelf



7.3.20 As illustrated in **Image 7.4**, the proposed overhead line alignment continues from Heath in a broadly southerly direction running adjacent to Holmewood industrial estate, utilising the backdrop of mature woodland in this area, routing as far west as possible from Stainsby and the associated scheduled monument and conservation area here. The proposed alignment crosses the B6039 before turning south, running parallel with the highway seeking to avoid the highest point of an upland ridge. The route additionally avoids the villages of Astwith and Hardstoft and their associated conservation areas to the east, therefore avoiding the identified key views outward to the east from the conservation areas. The alignment also avoids Broomriding Wood LWS which includes designated ancient woodland to the west. Additionally, it is understood some of the surrounding lands here are classified as National Trust inalienable lands which benefit from additional statutory protection under the Planning Act 2008 and therefore, the Project has actively sought to avoid these areas. From Hardstoft Road, the route alignment tracks east of Pilsley, crossing the existing 132 kV overhead line HR route which would require diversion and undergrounding, continuing towards the B6014 Doe Hill Lane, passing west of Tibshelf.

7.3.21 This section of the route is where the preferred alignment deviates from the EPC and associated graduated swathe presented at Stage 1 consultation as described in **Chapter 5 Review of the Corridor Presented at Stage 1 Consultation**. The proposed alignment reflects a careful balance of multiple factors identified during environmental, socio-economic and technical appraisals, including:

- Reduces technical complexity through avoidance of significant engineering challenges associated with the inherent terrain and characteristics of the local road network in the River Amber valley area between Stretton and Oakerthorpe, which would also correspond with lesser environmental effects during construction.
- Deviating outside the original EPC towards Tibshelf instead of Stretton provides a shorter and more direct route better aligning with Holford Rule 3.
- Simplifies interactions with existing 132 kV overhead lines in the area by comparison with the original EPC presented at Stage 1 consultation and other routing options evaluated.
- The alignment maintains sufficient distance from Hardwick Hall and associated heritage assets, with the boundary of the RPG located over 1.4 km away at its nearest point and approximately 2.5 km from the nearest listed building at the Hall, with the alignment also avoiding views between Hardwick Hall and the conservation areas of Stainsby, Astwith and Hardstoft. However, it is recognised that parts of the route are on elevated ground, potentially resulting in a degree of intervisibility within long distance views from locations within Hardwick Hall, depending on the openness of the views, frequently limited by vegetation within the RPG. These effects will be further assessed through the Project's Landscape and Visual Impact Assessment presented within the Preliminary Environmental Information Report (PEIR) Chapter 6. Setting impacts to Hardwick Hall and other heritage assets have been discussed in PEIR Chapter 8 Historic Environment and further assessed as part of the Environmental Statement. Deviating from the EPC also avoids effects on designated heritage assets within the River Amber valley area, including the Grade II* listed Ogston Hall and the conservation areas of Higham Old Village, Hallfield Gate and Amber Mill and Toad Hole.
- Ecology and Biodiversity: When compared to the original EPC the preferred alignment provides a greater distance between the Project infrastructure and Ogston Reservoir Site of Special Scientific Interest (SSSI). Other areas of local ecological value have been noted. However, these will be subject to specialist ecological assessment to ensure impacts are avoided or mitigated.
- Residential Receptors: Impacts to communities at Pilsley, Tibshelf and Blackwell have been assessed in balance with those associated with the EPC. The proposed alignment avoids more technically challenging pinch-points in proximity to more densely populated areas where the introduction of new infrastructure would have been expected to impose greater potential for adverse effects.
- The proposed alignment identified has been routed and sited as far west as practicable within the original EPC, away from Stainsby whilst looking to minimise impact to HPI and associated biodiversity, which would otherwise require removal for construction and maintenance during operation once the Project infrastructure is energised.

- 7.3.22 Regarding socio-economic impacts, the alignment intersects the ‘Five Pits Trail’, made up of interconnected Public Rights of Way (PRoWs) which run north to south across the central area of the emerging preferred alignment between Tibshelf, Lower Pilsley and Chesterfield Road (B6039). Given the extensive nature of the Five Pits Trail, routing the Project infrastructure without crossing it is not feasible.
- 7.3.23 The Five Pits Trail is a locally valued recreational resource, offering off-road access and connecting multiple communities via a network of walking routes. However, it is not a formally designated national trail or statutory ecological site. While the proposed alignment crosses this feature south east of Pilsley, the nature of the overhead line infrastructure allows for PRoW continuity. The crossing can be sensitively managed through the construction phase by implementation of mitigation measures including temporary closures during specific activities (e.g. conductor stringing), temporary diversions, and the establishment of managed crossing points where haul roads intersect the trail.
- 7.3.24 From an operational perspective, the proposed alignment would have minimal long-term impact on the Five Pits Trail, as all necessary statutory electrical clearances can be maintained. No part of the Project infrastructure will obstruct or sever public access, and the PRoWs beneath the overhead line will remain open and usable. Impacts will be limited to visual presence of pylons and conductors.

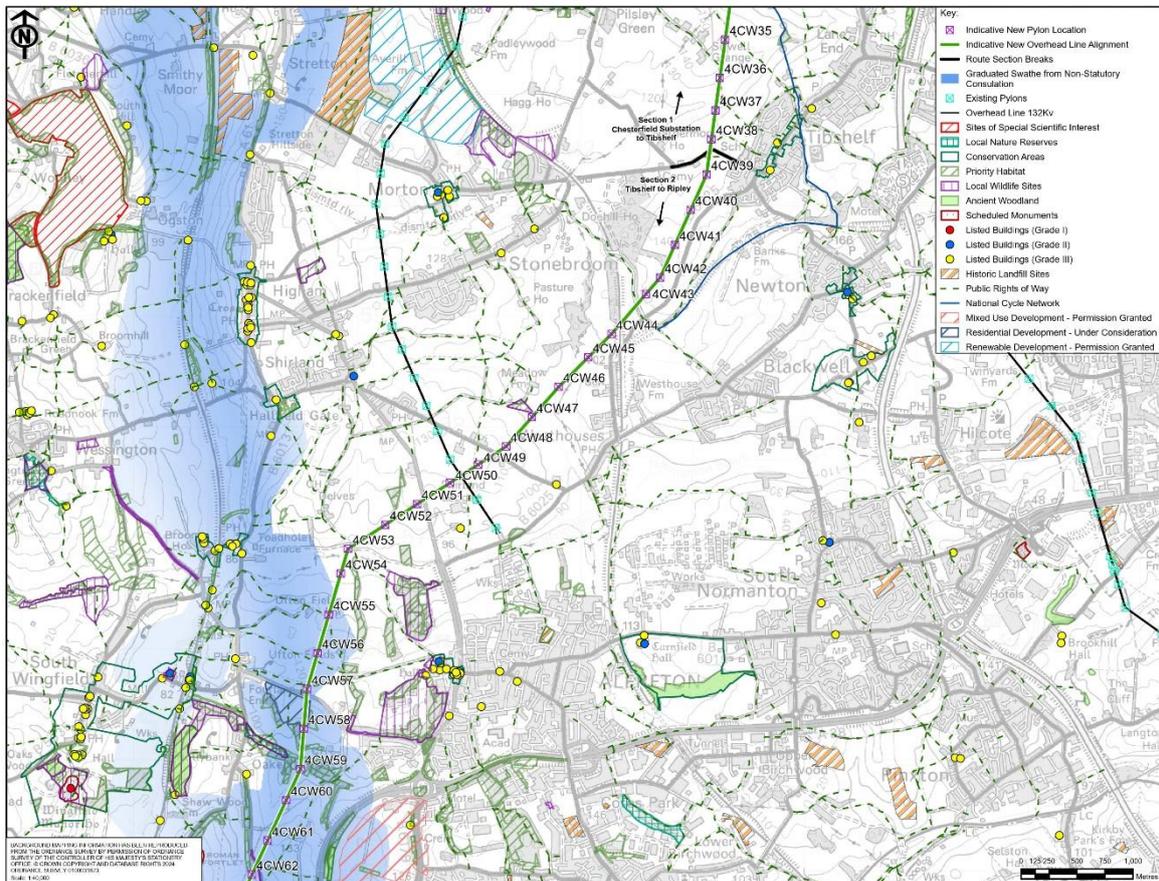
7.4 Section 2: Tibshelf to Ripley

Overview

- 7.4.1 Section 2 of the route is located between Tibshelf and Ripley, and primarily comprises the land and associated works required for the construction of the new overhead line. The alignment extends from B6014 Doe Hill Lane west of Tibshelf, progressing in a generally south westerly direction towards Alfreton and then continues in the direction of Pentrich, broadly following the A38 corridor routing southwards towards Ripley until reaching Lower Hartshay immediately south of the A610. The proposed alignment between Tibshelf and Ripley comprises the following permanent works:
- approximately 10.5 km of new overhead line between Tibshelf and Ripley;
 - undergrounding and diversion of NGED 132 kV overhead line CH Route – Chesterfield to Alfreton (Double Circuit), the first few spans crossing the proposed alignment immediately north of the existing 132 kV / 33 kV Alfreton Substation; and
 - modification of other lower voltage overhead lines on the local distribution network.
- 7.4.2 The preferred alignment in Section 2 continues from Tibshelf after diverging from the EPC presented at Stage 1 consultation, as described within the appraisal in **Chapter 5 Review of the Corridor Presented at Stage 1 Consultation**, before rejoining it to the north east of Oakerthorpe. From there routing remains within the EPC, traversing east of Oakerthorpe mirroring the darker shading in the graduated swathe and preference during early options identification and selection to avoid numerous technical, environmental and socio-economic constraints present in the western loop where optionality was shown in the EPC at Stage 1 consultation. The graduated swathe presented at Stage 1 consultation also indicated a preference to route east of Pentrich; however, the preferred alignment is now routed west of Pentrich taking consideration of feedback received during consultation, in conjunction with further evaluation from environmental and technical specialists.

Proposed Overhead Line Alignment Between Tibshelf and Alfreton (A615)

Image 7.5: Preferred alignment between Tibshelf and Alfreton



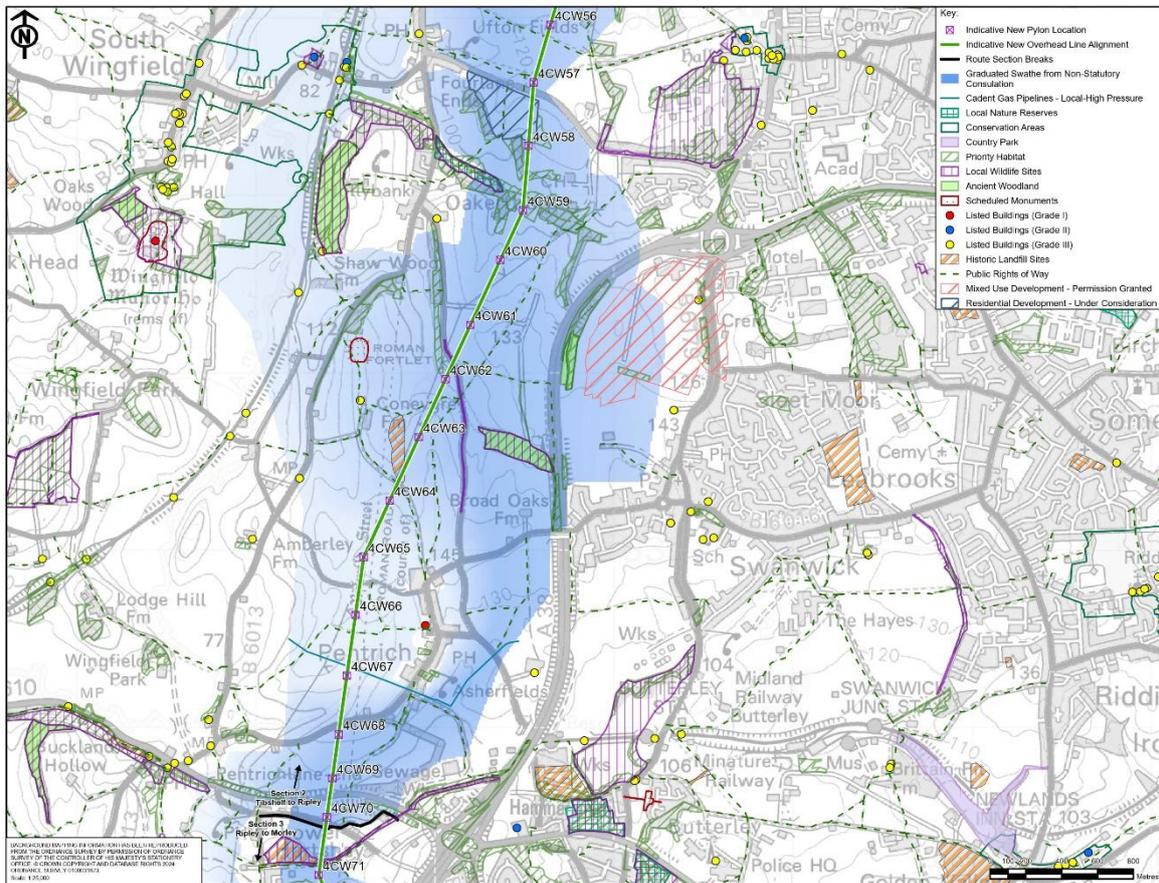
7.4.3 As illustrated in **Image 7.5**, the proposed alignment in this section begins at Tibshelf where it routes north west of the village and its associated conservation area. Here, the most appropriate area to pass through was found west of Tibshelf Community School, approximately 260 m from the main school buildings beyond an area of parking and playing fields. This was chosen given that a route further west would result in a more indirect alignment with more angle pylons and larger directional changes which is considered to result in greater associated landscape and visual impacts. Additionally, the westerly route would also introduce a pinch-point between residential properties, a cemetery and Doe Hill Country Park, a former opencast mining site surrounded by woodland some of which is categorised as HPI.

7.4.4 From here the proposed alignment generally traverses in a south westerly direction following the B6025 until it crosses the Erewash Valley Railway Line (non-electrified), and a water body associated with Doe Hill Country Park. Routing further north would have resulted in the overhead line being sited closer to the main recreational area of Doe Hill Country Park and additional loss of surrounding woodland while to the south a combination of features including the village of Westhouses (and Primary School), an explosives manufacture and storage facility, solar farm, flood zones associated with Alfreton Brook and the built up area of Alfreton constituted a suite of constraints with limited availability of alternative options.

- 7.4.5 Continuing westwards, the route intersects the 132 kV overhead line CH route approximately 700 m north of Alfreton Substation before crossing the A61 and Alfreton Brook circumnavigating north and west of Alfreton Park and turning southwards, remaining to the west of the A61 and A38 corridors, before reaching the A615.
- 7.4.6 As described in **Chapter 5 Review of the Corridor Presented at Stage 1 Consultation**, in addition to technical challenges associated with routeing through the River Amber valley another key consideration for routeing the alignment through this area was avoiding and distancing the Project infrastructure from Ogston Reservoir and its associated SSSI designation and primary interests, namely wintering and breeding bird species. The proposed alignment lies approximately 4 km from the reservoir and therefore sits well outside its immediate ecological influence. The reservoir is also located within a natural basin, which along with the separation distance, provides an effective natural screen. The routeing approach has ensured that the SSSI can be avoided through sensitive routeing and siting of infrastructure.
- 7.4.7 The proposed alignment crosses Alfreton Brook (Environment Agency (EA) Main River) further east of alternative routeing options within the EPC which would reside in closer proximity to its confluence with the River Amber, south of Toadhole Furnace. Consequently, this reduces Flood Zones 2 and 3 exposure to under 200 m less than the typical overhead line ruling span.
- 7.4.8 Feedback received during Stage 1 consultation suggested the Project consider impacts on Alfreton Park as part of the design refinement including concerns raised by Alfreton Park School, particularly in relation to pupils' sensitive hearing and difficulty communicating distress. The preferred alignment of the overhead line would be over 500 m from the school buildings, at which distance significant adverse impacts are unlikely to occur. Furthermore, landscape and visual impacts on Alfreton Park associated with introduction of Project infrastructure are expected to be limited. Although likely to be evident in views from some areas of the park, multiple belts of intervening woodland and tree groups along the western side of the parkland would screen the lower parts of the overhead pylons. Further Environmental Impact Assessment (EIA) would be undertaken and additional mitigation implemented if required in accordance with an Approved Code of Construction Practice secured by the development consent order to minimise nuisance during construction. From a heritage perspective, albeit originating in the 18th century as parkland to the Grade II listed Alfreton Hall, impact is considered to be relatively low given its distance from the proposed route alignment and intervening woodland. The parkland itself is also not a designated heritage asset and has been greatly altered in the 20th century.
- 7.4.9 In summary, the proposed alignment between Tibshelf and Alfreton outside of the EPC has been selected to negate significant engineering challenges associated with construction of the overhead line through the River Amber valley, and consequential landscape and visual effects as described in paragraph 7.3.21. It also provides greater separation to sensitive environmental features such as Ogston Reservoir SSSI.

Proposed Overhead Line Alignment Between Alfreton (A615) and Lower Hartshay (A610)

Image 7.6: Preferred alignment between Alfreton (A615) and Lower Hartshay (A610)



- 7.4.10 As illustrated in **Image 7.6**, the proposed alignment for the new 400 kV overhead line continues across the A615 in a southwards direction crossing Alfreton golf course at its narrowest point, east of Oakerthorpe and broadly following the direction of the A38 corridor passing west of Pentrich before reaching the A610 north of Lower Hartshay.
- 7.4.11 Within the Corridor Preliminary Routing and Siting Study (CPRSS) EPC, presented at Stage 1 consultation, two broad routing options were assessed east and west of Oakerthorpe. The proposed alignment adopts the eastern option, east of the existing Midland Main Line railway line that runs between Clay Cross and Oakerthorpe. This alignment is consistent with the technical preference and represents the most appropriate option considering a range of environmental and socio-economic factors.
- 7.4.12 Maintaining an alignment to the east of Oakerthorpe, passing through Alfreton golf course and adjacent to the Oakerthorpe LNR, offers a more direct and linear route for the new 400 kV transmission connection. This approach is consistent with Holford Rule 3, as it avoids unnecessary deviation and the use of additional tension pylons required to negotiate the more constrained western corridor between Oakerthorpe and South Wingfield. In this respect, the proposed alignment is also preferred due to reduced landscape and visual impact associated with fewer direction changes and pylons.

- 7.4.13 Routing to the east of Oakerthorpe allows the alignment to utilise the natural landform of the valley as a visual backcloth. The eastern route moves the Project infrastructure away from the more rural landscape of the Derbyshire Peak Fringe into South Yorkshire, Nottinghamshire and the Derbyshire Coalfield Landscape Character Area, that has been subject to more development and industrialisation.
- 7.4.14 Although the preferred alignment intersects Alfreton golf course, which spans the entire width of the corridor on the eastern alignment, south of the A615 the interaction is considered manageable during construction and subsequent operation. Potential mitigations include positioning of pylons outside the golf course boundary and providing a multi-directional haul road access either side of the course, limiting impact to oversail of Project infrastructure. Temporary disruption during construction would still occur including vegetation clearance and stringing activities that may temporarily impact the use of the golf course.
- 7.4.15 Vegetation clearance is anticipated due to the presence of HPI woodland surrounding the golf course and that which is contiguous with Oakerthorpe LNR located immediately west of the route, but beyond the preferred alignment. In line with Holford Rule 5, further survey works will be undertaken to inform micro-siting of the overhead line where possible to reduce the extent of vegetation clearance required and associated ecological impacts.
- 7.4.16 The western leg around Oakerthorpe within the EPC presented at Stage 1 consultation would have resulted in significant interaction with Flood Risk Zones 2 and 3 for approximately 3 km distance, spanning nearly the entire corridor width approximately 570 m between South Wingfield and Oakerthorpe. Furthermore, it would have brought Project infrastructure closer to South Wingfield, including Wingfield Manor Scheduled Monument (including Grade I listed building), other listed buildings and the South Wingfield Conservation Area, increasing the potential for heritage and visual impacts.
- 7.4.17 From a technical perspective this section of the EPC also presents considerable construction and delivery challenges due to the presence of multiple physical constraints, including the River Amber and the Midland Main Line railway that run through the centre of the corridor, both of which would require complex overhead line crossings.
- 7.4.18 There are also two low-clearance bridges on the A615 and Holme Lane, with height restrictions of 4.1 m and 3.6 m respectively, which limit accessibility for construction traffic, including Heavy Goods Vehicles and Abnormal Indivisible Loads, from the A38 strategic road network (SRN) junction south west of Alfreton. As a result, longer prescribed construction routes via the A6 or A632 would be necessary, and haul roads would likely need to be fragmented across this section. Furthermore, enabling continuous construction access west of Oakerthorpe is complex, with a high likelihood of requiring multiple temporary bridge or large culvert crossings over the River Amber, necessitating consents and permits from the EA.
- 7.4.19 The combination of these constraints significantly reduces the technical viability of the western route and provides strong rationale for adoption of the proposed alignment.
- 7.4.20 At the time of writing, the preferred alignment crosses an area of land south of the A615 covered by a planning application (reference AVA/2022/0141) for 240 residential units which is pending a decision. Monitoring of the progression of this planning application is ongoing.

- 7.4.21 Further south, consideration was given to alternative route options either to the east or west of Pentrich. At Stage 1 consultation darker shading in the graduated swathe indicated a preference to route east of the settlement; however, informed by stakeholder feedback and further studies the preferred alignment is now routed to the west. Albeit situated on higher ground and passing through more open landscape, the western routeing option enables a straighter alignment around Pentrich and towards Lower Hartshay with fewer angle pylons and provides greater flexibility to increase separation from sensitive receptors. North east of Pentrich the preferred alignment avoids Broadoak Plantation ancient woodland, passing west of the feature and maintaining a buffer of approximately 180 m. By contrast a route east of Pentrich would follow the east side of Millstone Lane, falling within much closer proximity to and likely impacting the area of ancient woodland, which would result in greater adverse effects on the habitat from activities such as installation of temporary haul road for construction access and vegetation clearance for maintaining the overhead line easement once energised during operation. Routeing any further east in closer parallel to the A38 would result in direct impact on the ancient woodland from the overhead line. However, by avoidance of the above this does result in the route being sited close to HPI woodland west of Millstone Lane. Oversail of Millstone Lane Road Verge LWS is also unavoidable given it runs along the lane for circa 1 km but can be mitigated through sensitive construction methods.
- 7.4.22 An eastern alignment tracking closer to the A38 would likely increase interaction with recorded mining legacy and result in a more complex local highway crossing at the intersection between Asher Lane and Back Lane which has several small water bodies in proximity as well as woodland, including that categorised as HPI, which would be impacted. South east of Pentrich an eastern route passing adjacent to the A38 SRN junction (Hartshay Interchange) is constrained by Ripley Sewage Treatment Works, industrial sites and large areas of HPI woodland necessitating a directional change south westward to bypass. It would also pass within approximately 300 m of the Grade II listed Asherfields. While the primary views from this property are oriented southward, the proximity still raises potential setting impacts.
- 7.4.23 Conversely, the preferred alignment would involve routeing closer to Coneygrey Farm Historic Landfill site; however, it is not considered to pose additional geotechnical risk beyond that already anticipated in the area given interaction can be limited to oversail through design development. The western alignment would pass closer to the Grade II listed Coneygrey Farmhouse and Grade I listed Church of St Matthew, which is located to the west side of the main road through Pentrich. While the church is enclosed by mature trees to the west, the eastern side of the churchyard is more open, potentially increasing visibility of the line from that direction. Although a section of the Ryknield Street Roman Road (MDR4958) is identified west of Pentrich, the alignment for this section of the Roman Road is considered speculative, as no evidence for its route is recorded at this location in the Historic Environment Record.
- 7.4.24 On balance, a western alignment was preferred due to the opportunity to offset from key visual receptors and heritage assets, as well as avoiding direct impacts to ancient woodland.

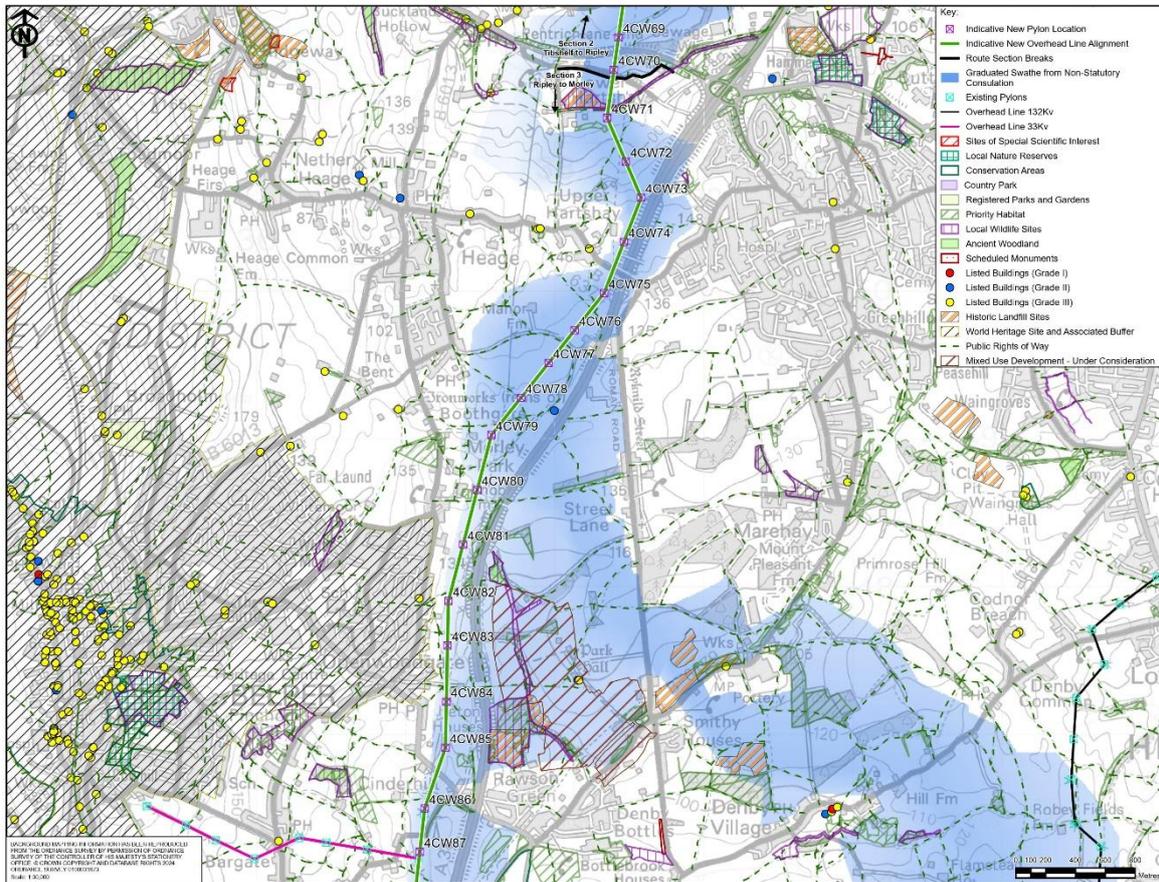
7.5 Section 3: Ripley to Morley

Overview

- 7.5.1 Section 3 of the route starts west of Ripley and extends to Morley, forming the central part of the Project. The alignment extends from the A610 passing through Lower Hartshay, progressing in a generally southerly direction closely following the western side of the A38 corridor towards the settlements of Cinderhill, Holbrook and Kilburn. The route crosses the A38 between Horsley and Coxbench, before reaching Morley. This section plays a key role in linking the northern and southern parts of the route. Proposed overhead line alignment between Ripley and Morley of the Project comprises the following permanent works:
- approximately 11.5 km of new overhead line between Ripley and Morley;
 - undergrounding and diversion of a section of the existing Belper to Spondon 33 kV overhead line; and
 - modification of other lower voltage overhead line on the local distribution network.
- 7.5.2 The EPC identified as part of the CPRSS presented at Stage 1 consultation provided optionality for routeing around the settlements of Denby Bottles, Denby Village, Rawson Green, Kilburn, and Horsley Woodhouse, either to the west (through Section C3d) or the east (through Section C3e). At that time the graduated swathe indicated a marginal preference to route and site the Project infrastructure along the eastern side of the EPC via Denby Village, Smalley and Horsley Woodhouse. Since then, taking into consideration feedback received from Stage 1 consultation complemented by further design studies, the preferred alignment in Section 3 between Ripley and Morley taken forward to Stage 2 consultation now routes to the west of these settlements. The key driver for this being to utilise as far as reasonably practicable existing infrastructure corridors which include a 33 kV overhead line on the distribution network between Belper and Spondon comprising steel lattice pylons, as well as the A38 SRN. The preferred alignment also provides a more direct route for the new overhead line, so better complies with Holford Rule 3. Whilst it is acknowledged that there are environmental effects which are further explored in the section below, the wider benefits achieved of consolidating existing electricity infrastructure combined with limiting impacts through design and sensitive construction methodologies, on balance is considered to provide a better overall outcome for the Project.

Proposed Overhead Line Alignment Between Lower Hartshay (A610) and Cinderhill (A609)

Image 7.7: Preferred alignment between Lower Hartshay (A610) and Cinderhill (A609)



- 7.5.3 As illustrated in **Image 7.7**, the proposed alignment crosses the A610 and continues to follow the A38, remaining to the east of Upper Hartshay and Heage. This alignment presents a more direct route option, in accordance with Holford Rule 3, while avoiding key technical, environmental and heritage constraints to the west of the corridor.
- 7.5.4 Lower Hartshay is a dispersed settlement located directly south of the A610. There are two LWSs present in Lower Hartshay: Lower Hartshay Wetland LWS and Cromford Canal LWS which intersect the EPC. The alignment was developed to avoid direct impact on these sites where possible, as well as recorded historic landfill in the same area. Consideration was also given to deviating the route east, to the north of the A610, which would have required removal or pruning of HPI and non HPI woodland on either side of the carriageway. Further south, a HPI woodland area, was identified as contiguous with areas potentially impacted by the project.
- 7.5.5 The feasibility of an alignment routed in closer parallel to the A38 was explored, avoiding routing through Lower Hartshay, but was discounted for a variety of reasons, principally engineering complexity alongside biodiversity impacts. A technical assessment carried out by the engineering team concluded that routing east of Lower Hartshay closer to the A38 and its junction with the A610 would present significant constructability challenges. Topographical analysis identified significant variances both north and south of the A610 westbound from the A38 SRN junction (Hartshay Interchange) given its raised profile on an elevated embankment,

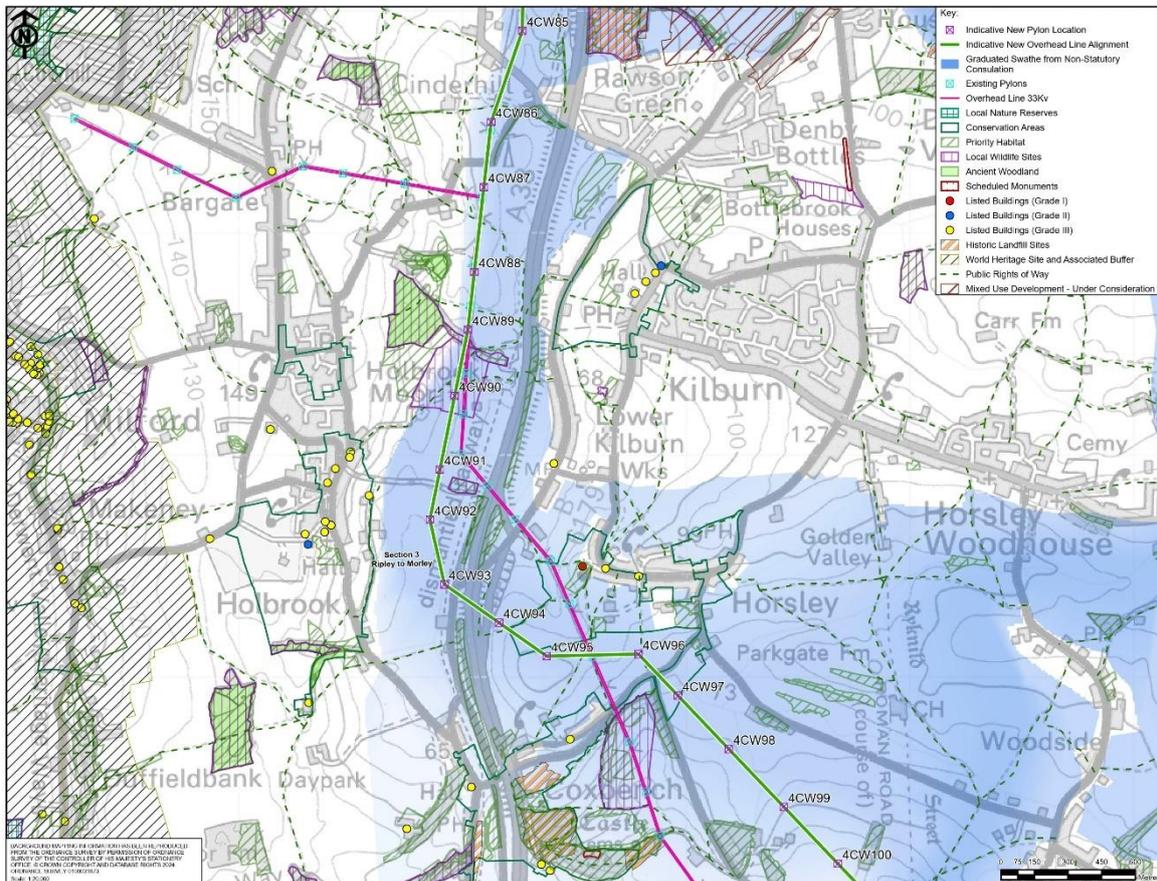
approximately 20 m above the surrounding land. This, coupled with roadside infrastructure, would have necessitated taller overhead line pylons with leg and body extensions to meet electrical clearance standards (Ref 40), which would introduce increased visual impacts on near residential receptors. Stringing works across the A610 would also require temporary protection such as scaffold structures.

- 7.5.6 Additional constraints that impinge routeing closer to the A38 include an operational Sewage Treatment Works (STW) facility, the disused Cromford Canal, Hartshay Brook, and the constrained geometry of access routes. Substantial enabling works, including large areas of vegetation clearance comprising primarily woodland removal, and temporary bridge or culvert installation, would have been required to the north of the A610 to facilitate this route. The narrow width of the existing easement serving the STW also limits the possibility of shared access.
- 7.5.7 There are also two existing highway bridges on 'Main Road' in Lower Hartshay designated as 'Special Engineering Difficulty' structures, one of which crosses the disused Cromford Canal. These would have required approval from the local highway authority and potentially reinforcement or highway improvements to support construction vehicle loading.
- 7.5.8 Routeing west of Lower Hartshay was not found to be a preference given it results in a more indirect alignment (which would increase route length) with more angle pylons to facilitate changes in direction contradicting best practice design and Holford Rule 3.
- 7.5.9 The alignment in this area oversails the Cromford Canal LWS and Lower Hartshay Wetland LWS, south of the A610. Oversailing of the overhead line across the LWS, when accounting for technical difficulties and constraints associated with alternative routeing options and receptors, represents the most effective routeing option through this area.
- 7.5.10 Beyond Lower Hartshay the preferred alignment continues in a southwards direction, tracking along the western side of the existing A38 SRN corridor towards Cinderhill. A narrowing in the EPC presented at Stage 1 consultation between Upper Hartshay and the outskirts of Ripley offered the potential for Project infrastructure to be routed and sited east of the A38 for a short distance. However, on balance it was concluded that routeing west of the A38 remained preferential and reflected consultation feedback. Following the east side of the A38 through this constrained section would require two acute crossings of the SRN within approximately 700 m, introducing additional changes in direction and increasing the number of angle (tension) pylons required. Additionally, it would introduce more complex interactions with the B6374 overbridge and a Severn Trent aqueduct and necessitate large temporary scaffold structures during stringing.
- 7.5.11 Construction access directly from or across the A38 is not permitted following pre-application advice received from National Highways, and frequent route changes across the SRN corridor would result in fragmented logistics and increase traffic through settlements. A western alignment parallel to the A38 reduces these issues and simplifies coordination with National Highways for approvals related to permanent and temporary works.
- 7.5.12 Morley Park Blast Furnaces (a scheduled monument and Grade II* listed building) are situated adjacent to the A38 approximately 1 km south of Upper Hartshay. Derbyshire County Council noted a preference that the setting of this heritage asset should be protected, noting rising ground to the east. The proposed alignment is routed around 250 m west of the asset, thereby avoiding direct impact to the heritage feature.

- 7.5.13 Following the A38 southwards, the preferred alignment traverses close to the outskirts of Belper. The Derwent Valley Mills World Heritage Site (WHS) is located approximately 1.5 km to the west of here, but its associated buffer zone encapsulates the settlement. This area has been afforded the highest level of amenity and heritage sensitivity in accordance with National Policy Statements EN-1 (Ref 12) and EN-5 (Ref 13), as well as Holford Rules 1 and 2 (Ref 20). As such, due cognisance has been taken when developing the proposed alignment to route and site outside the WHS and its buffer. The proposed route avoids the built-up areas of Belper entirely, passing through open countryside available to the east, avoiding the WHS and minimising effects on this internationally significant heritage asset. The nearest parts of the buffer zone to the preferred alignment comprise 20th century residential development which is considered to diminish indirect impacts to the setting of the WHS. Topography in this area falls west to east from Belper towards the A38. Elevated panoramic views of the proposed overhead line would be available from Bargate and Holbrook; however, these would be orientated to the east, looking away rather than towards the WHS. Consequently, intervening landform coupled with surrounding woodlands and tree belts in proximity to the corridor would provide a backdrop for screening and are thereby considered to limit visibility of the Project infrastructure aligning with Holford Rule 5 (Ref 20).
- 7.5.14 Geotechnical assessments indicated that the eastern side of the A38 corridor contains extensive areas of compressible ground and clusters of historic mine entries, which pose significant risks to construction and foundation design. Comparatively, data suggests that mining legacy on the western side is less pronounced, presenting fewer geotechnical constraints.
- 7.5.15 North of Denby Bottles there is a site allocated within the Amber Valley Borough Council's Local Plan (Ref 35) for development including the provision of 300 homes which falls within the EPC presented at Stage 1 consultation. At the time of writing an outline planning application (ref. AVA/2023/0182) is under consideration; however, given the preferred alignment is routed along the west side of the A38 this would avoid the built-up proposals.
- 7.5.16 In this location concerns were raised within Stage 1 consultation feedback, including from local Parish Councils, about the presence of acid tar pits (the 'Cinderhill Tarpits'). The area is designated by Amber Valley as a 'Special Site' under Part 2A of the Environmental Protection Act 1990 (Ref 36) since 2007, with the eastern extent being designated a LWS (Cinderhill Tar Pits and Morrells Brook LWS). From inspection of historical records associated with the site, the most extensive area of tar pits is located on the east side of the A38 north of Rawson Green, although a smaller cluster of tar pits lies on the western side. Concerns included the potential for environmental implications resulting in disturbance to local geology and ground around these features from any intrusive works, causing possibility of leaching contaminants into surrounding ground and surface water sources, with specific reference to Bottle Brook which flows into the River Derwent and subsequently into the River Trent. These risks were carefully evaluated during route development with the proposed alignment avoiding the site and providing a buffer of approximately 150 m from the westernmost pits. Further investigation, survey work, and consultation will be undertaken as the Project design develops.

Proposed Overhead Line Alignment Between Cinderhill (A609) and the A38 Crossing West of Horsley

Image 7.8: Preferred alignment between Cinderhill (A609) and the A38 crossing west of Horsley



- 7.5.17 As illustrated in **Image 7.8**, this section of the proposed overhead line alignment begins south of the A609 (Belper Road), intersecting the corridor of an existing 33 kV overhead line with steel lattice pylons near Killis Lane, following it southwards broadly parallel to the A38 across Ben's Well Water (a tributary of Bottle Brook) before turning south east and crossing the B6179 and A38 near Horsley.
- 7.5.18 The EPC provided optionality for routing around the settlements of Denby Bottles, Denby Village, Rawson Green, Kilburn, and Horsley Woodhouse, either to the west (through Section C3d) or the east (through Section C3e). This flexibility offered consultees the opportunity to feed back their views and preferences around routing through this area. At the time of Stage 1 consultation initial preference shown within the graduated swathe developed at the CPRSS stage leaned towards routing eastward around Denby, across the A609 between Horsley Woodhouse and Smalley, and continuing towards Morley via Cloves Hill.
- 7.5.19 One of the key themes extrapolated from analysis of feedback received was for the Project to explore routing closer to or in parallel with existing overhead lines, particularly in the vicinity of Morley. This suggestion aligns with National Grid's Approach to Consenting (Ref 4) that sets out a mitigation hierarchy for introduction of new overhead lines which includes reduction of 'wirescape' (rationalisation) through modification of existing overhead lines where practicable.

- 7.5.20 Two existing lattice pylon overhead lines are located in the vicinity of the EPC through this area which form part of the local distribution network owned, operated and maintained by NGED.
- 7.5.21 The first is a 132 kV overhead line east of the EPC broadly running north to south from Loscoe to Spondon. Tracking the Project infrastructure near this would have required the new 400 kV overhead line to be routed along the eastern loop of the EPC circumnavigating Denby Village and converging with the corridor of the 132 kV overhead line north east of Smalley. From that point routeing would require deviating outside the EPC for a distance of approximately 6 km before rejoining it south east of Stanley near a spur in the existing 132 kV overhead line.
- 7.5.22 Following comprehensive evaluation by multi-disciplinary teams from a technical, consents and environmental perspective this routeing option was discounted due to a number of key constraints:
- Two pinch-points less than 60 m width where linear bands of residential properties and development are present on the A608 between Smalley and Heanor Gate, and on A609 Belper Road between Stanley Common and West Hallam respectively. The first pinch-point would result in an alignment that directly oversails a hardstanding storage area for caravans, containers and other miscellaneous equipment. The latter is already occupied by the existing 132 kV overhead line route and therefore is reliant on diversion and undergrounding of this apparatus to accommodate the Project infrastructure. Furthermore, to navigate the pinch-point whilst keeping routeing as direct as possible in accordance with Holford Rule 3 (Ref 20) would require the use of two large, high angle deviation pylons. In both cases, these locations are considered too narrow for routeing a 400 kV overhead line alignment without significant detrimental impact to surrounding residential properties and gardens. Comparatively, 400 kV overhead lines used on the NETS are also inherently larger scale than their 132 kV counterparts on the distribution network given their higher capacity. The typical separation on a standard 400 kV overhead line pylon between adjacent circuits on either side of the structure can exceed 20 m at its maximum, depending on type. This coupled with mandated statutory electrical safety clearance requirements, severely restricts Limits of Deviation for routeing and imposes more adverse landscape and visual impacts on receptors in the immediate vicinity of the pinch-point. An alternate routeing option was considered to the west of Stanley Common; however, similar constraints applied, in addition to the high likelihood of direct impacts on Morley Hayes Wood, an area of ancient woodland.
 - Significantly increased geotechnical risk given that routeing would cross an extensive area of historic landfill (Whitehouse Opencast Site) north of Stanley Common which contains special and liquid sludge waste types and siting at least three pylons within the landfill area is unavoidable. This would consequently introduce further complexity to ground investigation surveys, and subsequent construction. Furthermore, records obtained from the MRA indicate dense clusters of mine entries (shafts and adits) north west of Denby between Rykneld Hill and Denby Pottery Factory as well as north, east and south of Smalley between Denby Village and Stanley Common. Widespread areas of historic surface mining operations are also recorded.
 - The existing 132 kV overhead line is approximately 350 m west of the southern boundary of Park Hall Airstrip, an unlicensed aerodrome. Developing routeing for a new overhead line that embodies best practice design principles outlined in the

Holford Rules would result in Project infrastructure being sited closer to the airfield. Consequently, the larger scale pylons required would likely have a more detrimental effect on operation of the airfield and flight paths. There is also existing wind turbine structure which could be avoided through micro-siting, but that would push an overhead line alignment further east even closer to Park Hall Airstrip or introduce further directional changes increasing the number of angle pylons.

- Routeing identified would cross a designated scheduled monument, Medieval iron working remains at Stanley monastic grange. The monument comprises buried archaeological remains which were discovered during previous investigations ahead of opencast mining. Placing Project infrastructure within or through a scheduled monument area would require special consent from Historic England and likely require further archaeological investigations and mitigation measures.
- The Woodland Trust own a large area of land near Smalley (161.13 ha) called the Young People's Forest at Mead, Smalley, where the Trust have commenced planting a planned 250,000 trees on a former opencast coal mine. The introduction of the new overhead line through this land would result in the need for significant tree removal.

7.5.23 The second existing lattice pylon overhead line intersects the EPC from north east of Holbrook to Brackley Gate north west of Morley Smithy. Its conductor system is operated at 33 kV but is strung on 132 kV pylons. Routeing an alignment along the west side of the EPC in this area continuing broadly in parallel with the A38 would result in the Project infrastructure first intersecting with the existing overhead line just north of Killis Lane. Approximately 300 m south of this location an intersection within the overhead line circuits (commonly referred to as a tee-in) is present with a spur heading west towards Belper 33 kV Substation via Bargate. From this point it is considered technically feasible to broadly follow the path of the existing 33 kV overhead line southwards and utilise the corridor for routeing the new 400 kV overhead line over a 3 km to 4 km distance. This solution would be reliant on diversion of the existing apparatus; however, it is anticipated to reduce overall landscape and visual impacts by reducing 'wirescape' and consolidating electricity infrastructure to an area where it is already located. The original EPC identified through this section is at least 350 m in width enabling sufficient land take to divert the affected section of existing lattice pylon overhead either underground or onto a smaller wood pole equivalent. There is also potential to divert the apparatus through buried installation along carriageway on the local road network to reduce construction impacts on agricultural land but which may result in a degree of temporary disruption to road users whilst work is undertaken.

7.5.24 There are a number of environmental constraints likely to be affected by routeing an overhead line through this section. The first notable interaction is Booths Wood and Brook LWS where the alignment crosses Ben's Well Water. The LWS comprises HPI woodland which is contiguous with an area of ancient woodland that lies to the west just beyond the EPC. In a parcel of land immediately adjacent to the south there is also Booths Lane Meadow LWS which would be traversed by a route for the new overhead line. The existing 33 kV overhead line that would be diverted to make way for the new 400 kV route does already interact with these features. The section of HPI woodland currently oversailed by the existing 33 kV overhead line would be subject to routine vegetation management for maintenance during its operation in accordance with statutory duties of the distribution network operator under the Electricity Act 1989 (Ref 1) to prevent clearance infringements. Two existing pylons

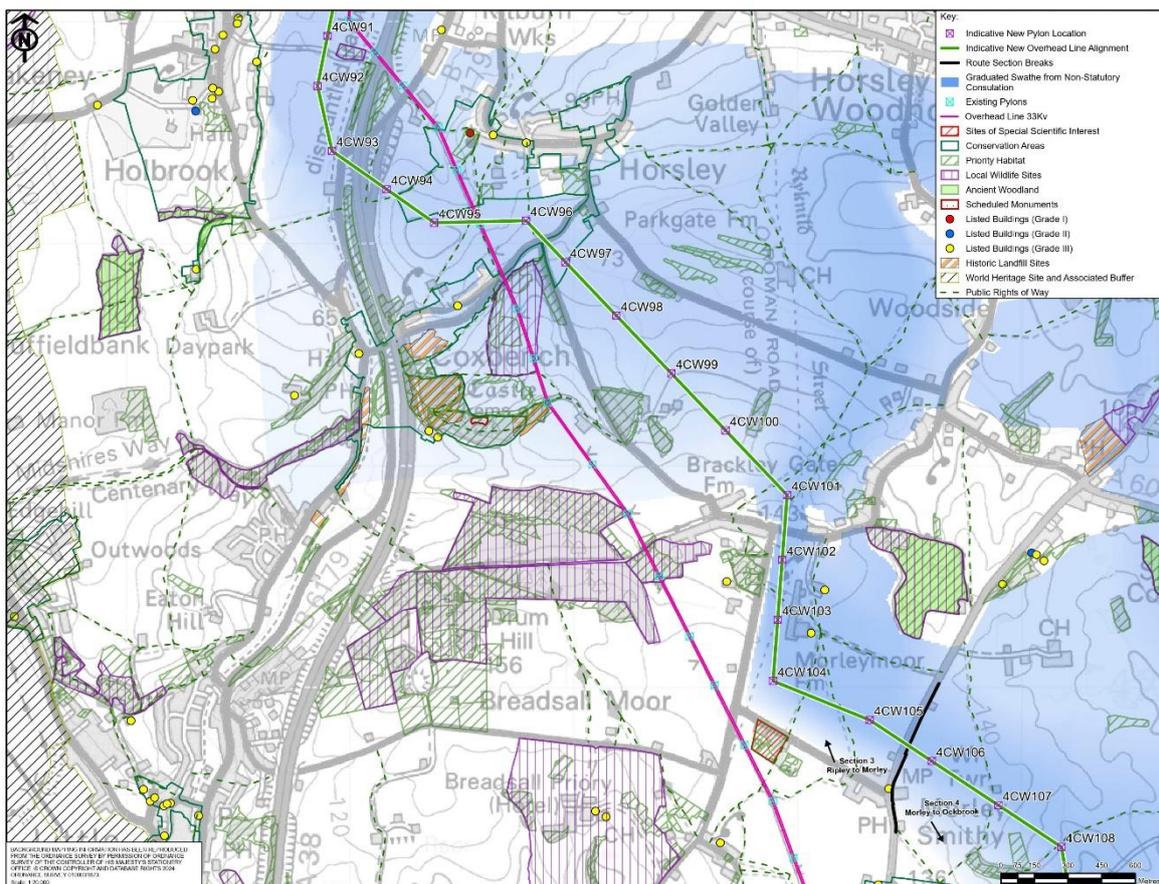
are also sited within Booths Lane Meadow LWS. The impact associated with construction of a new 400 kV overhead line on these receptors can be minimised by routing through the narrowest area of HPI woodland occupied by the existing 33 kV overhead line to reduce the extent of vegetation clearance required. Albeit a wider corridor would be needed for the 400 kV apparatus given its increased scale, that could be offset by greater ground clearance requirements and the characteristics of the surrounding vegetation at the crossing point, especially if a pylon is sited closer to the woodland boundary rather than crossing at midspan. Independent sections of haul road could also be installed either side of the HPI woodland avoiding the need to remove areas of it for temporary access during construction. Ruling spans between 400 kV pylons on the transmission network are also larger than their 132 kV or 33 kV counterparts on the distribution network, therefore incursion of the Booths Lane Meadow LWS could be limited to construction of a single pylon and conductor stringing activities with potential for further micro-siting during detailed design subject to survey. Routing the new alignment adjacent to Booths Wood on lower landform to the east is considered to impart landscape and visual benefits by providing natural screening of the proposed overhead line for intervening views from the west in accordance with Holford Rule 5.

- 7.5.25 Further south, the existing 33 kV overhead line turns south west crossing the A38 to the north of the SRN junction (Coxbench Interchange) passing in proximity to an LWS associated with Holbrook Disused Sewage Works, several blocks of HPI woodland surrounding the junction and through a narrower area between residential properties off B6179 Derby Road to the west of Horsley. To avoid and provide a greater buffer to these features a proposed alignment for the 400 kV route would traverse further south through more open agricultural land where constraints are sparser before crossing the A38 to the north of a storage yard adjacent to the SRN junction. The major crossing of the overhead line over the A38 is considered to be increased in complexity given the grade separated construction of the SRN junction here with the A38 carriageway raised in profile compared to surrounding land immediately to the west; however, this is considered manageable through design.
- 7.5.26 Routing on the west side of the EPC also involves crossing Bottle Brook, an EA Main River and tributary of the River Derwent which flows north east to south west extending from south of Denby, running broadly in parallel to the B6179 and A38 before exiting the EPC south of Coxbench. As a result, mapping and site analysis indicates interaction with Flood Zones 2 and 3 associated with Bottle Brook including potential siting of one pylon within the flood zone extents. However, micro-siting as well as implementation of appropriate mitigation during design and construction could alleviate effects. Furthermore, the proposed crossing point identified for Bottle Brook is at a location where the watercourse has been already modified and culverted as part of the A38 construction.
- 7.5.27 In the same area routing would also coincide with a section of the former Midland Railway Ripley Branch Line which has been earmarked and approved by Derbyshire County Council for development of a 3 m wide, 5.6 km long surfaced strategic Greenway, connecting Duffield Road in Little Eaton (south) to A609 Rawson Green (north). This scheme is set to form a critical segment of the Key Cycle Network, promoting sustainable travel and recreational use while enhancing regional connectivity.

- 7.5.28 The proposed alignment runs in parallel to part of the proposed Greenway route. Mature trees appear to flank both sides of the proposed Greenway, which would assist in screening views of the overhead line route and pylons to some extent. The key area of interaction would be where the proposed alignment turns south east and crosses it adjacent to the A38 and Bottle Brook but the impact is considered to be limited to enabling works for overhead line stringing including an element of tree removal either side of the Greenway. Overall, routing of the proposed alignment in proximity to this feature is not expected to detract from its recreational use once proposed redevelopment of the Greenway is completed nor impose significant landscape and visual effects.
- 7.5.29 The possibility of a more direct, straight-line route from Ripley to Morley was studied; however, this was not progressed due to the presence of a tight cluster of settlements in the central part of this section of the EPC including Denby, Denby Bottles, Kilburn, Horsley Woodhouse, and Rawson Green.

Proposed Overhead Line Alignment Between the A38 Crossing West of Horsley and the A608 at Morley Smithy

Image 7.9: Preferred alignment between the A38 crossing west of Horsley and the A608 at Morley Smithy



- 7.5.30 As illustrated in **Image 7.9**, after crossing the A38 the proposed alignment within this section of the EPC traverses in a south easterly direction, cresting a ridgeline between Horsley and Coxbench, before the terrain descends and the routing crosses Coxbench Road and the path of Park Brook, a tributary of Bottle Brook. The overhead line route then continues for approximately 1.5 km broadly following the

direction of Smalley Mill Road to the south of Horsley Lodge Hotel and Golf Course and then turning southwards through a narrowing around 150 m between residential properties at Cloves Hill rejoining the darker shading in the graduated swathe presented at Stage 1 consultation. From there routeing runs alongside Quarry Road before a sharp directional change and running in parallel with Brick Kiln Lane circumnavigating local constraints preventing more direct routeing, and passing just north of Morley Smithy, where it crosses the A608.

- 7.5.31 In between Horsley and Coxbench the proposed alignment crosses designated conservation areas associated with the settlements. However, sensitive routeing and siting has isolated interaction to agricultural land on the periphery of the conservation area extents away from the core built-up areas and distinguishing heritage assets. It is acknowledged that introduction of Project infrastructure may impact the setting but the existing 33 kV lattice pylon overhead line from Belper to Spondon is already visible in the landscape and traverses through the conservation areas over larger distance in closer proximity to residential properties and sensitive environmental sites. Therefore, diversion and undergrounding of the existing apparatus to create a new corridor for the 400 kV route is considered as potential mitigation to curtail heritage, landscape and visual impacts through reduction in 'wirescape'. Routeing of the new overhead line through the area would be seen in localised views, although there are sizeable blocks of woodland surrounding the settlement which would provide some screening of the infrastructure.
- 7.5.32 By routeing east of Coxbench the proposed alignment avoids direct impacts to HPI woodland and grassland from construction and operation of the new 400 kV overhead line, as well as the Warren LWS and a pinch-point between residential properties which the existing 33 kV overhead line passes through on its southerly trajectory. Conversely, this does result in an acute crossing of Park Brook with routeing running in parallel to Flood Zones 2 and 3 over approximately 300 m. Modifications to the existing 33 kV overhead line to enable construction of the preferred alignment for the new 400 kV overhead line may likely require some works within the aforementioned HPI and LWS areas.
- 7.5.33 From Coxbench Road the preferred alignment enters an undulating valley with Smalley Mill Road and Park Brook running along its base. The proposed alignment traverses in a south easterly direction to the south of Smalley Mill Road. In this area terrain generally falls from south to north with Sandy Lane following the flank of an upland ridgeline, cresting at its highest elevation of 140 m Above Ordnance Datum (AOD) around Brackley Gate. With the preferred alignment sited approximately 500 m east of the route of the existing 33 kV overhead line which traverses the upland ridge it thereby avoids and provides greater separation to Horsley Castle Scheduled Monument which falls within Coxbench conservation area and comprises the remains of a medieval castle. Consequently, intervening landform and woodland is considered to provide effective screening diminishing visual impacts from introduction of Project infrastructure aligning with Holford Rule 5 (Ref 20).
- 7.5.34 From Brackley Gate the preferred alignment continues southward via Cloves Hill and runs along Quarry Road for approximately 700 m before taking a directional change and heading eastwards towards the A608. The preferred alignment was carefully developed in this area to avoid direct impacts to residential properties and nearby environmental features including ecologically valuable sites and irreplaceable habitats such as Morley Brick Pits SSSI and Cloves Wood, an area of designated ancient woodland and LWS, situated between the A608 and Cloves Hill which restrict routeing.

- 7.5.35 To the west of Cloves Hill and Morley, the inherent topographical and landscape characteristics of the area such as Drum Hill and the elevated terrain of the River Amber Valley, coupled with widespread areas of HPI deciduous woodland and grassland, and sites such as Dobb's Hill Plantation LWS and Moor Plantation and Drum Hill LWS, limits the potential to shift the alignment further west closer to the A38.
- 7.5.36 Morley Brick Pits SSSI fell within the envelope of the EPC presented at Stage 1 consultation but given its designation and high ecological value, the preferred alignment has been routed north beyond Brick Kiln Lane to avoid direct impacts on the SSSI.
- 7.5.37 Overall, on the balance of the appraisal above, the Project has elected to move away from the initial preference shown within the graduated swathe presented at Stage 1 consultation and route the preferred alignment along the west side of the EPC in this area of optionality so that it follows existing infrastructure corridors including the A38 and existing 33 kV lattice pylon overhead line. The preferred alignment would also provide a more direct route for the new overhead line, so better complies with Holford Rule 3. By comparison initial preference for routing east of Denby between Ripley and Morley for route Section 3 would have resulted in a longer, less direct route with larger directional changes to bypass areas of settlement and constraint. Additionally, the preferred alignment avoids a pinch-point on the A609 between Horsley Woodhouse and Smalley, less than 120 m in width restricting routing and available land take for construction. Routing project infrastructure through this was also considered to impart more direct adverse impacts on numerous residential properties in the immediate vicinity, as well as the recreational amenity of Stainsby Meadow Recreation Ground.

7.6 Section 4: Morley to Ockbrook

Overview

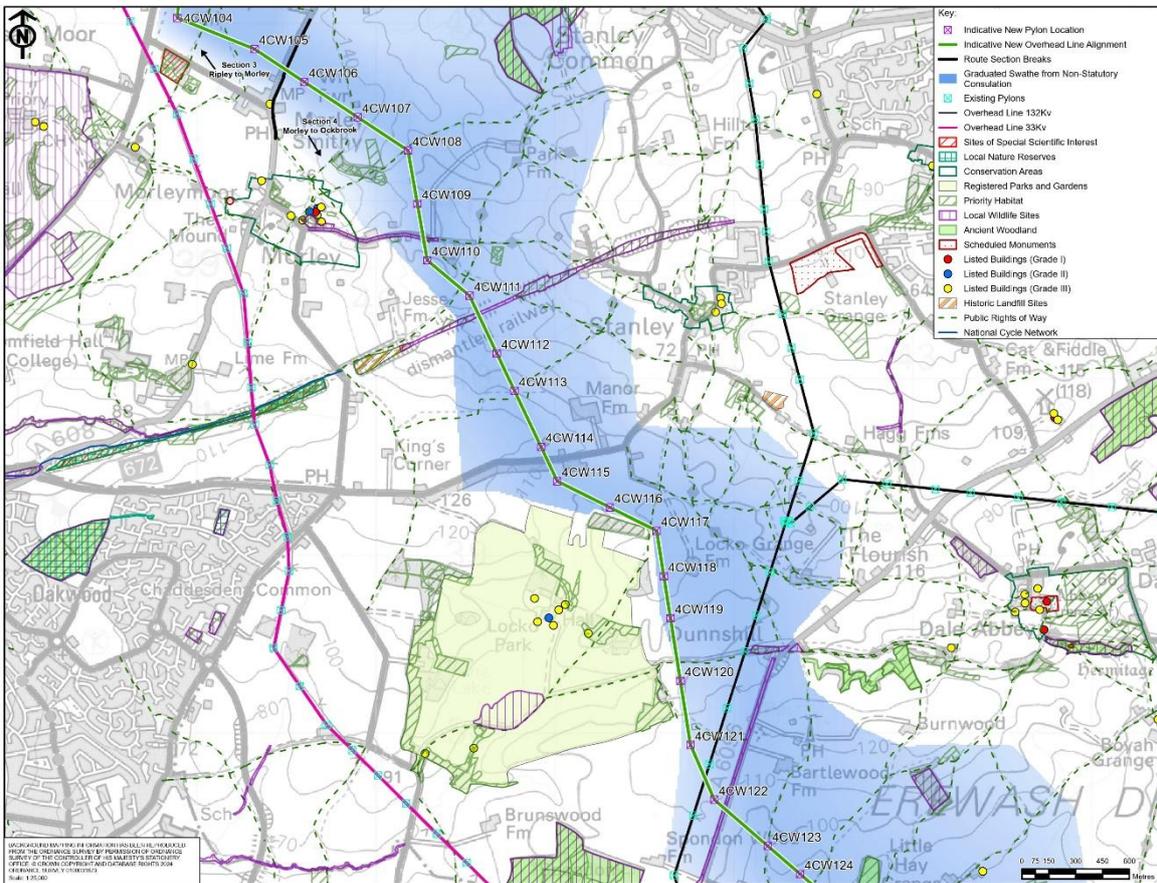
- 7.6.1 Section 4 of the route is located between Morley and Ockbrook, entering into the southern half of the Project. This section primarily comprises the land and associated works required for the construction of a new overhead line. The alignment extends from the north east of Morley Smithy where it crosses the A608 and continues south east, passing south west of Stanley and circumnavigating around Locko Park and its RPG. The alignment then progresses southwards until the A6096 and turns south east running around the north east side of Ockbrook. This section plays a key role in linking the northern and southernmost parts of the route. The proposed overhead line alignment between Morley and Ockbrook of the Project comprises the following permanent works:
- approximately 7.5 km of new overhead line between Morley and Ockbrook;
 - undergrounding and diversion of NGED 132 kV overhead line CL Route (Double Circuit), where it crosses the proposed alignment; and
 - modification of other lower voltage overhead line on the local distribution network.
- 7.6.2 This route section lies within Erewash District, which is positioned between Nottingham and Derby and includes a large area of Green Belt which emerges to the East and North of Derby and surrounds the conurbation of Nottingham. As set out in the CPRSS, at the routing and siting stage of the Project it was found that all but preliminary corridor 1, where a range of receptors and constraints are present and afforded high protection under the NPS (EN-1 and EN-5), all other preliminary

corridors identified would pass through areas of Green Belt – including those also passing through the Derwent Valley Mills WHS. On the basis that corridor options seeking to achieve a connection between Willington and Chesterfield, besides from routing westwards into the Peak District, would have to pass through the Green Belt, this designation was not assessed to be a differentiating factor. Due to the potential scale and nature of the Project, impacts on the Derby and Nottingham Green Belt are unavoidable however in developing the proposed route alignment in this area, National Grid have sought to minimise impacts on Green Belt where practicable including utilising the existing infrastructure corridor of the A38, taking a more direct route than to the east (thereby minimising the number of directional changes and pylons, together with associated length) and proposing the reduction of ‘wirescape’ (rationalisation) through modification of a section of the existing 33 kV overhead line on the distribution network.

7.6.3 Route Section 4 remains broadly consistent with the CPRSS EPC presented at Stage 1 consultation. From Morley Smithy the preferred alignment continues in a south easterly direction towards Dale Abbey, following the western side of the EPC within the darker shading of the graduated swathe. The graduated swathe indicated a marginal preference to route and site the Project infrastructure along the centre of the EPC around A6096 Dale Road. However, the proposed alignment is now sited slightly further west where it is considered to provide a more direct route, whilst balancing the impacts on environmental features, as well as using surrounding landscape and woodland around Locko Park to better screen the Project infrastructure. After crossing Dale Road (A6096), the preferred alignment rejoins darker shading of the graduated swathe within the EPC traversing around the north east of Ockbrook, maintaining the most direct route possible and avoiding higher elevation terrain to the east side of the EPC where siting of an overhead line would impart more prominent landscape and visual impacts. The proposed alignment developed through this section considers feedback received during Stage 1 consultation together with further survey works, design studies and environmental assessment.

Proposed Overhead Line Alignment Between Morley (A608) and Dale Abbey (A6096)

Image 7.10: Preferred alignment between Morley (A608) and Dale Abbey (A6096)



7.6.4 As illustrated in **Image 7.10**, the alignment in this section begins to the north east of Morley Smithy, from where it crosses the A608, and continues towards the A6096 in the vicinity of Dale Abbey.

7.6.5 The lighter shading in the graduated swathe within the central band of the EPC in this area reflects the presence of environmental and socio-economic sensitivities including Morley Hayes Golf Club which occupies a large area of land between Morley Smithy and Stanley Common, south east of the A608. The preferred alignment marginally intersects the south west corner of the Tower course; however, impacts on the golf course from construction and operation of the overhead line are considered to be minimal and capable of being mitigated through design refinement. Pursuing an alternative routing option further east within the EPC is not preferable since it would have a far more significant effect on the business and its recreational use. Additionally, it would result in direct impacts on Morley Hayes Wood, a designated ancient woodland and LWS which would require extensive tree removal to create a corridor for a new 400 kV overhead line, adversely affecting an irreplaceable habitat. Routing east in this area would also increase impacts on the settlement of Stanley Common and residential properties on its curtilage, as well as several designated and potential environmental assets. These include:

- HPI Deciduous Woodland;
- Smalley Wood potential Local Wildlife Site (pLWS);
- Smalley Green Meadow LWS;
- Stanley Common Meadow LWS; and
- Hayeswood Farm Grassland LWS.

7.6.6 Routing west of Morley Smithy was also appraised but again discounted due to the presence of Morley Brick Pits SSSI, as well as Morley Conservation Area, which contains a number of heritage features including a scheduled monument and listed buildings.

7.6.7 The proposed alignment in this section is located within the western part of the graduated swathe, approximately 900 m from the Stanley Conservation Area. Moving the alignment further west would increase the potential for impacts on Locko Park, a RPG, which is afforded a high level of protection under national planning policy.

7.6.8 The alignment lies west of Stanley and currently avoids any fluvial or reservoir flood risk zones associated with the River Erewash. Routeing on the eastern edge of the EPC, closer to Stanley, would result in interactions with a number of surface water flood zones and flow paths associated with Stanley Brook. This would require extensive mitigation requirements during both construction and operation. Additionally it would bring Project infrastructure closer to its conservation area, listed buildings and a designated scheduled monument associated with medieval iron working remains at Stanley monastic grange. There is an established presence of existing electrification infrastructure in this part of route Section 4 within Erewash district, which has informed the development of the preferred alignment. Existing infrastructure includes:

- the 132 kV overhead line HM route, running broadly north to south east of Stanley Village, connecting Spondon Peaking Substation to Loscoe Switching Station;
- the 132 kV overhead line CLT route, which feeds into Stanton Substation and connects via a tee-in point to the HM route approximately 1 km south east of Stanley; and
- a 33 kV overhead line strung on 132 kV pylon, which runs between Spondon Peaking Substation and Belper.

7.6.9 Shifting the proposed route alignment eastward closer to Stanley would require more indirect routeing with larger directional changes to bypass narrow areas between residential properties and buildings on the curtilage of the village. As a result, it is considered that this would impose more adverse landscape and visual impacts on the settlement. This would also introduce greater interactions with the existing NGED 132 kV overhead line HM route that runs through the area. The combination of these constraints significantly reduces the availability of a corridor for routeing the new infrastructure, making it challenging to accommodate the proposed alignment to east of Stanley.

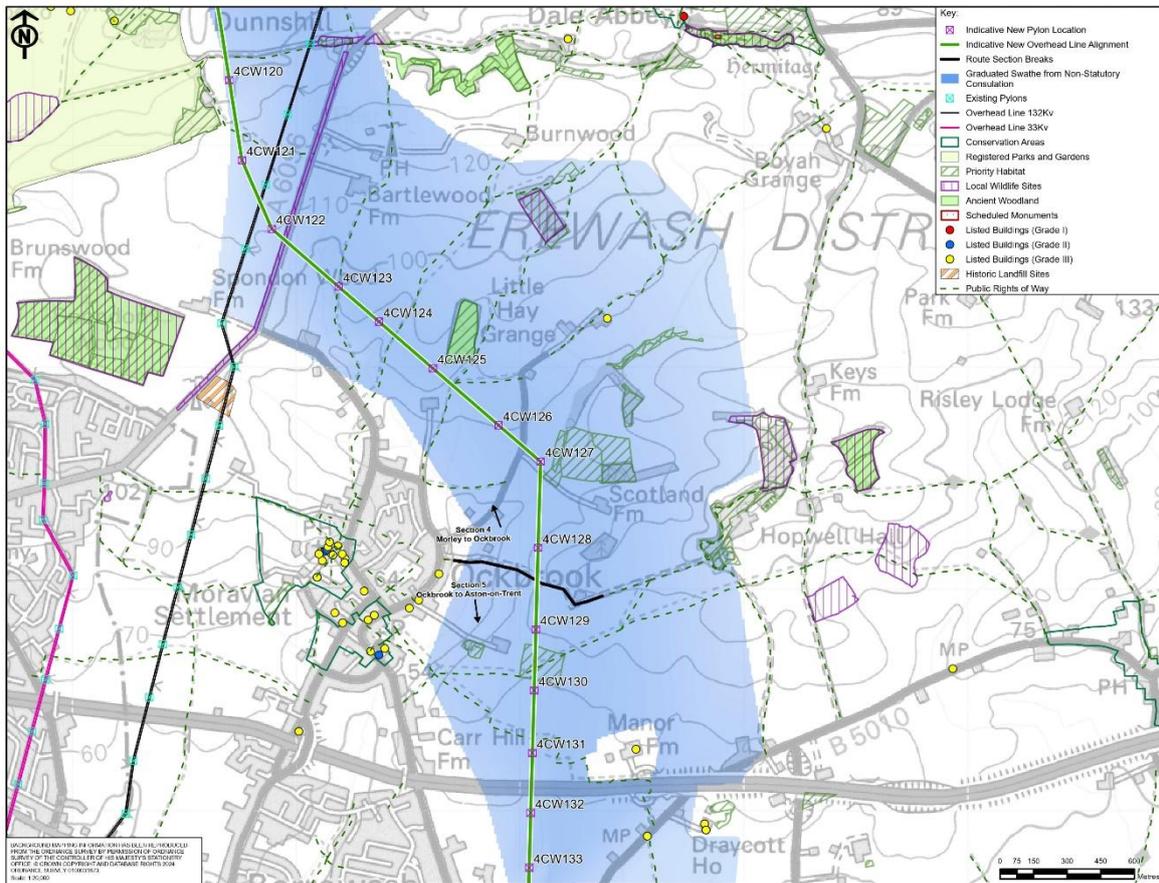
7.6.10 Between Church Lane, east of Morley village and Derby Road running between Oakwood and Stanley the proposed route alignment crosses the Stanley–Morley Disused Railway LWS, comprising a linear band of broad-leaved woodland along the old Breadsall Railway Cutting, together with areas of HPI woodland. Proposed pylon locations are sited outside of the LWS to minimise impacts from construction, but

areas of removal will be required to facilitate overhead line stringing and retention of a corridor at the point of oversail for maintenance of electrical safety clearance during operation. Although impacts are anticipated as a result, the p route does avoid designated SSSI and LNR associated with Breadsall Railway Cutting, approximately 1 km further west, outside of the EPC originally identified.

- 7.6.11 A more direct route from Morley to Ockbrook was considered during early options identification and selection as part of the CPRSS, and backchecked following feedback received during Stage 1 consultation. While the proposed alignment maintains a relatively straight path consistent with Holford Rule 3 (Ref 20), attempts to further reduce the number of angle pylons would result in routing through the Locko Park RPG, in direct conflict with national planning policy. Furthermore, straightening the route alignment would impact additional constraints, including listed buildings, areas of designated ancient woodland, and Ockbrook's built-up area.
- 7.6.12 Dunshill Shelterbelt LWS runs in parallel with the A6096 over a distance of approximately 1.8 km and is therefore intersected by the preferred alignment meaning impacts on this feature are unavoidable. Tree removal would be required to facilitate construction and maintenance of the overhead line which would be minimised as far as practicable.
- 7.6.13 In summary, while movement of the alignment in either direction was considered, the proposed alignment represents a balance between minimising environmental, heritage, and visual impacts, whilst ensuring engineering feasibility.

Proposed Overhead Line Alignment Between Dale Abbey (A6096) and A52 Brian Clough Way

Image 7.11: Preferred alignment between Dale Abbey (A6096) and A52 Brian Clough Way



- 7.6.14 As illustrated in **Image 7.11**, the alignment in this section begins at the A6096, continuing in a south easterly direction to the north east of Ockbrook, crossing Far Lane and then turning southward towards the A52 (Brian Clough Way). Throughout this section, the alignment remains south of Dale Abbey and east of Ockbrook, avoiding the built-up areas, block of ancient woodland and heritage features in the vicinity including Dale Hill Natural Burial Ground.
- 7.6.15 A constraint in this section is the Dale Abbey Conservation Area, which contains a concentration of designated heritage assets, including multiple listed buildings and the ruins of Dale Abbey, a Grade I listed building and scheduled monument. These assets are afforded the highest levels of statutory protection, and their setting is considered highly sensitive. However, the proposed alignment avoids direct impacts to these heritage assets as Dale Abbey lies outside the EPC.
- 7.6.16 The proposed alignment is located along the western edge of the EPC, avoiding direct impacts to Dale Abbey and maintaining an efficient, technically feasible route. Shifting the alignment further east within or beyond the EPC would result in a more indirect route, requiring a greater number of angle pylons, thereby conflicting with Holford Rule 3, which promotes straight, direct routing where feasible.
- 7.6.17 Furthermore, the topography rises towards the east, and siting across raised landform would potentially increase visual impacts across a wider area. This is

particularly relevant in the context of views from elevated land around Ockbrook and surrounding rural settings. In addition, the eastern part of the EPC includes numerous parcels of historical landfill, which has an increased risk of ground contamination and poor geotechnical conditions, potentially complicating construction activities.

- 7.6.18 Although shifting the alignment further east may reduce potential views from Ockbrook and surrounding areas, it would also lead to impacts on larger blocks of woodland to the north east of Ockbrook, including HPI and non HPI woodlands, ancient woodland, and LWSs, and the need to cross elevated terrain, further increasing landscape and technical impacts.
- 7.6.19 To the north of Ockbrook routeing of the preferred alignment avoids, but traverses close to a block of ancient woodland. Impact as a result of the proposed development is considered likely to be minimal through use of sensitive construction methods and potential further micro-siting.
- 7.6.20 In balancing these factors, the proposed alignment is considered to represent the most appropriate route in this section, avoiding high-value environmental and heritage constraints while maintaining engineering feasibility and consistency with the Holford Rules.
- 7.6.21 Alternative alignment options were considered, including shifting the route further east of Ockbrook closer to Hopwell. However, such a shift was found to offer no additional benefit in terms of reducing visual impact or addressing community concerns. This is because moving the alignment further east would involve routeing on higher ground increasing the visibility of pylons and overhead lines in the surrounding landscape.
- 7.6.22 Routeing along the east side of the EPC would also involve oversailing the A52 where it has been constructed on a raised embankment with an overbridge for crossing the B5010 between Borrowash and Risley. This, coupled with roadside infrastructure, would necessitate taller pylons to meet electrical clearance standards (Ref 40) and increase complexity of temporary works required for construction. In addition to the above constraint, presence of residential properties near this area including Grade II listed buildings such as Manor Farm and Draycott House would also result in a more indirect alignment with sharper changes in direction to bypass these receptors. This would introduce further angle pylons and more detrimental landscape and visual effects in conflict with Holford Rule 3.
- 7.6.23 The proposed alignment, which runs east of Ockbrook and west of Hopwell utilises an area of lower lying landform and avoids where practicable designated ecological sites and priority habitats in this area. Hopwell itself lies outside of the EPC, and any shift further east risks interactions with HPI deciduous woodland and potentially an area of ancient woodland.

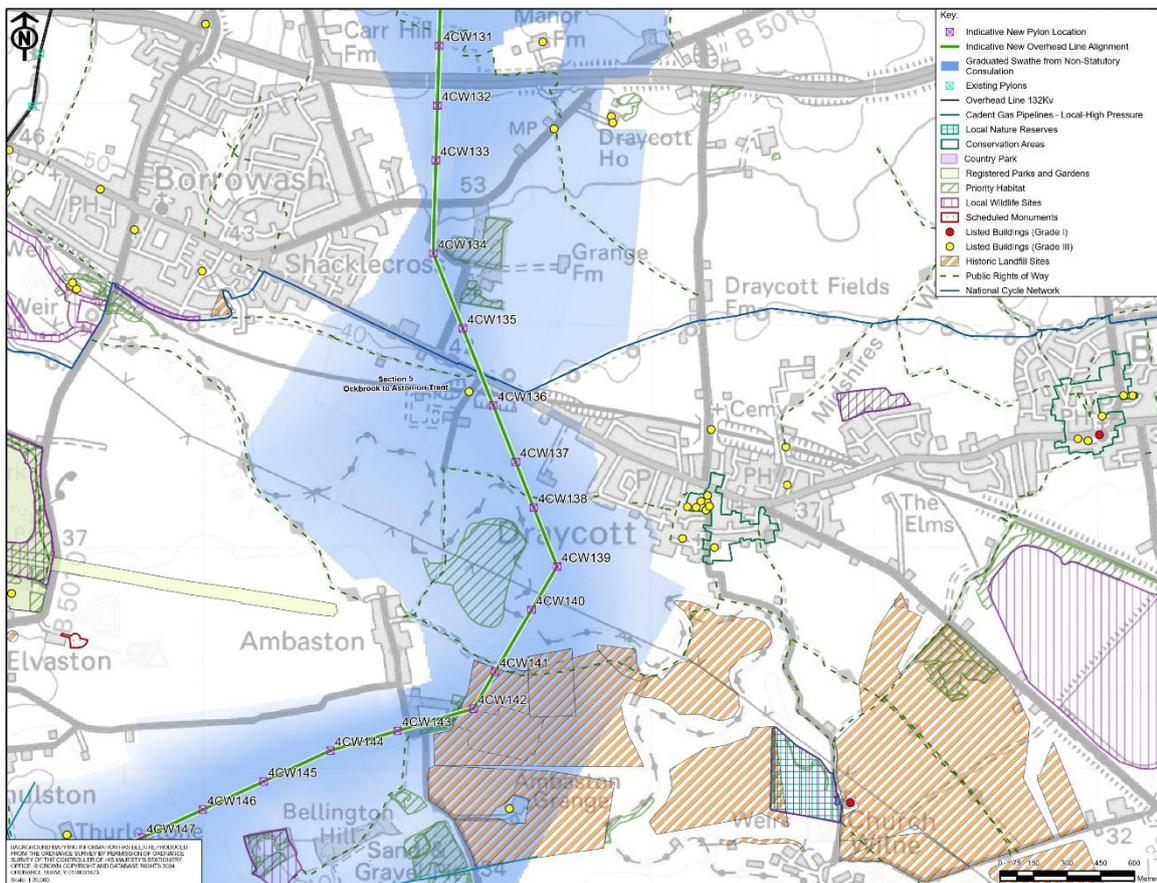
7.7 Section 5: Ockbrook to Aston-on-Trent

Overview

- 7.7.1 The route continues from the south east side of Ockbrook and progresses in a generally southerly direction. After crossing the A52 (Brian Clough Way), it continues southwards crossing the A6005 and Derby to Nottingham Railway Line between Borrowash and Draycott. The route then crosses the River Derwent, circumnavigating eastwards around Ambaston and Elvaston, before turning south west, thereby avoiding direct impacts to these settlements. Continuing south west, the alignment passes between Thulston and the Trent Valley Crematorium before crossing the A6 Derby Spur near the A50 Junction 2 (Aston Interchange) and then follows the A50 towards Chellaston. This section plays a key role in linking the central and southernmost parts of the route. The proposed overhead line alignment between Ockbrook and Aston-on-Trent of the Project comprises the following permanent works:
- approximately 8 km of new overhead line between Ockbrook and Aston-on-Trent; and
 - modification of other lower voltage wood pole overhead lines on the local distribution network.
- 7.7.2 The alignment intersects a broad area of Flood Zones 2 and 3, corresponding with the Trent Valley Floodplain near its confluence with the River Derwent, particularly around Ambaston and Shardlow. The floodplain here extends up to approximately 3 km in width, occupying the full breadth of the EPC between Draycott and the A50 dual carriageway. Of the viable routeing options available, the proposed alignment represents the shortest crossing through the floodplain, minimising the extent of interaction with flood-prone land as far as practicable.
- 7.7.3 The preferred alignment in Section 5 continues from Ockbrook remaining to the west side of the EPC before crossing the A52, B5010 (Nottingham Road) and A6005. From there, the route moves to the east side of the EPC to minimise the number of crossings over the River Derwent, consistent with the graduated swathe at Stage 1 consultation. After this point, the graduated swathe indicated optionality either east or west of the EPC until the A50 crossing; however, the preferred alignment routes to the west side of the EPC. This is primarily driven by the presence of extensive historic landfill between the River Derwent and Shardlow, as well as flood zone associated with the Trent Valley Floodplain.

Proposed Overhead Line Alignment Between A52 Brian Clough Way and River Derwent

Image 7.12: Preferred alignment between A52 Brian Clough Way and River Derwent



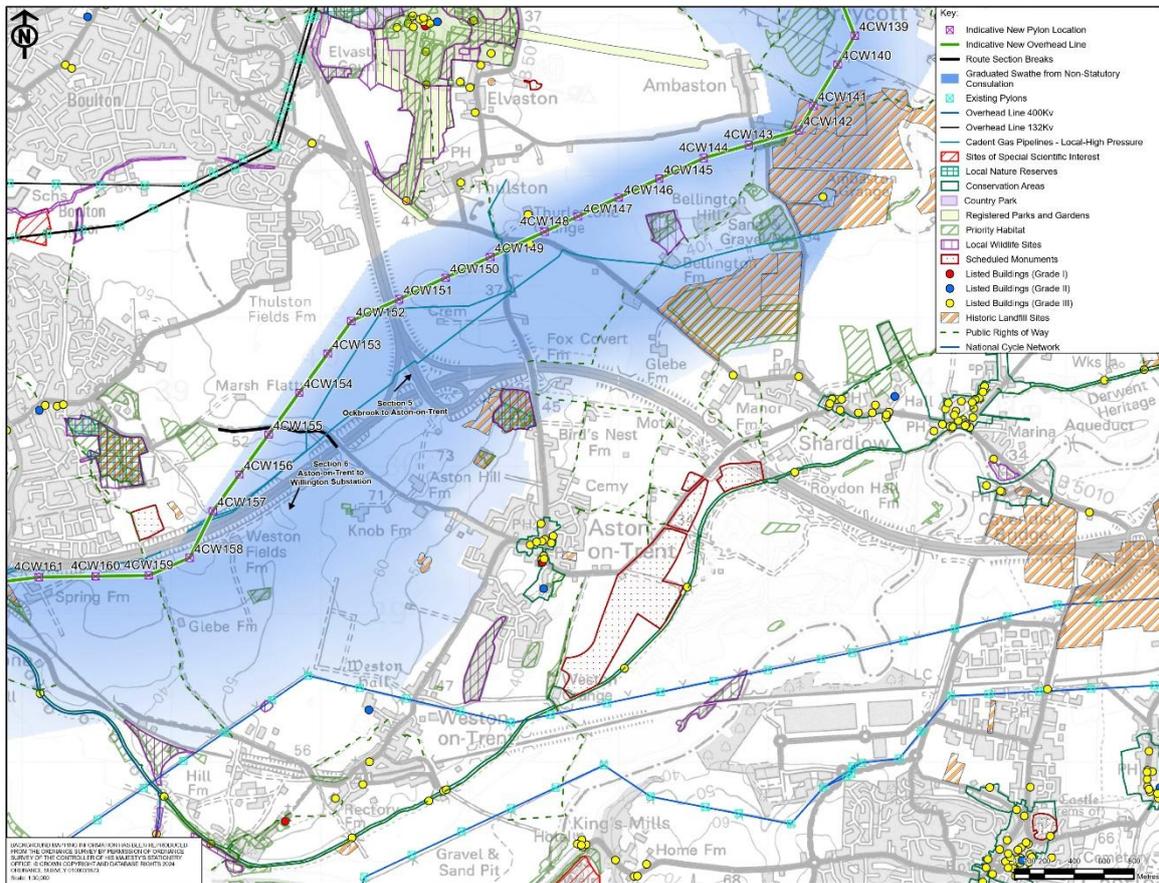
- 7.7.4 As illustrated in **Image 7.12**, the alignment in this section continues from the south east side of Ockbrook in a southerly direction. After crossing the A52 (Brian Clough Way), the alignment maintains a southerly course crossing the A6005 and Derby to Nottingham Railway Line between Borrowwash and Draycott. It then crosses the River Derwent between pylons 4CW140 and 4CW141 (see **Image 7.12**), while maintaining a route east of Ambaston, thereby avoiding direct interaction with the settlement and its immediate surroundings.
- 7.7.5 From Ockbrook, the proposed alignment traverses predominantly open agricultural land, routing between the settlements of Borrowwash and Draycott, across the A6005, and towards the meandering course of the River Derwent.
- 7.7.6 Two key constraints in this area are the settlements of Borrowwash and Draycott. The proposed alignment maintains a balanced distance between them, and further movement eastward would bring the route closer to Manor Farm (Grade II listed), though this is noted to be well-screened by woodland.
- 7.7.7 A more direct route between Ockbrook and Aston-on-Trent outside the EPC presented at Stage 1 consultation was analysed but presented multiple conflicts. Albeit favourable from a technical perspective, such routing would involve siting the overhead line in closer proximity to residential areas on the curtilage of Borrowwash, and more fundamentally would also require passing through Elvaston Avenue, a tree-

lined vista, and designed landscape feature of Elvaston Castle RPG, as well as potentially affecting its Grade I listed Church of St Bartholomew and Grade II* listed Elvaston Castle. This would directly conflict with national planning policy and Holford Rule 2 (Ref 20) (avoiding areas of the highest amenity). Routeing to the west, outside of the EPC is also considered to result in more landscape and visual impacts due to the higher ground west of Ambaston.

- 7.7.8 As a result, the preferred alignment tracks east and south of Ambaston, driven by the need to avoid direct impacts to Grade II* listed Elvaston Castle, its RPG and associated heritage assets.
- 7.7.9 The proposed alignment has also been developed to avoid multiple crossings of the River Derwent (EA Main River) as well as impacts to areas of HPI (including Coastal and Floodplain Grazing Marsh and deciduous woodland), riparian corridors, and large water bodies, while minimising, where practicable, impacts to non-designated habitats.
- 7.7.10 Feedback from Stage 1 consultation requested that the Project explore an alternative routeing option following existing 132 kV overhead line corridors, running north to south, west of Ockbrook. Although potentially offering a more direct route (reduction by circa 1.8 km), there are routeing constraints present which impose technical and constructability limitations, in addition to environmental and socio-economic effects that render this unfeasible even if existing 132 kV overhead lines were undergrounded. There are pinch-points between the settlements of Borrowwash and Spondon due to the numerous residential properties and recreational areas (including Asterdale Sports & Leisure Centre and Spondon Bowls Club) off the A6005 and further south near Alvaston which are not wide enough to accommodate construction of a new route alignment without oversailing them. Undergrounding of the 132 kV overhead line circuits would require directional drilling beneath property, the River Derwent and major roads such as the A6. The above, combined with restricted land take and access limitations in places due to close proximity of surrounding infrastructure significantly increases both complexity and cost.
- 7.7.11 Moreover, Elvaston Castle RPG also poses a key constraint to routeing here. Coupled with the interconnected LNR extending to the west of its boundary, routeing for a new 400 kV alignment would be pushed further west closer to the A6 to avoid and circumnavigate these designations, increasing interaction with the 132 kV overhead lines on the distribution network south of Spondon which are critical to the supply of the wider Derby area. Numerous phased system outages on the distribution network would be required for diversion of these assets to facilitate construction of a new 400 kV route.
- 7.7.12 Another consideration is the proposed canal restoration project by the Derby and Sandiacre Canal Trust, which crosses the EPC between Borrowwash and Draycott. Consultation with the Canal and River Trust during pre-application engagement confirmed that the planned canal corridor bisects the EPC, meaning that interaction with the Project infrastructure is unavoidable, even if routed west of Gypsy Lane. However, the routeing design has been optimised to minimise interaction to oversail of Project infrastructure only and ongoing discussions are being held with the Derby and Sandiacre Canal Trust.
- 7.7.13 Overall, the proposed alignment follows the most direct and feasible path within the EPC, minimising directional changes and avoiding significant environmental, heritage, and technical constraints, while maintaining compliance with national planning policy and the Holford Rules.

Proposed Overhead Line Alignment Between River Derwent and A50

Image 7.13: Preferred alignment between River Derwent and A50



7.7.14 As illustrated in **Image 7.13**, the route then crosses the River Derwent, remaining east of Ambaston and Elvaston, before turning south west after which the alignment passes between Thulston and the Trent Valley Crematorium before crossing the A6 Derby Spur near A50 Junction 2 and then follows the A50 towards Chellaston.

7.7.15 A significant constraint in this area is the presence of extensive areas of historic landfill between the River Derwent and Shardlow. Complete avoidance of these areas is not possible due to other local constraints; however, interaction with the areas of historic landfill as well as flood zones will be minimised where practicable in line with best environmental practice. The proposed alignment results in approximately 500 m of the route including at least two pylons and associated access falling within mapped historic landfill boundaries. An alternative route closer to Shardlow would intersect landfill areas for approximately 1.8 km significantly increasing interaction and associated environmental risks. This constraint supports the rationale for locating Project infrastructure along the western side of the EPC in this area, though complete avoidance of landfill sites is not feasible due to other environmental and technical constraints. The combination of landfill presence and surrounding Flood Zone 3 (high probability of flooding) increases the potential for contamination risks, and additional complexity to design and constructability.

- 7.7.16 As such, regardless of proposed alignment, construction in these areas will require remediation strategies and piling risk assessments.
- 7.7.17 The River Derwent bisects the corridor east of Ambaston. The alignment has been developed to avoid multiple crossings of the river, instead seeking to cross it once along a more linear and less constrained section. A single crossing of the River Derwent helps reduce impacts on riparian and riverine habitats and associated species. Mitigation included as part of the proposed design involves limiting impact to oversail of Project infrastructure only, positioning of pylons either side of the river and maximising distance to the banks as far as practicable. Independent sections of haul road either side would also avoid installation of a temporary bridge for construction access across the river. Temporary disruption during construction would still occur including vegetation clearance and stringing activities.
- 7.7.18 The proposed overhead line alignment is approximately 280 m from the south eastern edge of Ambaston village. Routeing the alignment further east would bring it closer to the Grade II listed Ambaston Grange Farmhouse, Shardlow Conservation Area and other heritage features including clusters of listed buildings. This reinforces that the proposed route around Ambaston achieves an optimal balance between Holford Rule 3 (directness) and Rule 2 (avoid smaller areas of high amenity value). Established belts of intervening woodland and tree groups are present immediately to the east and south of Ambaston village, which is considered to afford an element of mitigation to reduce visual impact through screening the lower parts of the overhead pylons once installed as well as obscuring views of the working areas and swathe from the settlement during the construction phase.
- 7.7.19 The proposed alignment through this section avoids the Bellington Wood LWS, which contains areas of HPI woodland and HPI Coastal and Floodplain Grazing Marsh around Shardlow.
- 7.7.20 Early consultation with the EA has also resulted in a recommendation that the Project consider avoidance or mitigation for key flood defence assets within the EPC in the vicinity of this area. These include:
- Ambaston Ring Embankment;
 - Shardlow Ring Embankment;
 - Shardlow Coppice Embankment; and
 - Draycott Front Floodbank.
- 7.7.21 The Ambaston Ring Embankment (Asset ID: 55488) intersects the EPC south east of Ambaston. The EPC is approximately 800 m wide in this area, offering flexibility for routeing at a safe distance. The proposed alignment passes approximately 100 m from the flood defence primarily due to the aforementioned historic landfill and flood zone constraints. While significant effects on the operation of the flood defence asset are considered highly unlikely, temporary impacts may arise during construction which the Project would seek to minimise through detailed design. Further assessment would also be carried out through the Environmental Statement. The other flood defence assets are located outside of the EPC; therefore, the alignment avoids impacts to these assets.

- 7.7.22 Feedback raised during Stage 1 consultation indicated a preference to avoid routeing close to Aston-on-Trent. The preferred alignment taken forward to Stage 2 consultation routes to the north of the Trent Valley Crematorium site (approximately 190 m from its land boundary) and crosses the A6 in an area with flat topography (approximately 2 per cent gradient). By contrast alternative routeing closer to Aston-on-Trent would involve interaction with a constricted pinch-point (approximately 85 m wider) directly east of the A50 / A6 SRN junction. That area would also lead to increased impact on several sensitive receptors including the Aston Brickyard Plantation LNR and LWS, a historic landfill, a cemetery, and a telecommunications mast.
- 7.7.23 Further landscape and visual impacts would also arise if the alignment were shifted east of the A50. This includes the need for a higher deviation tension pylon north of the A50 and increased pylon height to meet safety clearances for an overbridge on Derby Road. Additionally, terrain to the south of the A50 rises steeply (average 8–10 per cent), meaning subsequent pylons along the route would be placed on a prominent ridgeline, increasing visual impacts.
- 7.7.24 Bringing the overhead line route closer to Aston-on-Trent, would also increase potential heritage impacts on its conservation area and listed buildings.
- 7.7.25 Another constraint identified from Stage 1 consultation is the planned pedestrian footbridge forming part of the Boulton Moor Strategic Urban Extension (BM1). South Derbyshire District Council requested the alignment avoid impacting the associated residential areas and location of a proposed bridge across the A6 Derby Spur for access to an area earmarked for a recreational site as part of the development plan. The proposed bridge is located approximately 300 m outside the EPC and the proposed alignment maintains a separation of approximately 700 m from the bridge location and approximately 530 m from the edge of the Boulton Moor development. Therefore the route does not impact the development of the pedestrian footbridge.
- 7.7.26 Overall, the preferred alignment follows the most direct and feasible path within the EPC, minimising directional changes and avoiding significant environmental, heritage, and technical constraints, while maintaining cognisance with national planning policy and the Holford Rules.

7.8 Section 6: Aston-on-Trent to Existing Willington Substation

Overview

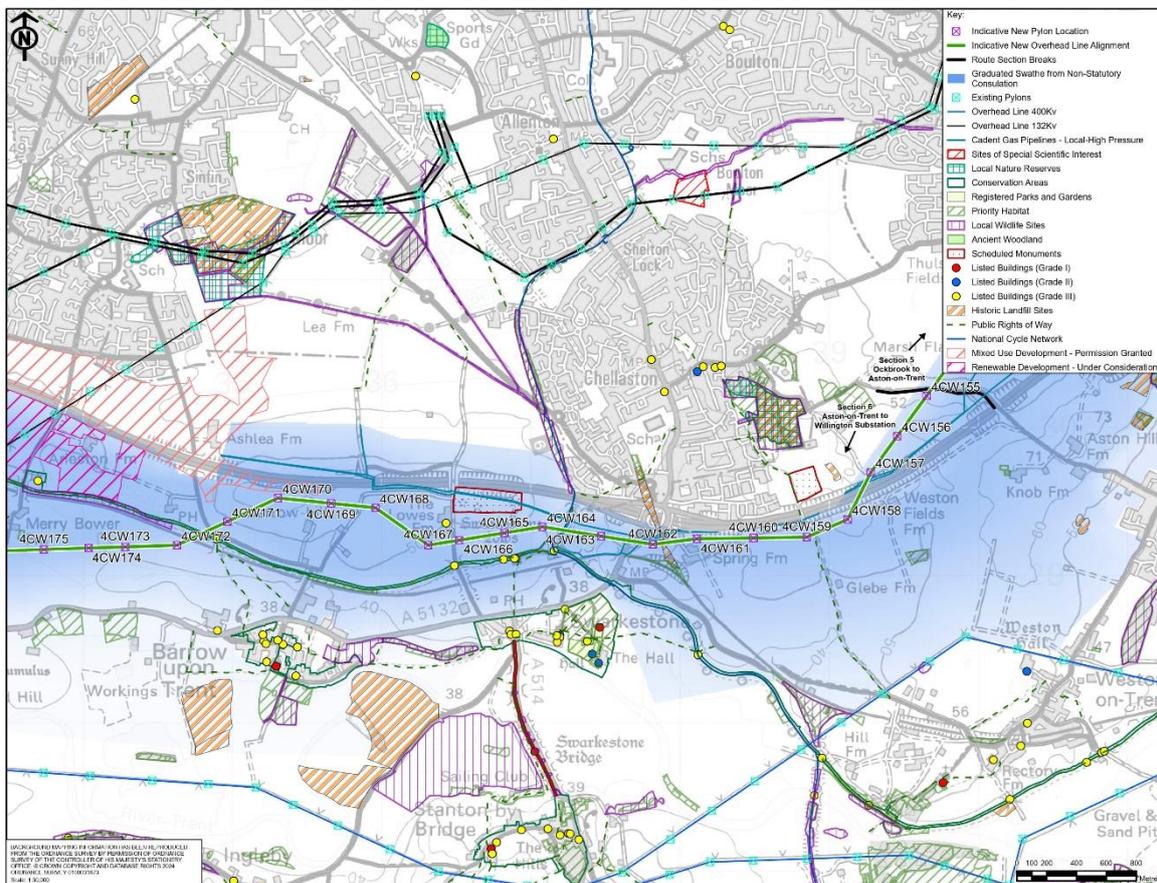
- 7.8.1 Section 6 is the final part of the route and covers the southernmost extent of the Project, extending from Aston-on-Trent to the Willington Substation. This section primarily comprises land and associated works required for the construction of the overhead line route and connection into the existing substation. The proposed alignment begins to the north west of Aston-on-Trent and follows a generally south westerly direction. After crossing the A50, the route runs parallel to the Castle Donington railway line, remaining south of the A50. It then crosses the Trent and Mersey Canal and Castle Donington Line just north west of Barrow upon Trent and continues roughly parallel to Twyford Road (A5132). Along this stretch, the alignment intersects and crosses multiple existing 132 kV overhead lines owned and operated by NGED before entering the Willington Substation from the north east. Proposed overhead line alignment between the Aston-on-Trent to Willington Substation section of the Project comprises the following permanent works:

- approximately 11 km of new overhead line between Aston-on-Trent and Willington Substation;
- undergrounding and diversion of NGED 132 kV overhead lines, where they intersect the proposed alignment:
 - 132 kV overhead line AW Route – Willington to Derby South (Double Circuit);
 - 132 kV overhead line HS Route – Willington to Derby (Double Circuit);
 - 132 kV overhead line AY Route – Willington to Derby South (Double Circuit);
 - 132 kV overhead line AR Route – Willington to Winster (Double Circuit); and
 - 132 kV overhead line DS Route – Willington to Uttoxeter (Double Circuit).
- modification of other lower voltage wood pole overhead lines on the local distribution network.

7.8.2 The preferred alignment in Section 6 continues from Aston-on-Trent, where it crosses the A50, following the northern edge of the EPC parallel to the A50 as presented at Stage 1 consultation. From there, the alignment remains between the Castle Donington railway line and the A50 before crossing the Trent and Mersey Canal. East of Barrow upon Trent, the preferred alignment is routed north of the A5132 (Twyford Road) outside the most prevalent areas of flood zone associated with the Trent Valley Floodplain. This remains consistent with the CPRSS presented at Stage 1 consultation as highlighted by the lighter shading in the graduated swathe. The CPRSS EPC also indicated optionality for approaching Willington by either continuing routing the alignment in parallel to the A50 SRN and then along the existing infrastructure corridor for the Midland Main Line, or alternatively following the north side of the A5132 via Twyford. The preferred alignment taken forward to Stage 2 consultation is now routed more centrally, primarily to reduce the extent and complexity of diversionary works to the 132 kV overhead line NGED assets. This considers feedback received during Stage 1 consultation together with further design studies. The alignment then enters Willington Substation terminating on the north side, to ensure compatibility with the substation design.

Proposed Overhead Line Alignment Between A50 and Trent and Mersey Canal

Image 7.14: Preferred alignment between A50 and Trent and Mersey Canal



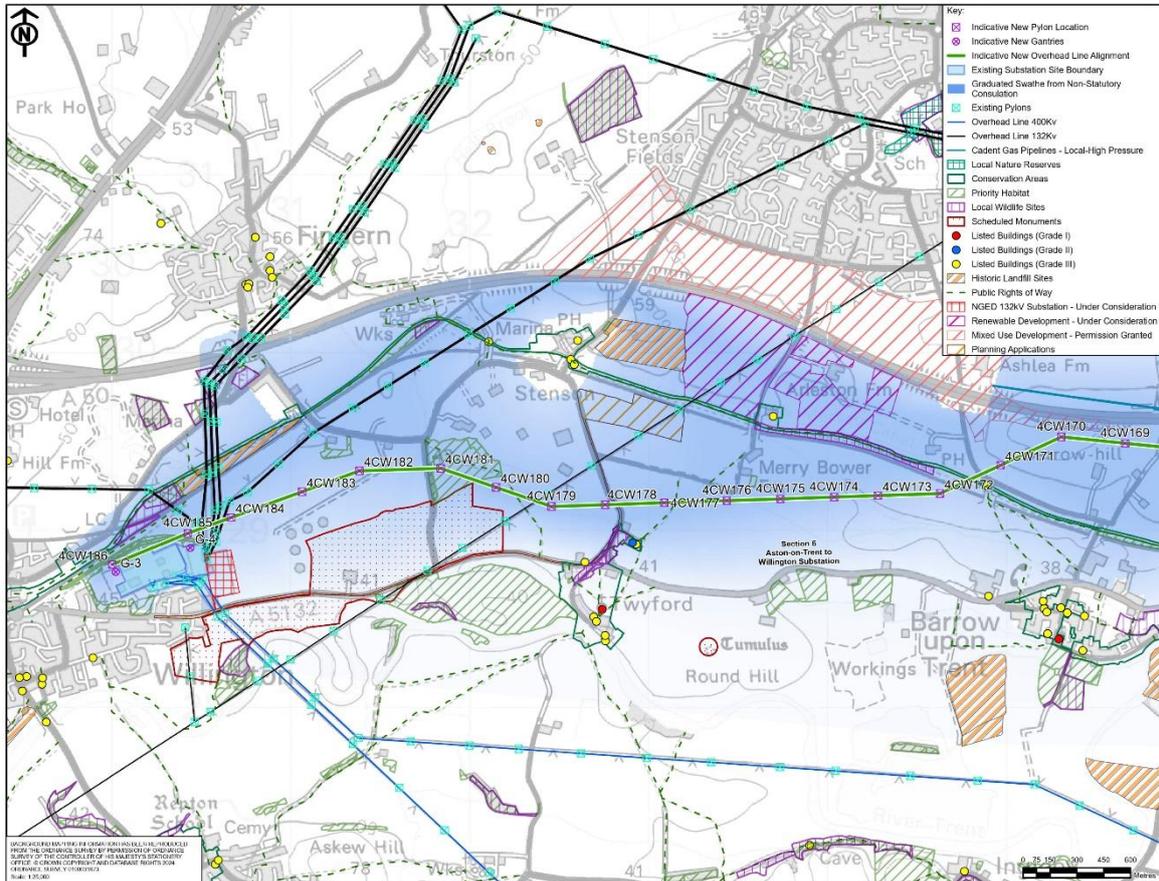
- 7.8.3 As illustrated in **Image 7.14**, the proposed alignment continues in a south western direction crossing the A50, avoiding a scheduled monument (named ‘Settlement Site’) approximately 280 m to the west adjacent to Chellaston Fields. The route then turns and runs in parallel to the A50, Castle Donington railway line and Trent and Mersey Canal, crossing the A514 to the south of A50 SRN Junction 3 and traverses westward towards Deep Dale Lane.
- 7.8.4 The area surrounding Weston-on-Trent presents a complex array of technical and environmental constraints that were carefully considered during the development of the proposed alignment. The preferred route is situated immediately south of the A50, to utilise the existing infrastructure corridor, thereby minimising impacts and maintaining constructability.
- 7.8.5 Feedback received during Stage 1 consultation queried whether the Project infrastructure could be routed east and south of both Aston-on-Trent and Weston-on-Trent. Following careful consideration and multi-disciplinary assessment, the preferred alignment described in this chapter is considered to provide the most optimal and balanced route for the Project. This routing avoids constraints associated with the following features outside of the EPC to the east of Aston-on-Trent and Weston-on-Trent:

- more extensive Flood Zones 2 and 3 areas associated with the River Trent and Derwent confluence;
- a large scheduled monument (Iron Age settlement and cursus);
- multiple recorded permitted waste sites;
- numerous water bodies and riparian habitats;
- greater interaction with the Castle Donington railway line and Trent and Mersey Canal; and
- two Extra High-Voltage overhead lines, which would require significant reconfiguration and system outages which would impose wider impacts on the NETS which is otherwise avoidable. Introduction of a third overhead line route into the same area would result in enhanced wirescape, conflicting with Holford Rule 6 (Ref 20), which seeks to reduce visual clutter from multiple parallel lines.

- 7.8.6 West of the A514, routeing of the preferred alignment is restricted by several constraints. To its north is the A50 SRN, Grade II listed Lowes Farmhouse and Swarkestone Lows Scheduled Monument which includes earthwork remains of surviving barrows and is the only surviving example in the Trent Valley. To the south, the Trent and Mersey Canal and its conservation area, the Castle Donington railway line, Swarkestone Conservation Area and a collection of other heritage assets. The preferred alignment avoids these features and offers the most optimal balance. Routeing closer to Swarkestone would be likely to increase visual and socio-economic impacts on the settlement. This would also require multiple crossings of the Trent and Mersey Canal and railway line introducing additional directional changes, taller pylon structures for clearance, as well as impacting on the status of the conservation area.
- 7.8.7 Routeing closer to the A50 corridor over a longer distance and oversailing the Swarkestone Lows Scheduled Monument was considered but would result in adverse impacts to the heritage asset from construction of the Project infrastructure.
- 7.8.8 From a design and constructability perspective, routeing south of the A50 provides a more direct path to Willington Substation with fewer directional changes, better aligning with the Holford Rules. By contrast, routeing north of the A50 would require at least two major crossings of the A50 within 1.2 km, introducing multiple additional angle pylons into the routeing as well as two large temporary scaffold structures to facilitate the stringing works over the SRN. It would also result in interaction with the Infinity Garden Village development, which has been highlighted by the local planning authority as an important strategic allocation within the emerging Local Plan.
- 7.8.9 Construction access over the A50 is not feasible; as such, routeing back and forth across the SRN would fragment access, routeing traffic through nearby settlements, and increasing community disruption.

Proposed Overhead Line Alignment Between Trent and Mersey Canal and Willington Substation

Image 7.15: Preferred alignment between Trent and Mersey Canal and Willington Substation



- 7.8.10 Upon reaching Deep Dale Lane the proposed alignment crosses both the Trent and Mersey Canal and the Castle Donington railway line north west of Barrow upon Trent and continues roughly parallel to Twyford Road (A5132), as illustrated in **Image 7.15**. Along this stretch on approach to Willington Substation, the alignment intersects and crosses multiple existing 132 kV overhead lines owned and operated by NGED.
- 7.8.11 This routing has been selected based on a range of multidisciplinary considerations, including environmental constraints, engineering feasibility, and heritage preservation, as well as compatibility with the substation site for termination of the new transmission connection.
- 7.8.12 One of the primary drivers for routing north of the A5132 away from the southern side of the EPC is to avoid the extensive areas of Flood Zones 2 and 3 to the east of Aston-on-Trent, which are associated with the River Trent and its tributaries. These flood zones present significant challenges in terms of construction, operation, and long-term maintenance of overhead infrastructure, as well as increasing risks related to water environment impacts.
- 7.8.13 In terms of constructability, the proposed alignment provides a more direct route through the Trent Valley Floodplain by following higher elevation terrain adjacent to the A50 corridor. This helps minimise construction complexity and limits interactions with flood zones to specific crossings at Cuttle Brook and Twyford/Hell's Brook.

Routing the alignment south of Stanton-by-Bridge was also considered, but similar to the reasons outlined in paragraph 7.8.5, would require crossings of the existing ZD and ZS 400 kV lines, necessitating technically complex duck-unders or temporary overhead line diversions, or even an underground cable section which would be particularly challenging in this area due to the presence of flood zones. Such solutions would carry high technical risk, and environmental and cost impact.

- 7.8.14 The proposed overhead line alignment avoids designated LWSs in this area, including Arleston Canal and Pond LWS and the Twyfords Green Complex LWS, but some vegetation clearance is likely required in the latter due to its proximity to the existing highway. However, the route interacts with areas of Coastal Floodplain and Grazing Marsh HPI with sensitive micro-siting and construction practices essential to minimise impacts to HPI and riparian and riverine habitats given the network of interweaving waterways south of the canal.
- 7.8.15 Visual and landscape impacts were also a key consideration. Routing in close proximity to the existing 400 kV overhead lines would increase the perception of wirescape, creating significant visual intrusion and landscape impacts, which conflicts with Holford Rule 6. The proposed alignment avoids such clustering by maintaining appropriate separation from the existing ZD and ZS lines. Additionally, the alignment has been designed to minimise directional changes, helping to reduce the number of angle pylons and their associated visual prominence.
- 7.8.16 At the Willington Substation, the proposed alignment offers compatibility with the current substation site, which includes termination of the new overhead line circuits on the northern side. Approaching from the east ensures a logical and efficient connection into the substation. In contrast, the alternative alignment would require a southern approach, involving greater directional changes near the substation and a less optimal layout.
- 7.8.17 Routing along the northern side of the EPC following existing infrastructure corridors over a longer distance including the A50 and the Midland Main Line railway was also considered; however, this would require more extensive diversionary works to the 132 kV overhead line, would have more significant impacts on operation of local distribution network, and increased technical complexity, resulting in greater socio-economic and cost impacts.
- 7.8.18 Routing closer to Mercia Marina and entering Willington Substation from the north would pose increased design and constructability challenges including more indirect routing with larger directional changes, multiple major crossings, pinch-points and greater interactions with several existing 132 kV overhead lines on the distribution network likely necessitating complex diversionary works. Further environmental constraints are present on the north side of the Midland Main Line railway including historic landfill, local wildlife sites and areas of local amenity. Routing closer to Findern would also likely impose more adverse landscape and visual impacts through enhanced 'wirescape' due to an increased concentration of electricity infrastructure within the area.
- 7.8.19 Preferred routing into Willington located to the south side of the railway simplifies and removes these interactions.
- 7.8.20 Finally, the proposed overhead line alignment avoids direct impacts to a scheduled monument located either side of Frizams Lane, but the construction activity is likely to be required within the scheduled monument extent for diversionary works to an existing 132 kV overhead line which already passes through it.
- 7.8.21 All together, these factors demonstrate that the proposed alignment offers the best overall balance between technical feasibility, environmental protection, operational efficiency, and national policy compliance.

8. Temporary Works and Draft Order Limits Development

8.1 Overview

- 8.1.1 This chapter describes the further considerations made by National Grid in developing the draft Order Limits associated with the proposed alignment and substation siting presented in **Chapter 6** and **Chapter 7**.
- 8.1.2 This chapter discusses the temporary works proposals, including the overall transport strategy, access strategies for construction and maintenance, temporary compounds and other temporary works requirements.
- 8.1.3 It also describes the approach to works by third parties, which may include existing overhead and underground third-party services that would need to be diverted, removed, undergrounded, or protected in order to mitigate impacts of the Project; access strategies for maintenance; and the development of environmental mitigation areas.
- 8.1.4 Finally, it will summarise how the design evolution presented in preceding chapters and the other works and land required for the Project described in this chapter (8) inform the scale and location of the outermost boundary for the Project, known as the draft Order Limits. Eventually, the final development consent order (DCO) Order Limits will define all the land required to construct, operate and maintain the Project.
- 8.1.5 The draft Order Limits and the temporary works elements described in this chapter can be viewed in the Project Consultation Plans.

8.2 Overall Transport Strategy

- 8.2.1 The Transport Strategy for the Project is informed by the requirement for the movement of materials (such as aggregates, concrete, steelwork, conductors and cables, fittings and switchgear), plant, equipment and construction personnel. It is also influenced by the nature and location of existing transport infrastructure, including roads suitable for two-way Heavy Goods Vehicle (HGV) movements and/or Abnormal Indivisible Loads (AIL), ports with appropriate water depth and offloading facilities, and available rail routes and offloading facilities. Construction programmes may modify requirements if material can be re-used between Project route sections.
- 8.2.2 Locally, deliveries and movements to locations along the overhead line route and substation sites would be by HGVs, light goods vehicles (LGVs) and private vehicles for site personnel. AILs would only be used for the transport of plant to the new Chesterfield Substation location.
- 8.2.3 Local deliveries and movements, between the strategic road network (SRN) and site access points, are the focus of the Project design and assessment, with the movement requirements and nature of the road network informing the strategy set out in the next section.

- 8.2.4 The specific siting of different elements facilitating local access has been informed by highway safety and environmental and socio-economic considerations. The avoidance of adverse transport effects forms an inherent part of the Project's design development approach.
- 8.2.5 Multi-modal considerations are relevant to the long-distance movement of material from source to the SRN and are also influenced by commercial considerations in the context of a potentially global supply chain, and to some extent by contractor preference. National Grid are investigating the potential use of material and plant import facilities at ports which could serve the region, to support the Project. Details will be presented within the DCO application.

8.3 Access Strategies for Construction

Construction Traffic Routes and Highway Improvements

- 8.3.1 The linear nature of the Project and characteristics of the road network within which it is routed present constraints to the construction of the Project. The Project is crossed by a number of roads, some of which are suitable for HGV traffic, but also by many that are not appropriate for two-way HGV movements where carriageway widths are narrow and geometry too tight, for instance. Additional constraints such as field drains, existing street furniture, height restrictions and weak bridges need to be considered. There are locations where local roads are not suitable for HGV traffic due to substandard pavement construction and/or strength.
- 8.3.2 This has led to the conclusion that the most appropriate transport solution is to identify a series of Primary Access Routes (PAR) to the SRN, connected along the Project corridor by new site access points (bellmouths) leading to off-highway haul roads. PARs are formed of one or more roads within the road network between the SRN/classified road network and the site access bellmouths. Secondary route options have also been identified in case of scenarios where primary route accessibility needs to be confirmed from the local highway authority (LHA) or other stakeholders.
- 8.3.3 Environmental and socio-economic receptors such as settlements and sensitive locations such as schools or hospitals have been avoided as far as reasonably practicable to reduce potential effects on receptors.
- 8.3.4 The shortest available routes between the SRN / classified road network and access points have been selected where practicable, balancing distance and the suitability of links to accommodate construction traffic.
- 8.3.5 To facilitate HGV access for the construction of the Project, temporary highway improvement works may be necessary at some locations such as carriageway widening or enhancing visibility.
- 8.3.6 The Project has adopted a generic worst-case scenario approach to the identification of these possible works by identifying areas where a carriageway may be used to access the Project and is less than 6 m width generally. For such routes, sections have been identified along the highway boundary which could be widened to create HGV passing places. These would be placed at regular intervals along narrower carriageways. Technical evaluation is still ongoing, and further details will be discussed and agreed with the relevant LHA so that a final design can be presented.

The Project may not require every passing place identified and following further assessment these will be refined within the draft DCO Order Limits.

- 8.3.7 Bridges with weight restrictions or height restrictions have been avoided where possible. Where existing bridges are proposed to be used within the PAR, further assessments may be required to establish if there is a need to avoid, widen or strengthen, before they are used by HGVs and AILs.

Bellmouths and Visibility Splays

- 8.3.8 The proposed new access points for the haul roads and substations require bellmouth entrances to be constructed. These will be designed in accordance with relevant highway standards.
- 8.3.9 The Project has sought to locate bellmouths as close to the proposed works as possible to seek to reduce where possible the overall distance travelled along the local road network (LRN), and amount of land taken during the construction phase. Siting has also been informed by highway safety considerations, including distance from bends and junctions, visibility splay requirements, environmental and socio-economic considerations. Where possible, proposed bellmouths would use or widen existing gates or target gaps in boundary vegetation and seek to minimise effects on other existing or proposed land-use activities.
- 8.3.10 Within the visibility splays at bellmouths, vegetation may need to be cut to a specified height and obstacles removed to provide clear line of sight to oncoming traffic, the extent of which is dependent on local conditions, the speed limit of the road and whether traffic management would be in place. The design and location of bellmouths may also require the removal and relocation of street furniture.
- 8.3.11 Where the LRN is not appropriate for the use of HGVs, crossover points (with associated bellmouths) will be provided whereby construction vehicles will use haul roads on either side of the road along the overhead line route by crossing directly over the road with priority given to road users on the LRN.
- 8.3.12 Several considerations have influenced the siting of bellmouths, including but not limited to where practicable:
- use of existing field boundary entrances;
 - use of existing watercourse crossing points;
 - topographical constraints;
 - the existing geometry of the LRN and visibility considerations;
 - limiting sharp bends in the haul road route;
 - the overhead line route;
 - existing vegetation to minimise removal or clearance;
 - proximity to adjacent receptors and existing infrastructure; and
 - specification of HGVs and other mobile plant required for construction.
- 8.3.13 Through these considerations, the siting of bellmouths has influenced the development of the overall alignment of the haul road and in turn the draft Order Limits.

- 8.3.14 Road Safety Audits (RSAs) would be carried out to inform the detailed design and subsequent technical approvals prior to installation.
- 8.3.15 The Project's proposed bellmouths may require a realignment, protection and/or diversion of existing underground services.

Construction Haul Road

- 8.3.16 Haul road routes are used for the purpose of reaching the location of Project works during the construction phase where local roads are deemed unsuitable following technical assessment as well as to reduce the volume of construction traffic required to use the existing LRN. HGVs would cross unsuitable parts of the LRN at crossover points (using suitable bellmouths) where left and right turns for HGVs are restricted to and from the haul road. LGVs and private vehicles for site personnel would use these haul road routes but would also be able to use the sections of highway unsuitable for HGVs as well as the wider road network.
- 8.3.17 The following considerations have also influenced the proposed alignment of haul roads:
- siting of bellmouths on existing roads as per the design criteria outlined in paragraph 8.3.12;
 - length of the haul roads to achieve the shortest distance where practicable to reduce impact on existing land use, earthworks extents and materials usage;
 - preference where possible for haul roads to run in parallel to the proposed overhead line alignment and limiting the number of crossings beneath, which has inherently sought to aid constructability and minimise adverse effects on areas of environmental sensitivity;
 - where practicable, avoid and terminate at major crossings such as dual carriageways, railway lines, Environment Agency (EA) Main Rivers and navigable watercourses such as canals;
 - minimise interaction with minor watercourses, brooks and drainage ditches; where crossing such features cannot be avoided, structures such as culverts or bridges would be placed perpendicular to the water flow wherever possible; and
 - avoid or minimise impact to environmentally sensitive designations and features or socio-economic receptors through bypassing using alternative access points or creating longer diversions of the haul road; examples include terminating the construction haul road either side of Alfreton golf course, avoiding the need for access works through this area, limiting impact to oversail of the overhead line only or micro-siting the haul road alignment away from blocks of ancient woodland to provide a greater buffer from construction works.

Substation Access

New Chesterfield Substation

- 8.3.18 The most appropriate route to access the new Chesterfield Substation would be via the nearest A road (A617). It is envisaged that adjustments would be required between the A road and substation location to allow construction traffic passage to the site.

- 8.3.19 AILs would be necessary at this location due to the requirement for super grid transformers. Transportation specialists are evaluating options in consultation with the relevant highway authorities. Initial studies indicate it is likely that the AIL route will join the LRN from the SRN at M1 Junction 29 and travel westbound along the A617 towards Chesterfield. At the Horns Bridge roundabout (A61 / A617), the AIL convoy will circumnavigate back onto the A617 eastbound (fifth exit), turn left onto B6425 Hassocky Lane avoiding use of the overbridge across the A617 and then route to the Chesterfield Substation via the A632 Chesterfield Road and Calow Lane up to the proposed access point for the new 400 kV substation.
- 8.3.20 Naturally pre-construction planning would fully consider highway restrictions and constraints including bridges and minor local roads, such as Bole Hill and Calow Lane in the immediate vicinity of the Chesterfield Substation site.

Existing Willington Substation

- 8.3.21 The most appropriate route to access the existing Willington Substation would be from A50 Junction 3 (Bonnie Prince Roundabout) via the nearest A road(s), A514 Swarkestone Road and A5132 Twyford Road. At this stage it is not envisaged that adjustments would be required along the LRN between the SRN and the substation site to allow construction traffic passage to the site.
- 8.3.22 The intention is to use the existing permanent access road for entry to and exit from the substation.
- 8.3.23 AILs have not been considered at this location given Project scope within the substation site is predominantly limited to termination, connection and commissioning of the new overhead line circuits.

8.4 Temporary Compounds

- 8.4.1 Early construction activities include the preparation and installation of temporary compounds required to support the construction phase of the Project at the strategic locations along the route given its transient nature.
- 8.4.2 Compounds will have a variety of uses which include but are not limited to:
- security gate house and Closed-Circuit Television;
 - plant storage and construction vehicle parking;
 - site offices, parking area and welfare facilities;
 - fencing and lighting;
 - laydown and storage areas;
 - maintenance / assembly of plant and equipment;
 - wheel wash facility;
 - collection, storage and disposal of surface water, in addition to water from within the compound including grey and foul water (where feasible and practicable, connecting to the local sewer network);
 - soil bunds;
 - waste management areas;

- utility connections including power supplies, water and telecoms (where feasible to do so, alternatively a local grid connection and/or fuelled generators will be used); and
 - fuel and lubricants storage including pollution prevention measures and spill kits.
- 8.4.3 The main compounds will be primary hubs for facilitating construction of the Project where possible and are proposed to be approximately 200 m by 250 m in size and comprise essential facilities such as welfare, office space, material laydown/storage and car parking.
- 8.4.4 Smaller scale satellite compounds are proposed to be approximately 130 m by 110 m in size and will be sited discretely to serve more localised sections of the route with suitable welfare provision, parking and areas for laydown and storage of some material and equipment.
- 8.4.5 All compounds are proposed to be serviced with power, telecommunications, clean water and foul water, either by connection to the main services or remote facilities such as generators, water tankers and septic tanks.
- 8.4.6 Siting of the compounds above has been informed by the following criteria where practicable:
- the location of particular Project elements;
 - specific construction needs that each compound is required to serve;
 - close to the proposed overhead line route alignment without being oversailed;
 - good proximity and connection to the SRN via the PARs and proposed construction access points (bellmouths), reducing travel distances for greater efficiency and minimising construction effects;
 - topography – flatter areas with minimal elevation change across the site;
 - presence of existing utilities for service connections;
 - avoidance of EA flood zones;
 - minimise adverse effects on environmental and socio-economic receptors; and
 - presence of existing vegetation for screening.

8.5 Other Temporary Works Requirements

- 8.5.1 This section continues to describe further temporary works considerations made by National Grid in developing the draft Order Limits associated with the proposed alignment and substation sitings presented in **Chapter 7**. This includes accommodating:
- pylon working areas;
 - foundation installation;
 - stringing positions;
 - protection strategies for crossings of sensitive features;
 - temporary overhead line;

- fencing;
- drainage areas;
- temporary traffic management;
- public rights of way management;
- works to third party assets;
- access for maintenance of the overhead line; and
- overhead line Limits of Deviation.

8.5.2 This section then summarises how these features inform the scale and location of the outermost boundary for the Project, known as the draft Order Limits. Eventually, the Order Limits will define all the land required to construct, operate and maintain the Project.

Pylon Working Areas

8.5.3 Pylon working areas would typically range in size from 60 m by 60 m to 80 m by 80 m. They are required for the installation of foundations, assembly and erection of the overhead line pylons and subsequent stringing works. Typically they would be stone laid on geotextile membrane, or formed of interlocking panels, depending on ground conditions and the duration and type of use. Soil stabilisation techniques could be considered subject to local conditions. Further detail on pylon working areas and construction methodology can be found in Chapter 4 Description of the Project of the Preliminary Environmental Information Report.

Foundation Installation

8.5.4 Construction of the pylon foundations requires uses of proprietary equipment such as shoring and formwork to excavate and install the footings. The specification is dictated by the eventual detailed foundation design informed by ground investigation works. Piling equipment may also be required at locations where ground conditions necessitate design and installation of piled foundations.

Stringing Positions

8.5.5 For most angle, terminal or in line tension pylons, an indicative pylon stringing position is also defined. These are broadly uniform in shape, although a bespoke design is applied for each, based on its deviation angle and any constraining features that may restrict stringing activities at that location. Stringing positions are displayed as 'bowtie' shaped zones, extending from the pylon centre point. Typically, the distance to the stringing position from the pylon centre point should be twice the pylon height (1:2 ratio).

8.5.6 However the size may vary plus / minus depending on a number of factors:

- the extent of changes in direction of the overhead line;
- the general topography of the easement;
- guidance from the cable manufacturer;
- the cable design; and
- site constraints.

8.5.7 These zones define the area in which the pulling of conductors will take place, as described in the general methodology set out below. Other than the siting of plant and equipment in these zones, no physical development, such as the construction of a hardstanding, is proposed to take place, unless defined for other reasons.

8.5.8 The general methodology adopted in relation to pylon stringing comprises the following:

- A stringing section is created between suitable tension pylons following review.
- Puller/Tensioner plant will be set up either end of the stringing section on a matted area.
- Conductor drums will be delivered to the puller tensioner sites. New conductor at one end and empty drums to recover hauling bonds (sometimes referred to as pilot ropes) at the other.
- Generally, the hauling bonds will be laid out manually or using winch tractors; however, drones and helicopters can be used to deploy hauling bonds between pylons in the stringing section.
- Hauling ropes will be deployed between all pylons and connected together to create one large hauling rope. There will be one rope per conductor required.
- Hauling ropes will pull through hauling bonds and in turn these will pull through the conductors.
- Hauling ropes will be raised to the arms on each pylon and reeved through specialist stringing blocks (running wheels). The hauling ropes will then be tensioned.
- Infrastructure and other assets at ground level will be protected using scaffolds / ground protection sheets / trestles and specialist protection systems / traffic management solutions.
- The new conductor will be deployed from the tensioner site towards the puller site.
- Once pulled out, the line teams will access the conductor and install permanent insulator arrangements and fittings.
- Pylons at either end of the pulling section may feature stay arrangements which will be removed as the stringing progresses.

8.5.9 The above process is repeated throughout all wiring sections until the entire route has been wired. Animations summarising how National Grid builds its projects are available on the Project website.

Crossing Protection Strategies

8.5.10 Temporary scaffolding with netting supported by catenary wires would be installed during construction, where required as a safety measure to protect and prevent significant disruption when crossing assets such as roads, railways, navigable watercourses, and existing distribution network overhead lines (where not already diverted or moved underground).

- 8.5.11 During conductor stringing the netting will protect against accidental dropping of conductors and any of the associated equipment in the event of malfunction. Temporary closures or suspension of some affected assets, such as roads, will likely be required during these works to install and remove the protective netting with those for crossing of major transport networks such as motorways and dual carriageways or railway lines usually conducted overnight.
- 8.5.12 In some instances, scaffold netting may not be required for crossings such as minor roads or access tracks with the sufficient protection provided by the scaffold structure itself.
- 8.5.13 Alternative methods such as catenary support systems or temporary traffic management may be used instead of scaffolding, where feasible and use of scaffolds is not technically viable due to site constraints or where their use would give rise to particularly significant effects.
- 8.5.14 Where field boundaries including hedgerows are crossed by the proposed 400 kV overhead line, trestles are typically placed either side to traverse them whilst running out the pilot wires.

Temporary Traffic Management

- 8.5.15 The use of Temporary Traffic Management on both the LRN and SRN is essential to facilitating construction of the new overhead line apparatus as well as associated temporary works. Examples include surveys, deployment of highways signage, installation of access points (bellmouths), highway improvements, vegetation clearance adjacent to highway, netting and de-netting of scaffold protection, third party service diversions where installed in carriageway, and reinstatement works.
- 8.5.16 All traffic management activities will be carried out by specialist contractors in accordance with relevant codes of practice under the New Roads and Street Works Act 1991 (Ref 37).
- 8.5.17 The type of traffic management is dependent on various factors including location, road type, the activity, phasing and extent of works, duration and timing. Provision for temporary traffic management is intended to be included within the DCO application and activities co-ordinated with the relevant highway authority.
- 8.5.18 Where road closures are required, the period of the closure would be kept to a minimum and diversions would be via the most appropriate alternative route. Access to properties would be maintained at all times. Any route diversions or closures will be discussed and agreed with the LHA.

Temporary Public Right of Way Management

- 8.5.19 Public Rights of Way (PRoWs) affected by the works would be assessed to identify whether they be diverted away from the affected area or have control measures put in place, such as gates and crossing points, to segregate PRoW users from the construction works. The safest option for both PRoW users and construction workers would be considered at each location.
- 8.5.20 Any potential temporary closures or diversions would be detailed in the DCO application. Any required temporary diversions would be clearly marked at both ends with signage explaining the diversion and the expected duration.

Fencing

- 8.5.21 Temporary fencing will be installed to encapsulate and delineate the construction swathe. The type of fencing adopted will vary depending on the site location and land usage type, for example palisade or mesh security fencing or hoarding is likely at temporary compound locations, whereas stockproof fencing is commonly used in pastoral agricultural areas for segregation of livestock away from construction activities. Post and rope would typically be used across arable land. Where feasible, unbroken natural land boundaries would be used to reduce the extent of fencing works if they are present in the immediate vicinity of the construction swathe.
- 8.5.22 Fencing can often also be used as an environmental mitigation measure such as screening receptors from view of construction works. The specific requirements will be defined in due course subject to further survey, design development works and assessments undertaken in the Environmental Statement submitted as part of the DCO application.
- 8.5.23 The new Chesterfield Substation will have a permanent security fence around its perimeter to ensure public safety and prevent unauthorised access to the operational area once commissioned.

Drainage Areas

- 8.5.24 Temporary drainage may be required to help manage and control surface water during the construction phase. These would be designed and installed in accordance with sustainable drainage system (SuDS) principles, taking account of the reduced natural drainage as a result of the impermeable temporary construction areas installed, such as bellmouths, haul roads, compounds and stone working areas. Drainage strategies are not being provided for pylon foundations and bases on the assumption the area will be less than 50 m².
- 8.5.25 There is a potential that existing field drains will be encountered throughout the draft Order Limits which may require diversion and/or reinstatement during construction of the overhead line route and associated temporary works.
- 8.5.26 The new Chesterfield Substation will require a permanent drainage installation to manage and control surface water both during construction and its subsequent operation.

8.6 Third Party Works

- 8.6.1 When undertaking design development for the Project, proposed built development (i.e. proposals for new development such as new housing, warehouses, and certain changes of land use) that has some status in the planning system at the latest Project design cut off (July 2025) has been considered both in routing of the preferred alignment and excluded from the draft Order Limits where practicable. Examples include:
- sites being identified within the local development plan (or advised to National Grid directly by local planning authorities as a site of future development);
 - being the subject of a submitted planning application; and
 - having been the subject of a request for, or received, an Environmental Impact Assessment screening or scoping opinion

- 8.6.2 Any subsequent submission of further development proposals are being monitored and will be considered following statutory (Stage 2) consultation.
- 8.6.3 Asset owners from utility providers would likely be engaged to provide service connections to temporary construction compounds as described in section 8.4.
- 8.6.4 For the removal, undergrounding and diversion of existing distribution network operator (DNO) 132 kV overhead lines and pylons, works would typically include site set up and access requirements similar to the construction of the new 400 kV overhead line, but reduced in scope due to the smaller scale of the assets.
- 8.6.5 For the removal, undergrounding and diversion of existing DNO 33 kV or 11 kV overhead lines or existing wood pole telecommunications infrastructure, this would typically be completed using a combination of civils, reinstatement and electrical / communication crews generally working on-site with support from a central depot.
- 8.6.6 Within the draft Order Limits, land is provided for third party overhead line asset mitigation/clearance.
- 8.6.7 The need for any cathodic protection to existing metallic pipelines, to reduce the risk of induced voltage from the overhead lines, will be determined at future design stages. Should this be required, the works will be coordinated with the relevant pipeline operator.
- 8.6.8 Where the overhead line route crosses highways with existing street furniture such as lighting columns it may be necessary for these to be lowered, modified or removed to ensure sufficient electrical safety clearance to prevent infringements during operation as well as facilitate installation of temporary works such as access points and netted scaffold protection.

8.7 Access Strategies for Maintenance

- 8.7.1 The National Grid overhead line would typically be subject to annual inspection from the ground by foot patrol or small van, or by air using a drone or helicopter to check for visible faults or signs of wear. Access would also be required for routine maintenance activities and vegetation management.
- 8.7.2 Access for these activities would be located along operation and maintenance access routes for each pylon location. Temporary interlocking track mat panels may be required along these routes during maintenance activities, but these inspection activities would not take place until after the Project has been commissioned.
- 8.7.3 The adopted strategy involves utilising existing access routes for maintenance where feasible and proposing new routes where necessary.

8.8 Draft Order Limits Development

Limits of Deviation

- 8.8.1 As acknowledged by the Planning Inspectorate's Advice Note Nine (Ref 38) a necessary and proportionate degree of flexibility needs to be incorporated into the design of a development so that unforeseen issues encountered after a development has been consented can be addressed. To allow for this proportionate degree of flexibility, Limits of Deviation (LoDs) have been developed for the Project components which will be specified in the DCO.

- 8.8.2 The LoDs will provide a maximum distance or measurement of variation within which every component of the Project would be located. LoDs will be applied both horizontally and vertically for the Project.
- 8.8.3 The horizontal LoD for new overhead line routes is, in general, 100 m (50 m either side of the centre line). In some exceptional circumstances, the LoD is decreased to less than 100 m to avoid a particular receptor. Where the LoD is 100 m the extent of movement of any pylon is limited by the span length and conductor swing. At a maximum span length, the conductors would require a swing distance of around 30 m, resulting in a potential lateral movement from the centreline of approximately 20 m either side, subject to topography and local conditions. There is no limit placed on the placement of a pylon along the centreline (longitudinal LoD); however, movement would be limited by the need to maintain appropriate span length between pylons. The horizontal LoD for substation sites is typically a 20 m offset around the proposed site perimeter.
- 8.8.4 The upwards vertical LoD for a typical standard lattice pylon is approximately 6 m which would allow for two extension panels (typically 3 m per extension panel but this varies between pylon types). This is to provide design flexibility to ensure that vertical clearance distances can be maintained.
- 8.8.5 There is no limit placed on the maximum depth of below ground works. Whilst a standard below ground LoD is not proposed, the Project would never go deeper than necessary for technical or environmental reasons as this would add engineering operational complexity and cost.

8.9 Land Ownership

- 8.9.1 During the development of the draft Order Limits, careful consideration is given to the design of both temporary and permanent land take, and where appropriate aligns the draft Order Limits with identified land ownership boundaries. Wherever feasible, land take for proposed works seeks to minimise disruption to landowners and avoid unnecessary division of land.

8.10 Draft Order Limits

- 8.10.1 The draft Order Limits, presented on the Consultation Plans, outline the geographical extent of land affected by a proposed development and includes land needed for the Project, such as:
- main development area, including permanent and temporary works;
 - access routes and visibility splays;
 - environmental mitigation, landscaping and some areas that are capable of delivering Biodiversity Net Gain (BNG) (subject to BNG strategy); and
 - third party mitigation.
- 8.10.2 The final Order Limits pursuant to the DCO will define the extent of land proposed to be acquired, as described in the Book of Reference, whilst also defining the geographical scope of environmental and stakeholder impacts to ensure they are considered and mitigated as appropriate.

- 8.10.3 Multiple disciplines including (but not limited to) engineering, traffic and transport, environment, planning and lands all feed into justifying the land required to construct, mitigate and maintain the Project.
- 8.10.4 From a technical perspective, and generally described in the sections above, the Project considers the following guiding parameters in the defining of the land take required for the temporary works (unless otherwise stated as permanent) (approximate figures):
- overhead line lateral LoD (50 m either side of the centre line of the overhead line, with a total of 100 m);
 - substation site LoD (20 m offset around the proposed site perimeter);
 - pylon stringing positions ('bow tie' shaped zones for the pulling of conductors; sized to be approximately 2 x the height of the pylon);
 - pylon working areas (60 m x 60 m hard standing area, increasing to up to 80 x 80 m, dependent on pylon type);
 - construction compounds (130 m x 110 m land take area for a satellite compound and 200 m x 250 m for a main compound);
 - permanent operational and maintenance access for pylons (6 m width access route);
 - construction (haul road) accesses (21 m swathe to allow for haul road construction, soil storage and drainage);
 - bellmouths and visibility splays (60 m wide junction access at the highway edge; visibility splays would be individually sized subject to road conditions); and
 - drainage design (SuDS, outfall pipes and outfall points all individually sized subject to site specifics).
- 8.10.5 Following the collation of all the proposed land take, a natural outer edge of the Project starts to become defined. This outer edge of the land take required is generally followed in defining the draft Order Limits. On some occasions, minimal buffers are applied to the parameters above (between 5 m and 20 m) to allow a small margin of additional flexibility. Additionally, on some occasions, natural rounding-off of land parcels and unviable 'slithers' of land which are enclosed by the surrounding Order Limits are also included within the draft Order Limits, from a practical standpoint.
- 8.10.6 At substation sites the draft Order Limits extend to the nearest field boundaries, beyond the typical parameters set out above. This is to include added flexibility during the construction process and allow safe working if the overhead line and substation elements are being constructed at the same time.

9. Next Steps

9.1 Introduction

- 9.1.1 The feedback from the non-statutory (Stage 1) consultation together with further technical and environmental assessments, complemented by early survey work, has led to the development of the proposed route alignment which is the subject of the statutory (Stage 2) consultation.
- 9.1.2 The refined Project design, inclusive of the proposed route alignment, proposed draft Order Limits and indicative construction areas along the route corridor, can be found in the Overall Location Plan, Route Section Plans and interactive mapping which are available at the Stage 2 consultation events or via the Project website.
- 9.1.3 Initial environmental assessments prepared for the Stage 2 consultation, based on the refined Project design, can be found in the Preliminary Environmental Information Report.

9.2 Next Steps

- 9.2.1 The Project will continue consultation with stakeholders and members of the public. National Grid is undertaking a Stage 2 consultation on its current proposals from 12:00pm 3 March 2026 to 11:59pm 28 April 2026.
- 9.2.2 All feedback submitted during the Stage 2 consultation will be reviewed and considered in further development stages of the design.
- 9.2.3 Further detailed assessments and studies will continue along the proposed route alignment, including technical and environmental assessments and ongoing survey works. The outcomes of this work, together with consideration of feedback from the Stage 2 consultation, may further inform and refine the design where practicable, including proposed locations of permanent and temporary infrastructure.
- 9.2.4 Ongoing environmental impact assessment will, therefore, continue to inform further design development and the mitigation measures required. This progress and assessment will be presented in the Environmental Statement which will form part of the development consent order (DCO) application submission.
- 9.2.5 National Grid expects to apply to the Planning Inspectorate for a DCO in 2027. Once submitted, the Planning Inspectorate will assess whether the application will be accepted within the statutory determination period of 28 days. If accepted, the pre-examination phase will commence before an examination begins in which members of the public, local authorities and others can participate (Ref 39).

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Appendix A. Local Planning Policy of Relevance to Good Design

Appendix A

Local Planning Policy of Relevance to Good Design

- A.1.1 Local planning policies relating to good design which have been adopted by local authorities that may be affected by the Project are set out in the following tables:
- **Table A1:** North East Derbyshire Local Plan (2014-2034), adopted 2021 (Ref A1);
 - **Table A2:** Bolsover District Council Local Plan, adopted in March 2020 (Ref A2);
 - **Table A3:** Amber Valley Borough Local Plan, adopted in April 2006 (Ref A3);
 - **Table A4:** Erewash Core Strategy, adopted March 2014 (Ref A4);
 - **Table A5:** City of Derby Local Plan – Core Strategy, adopted January 2017 (Ref A5);
 - **Table A6:** South Derbyshire Local Plan Part 1, adopted June 2016 (Ref A6);
 - **Table A7:** South Derbyshire Local Plan Part 2, adopted November 2017 (Ref A7); and
 - **Table A8:** Chesterfield Borough Local Plan, Adopted July 2020 (Ref A8).
- A.1.2 Additional, unadopted, policies are set out from the following local policy documents are in development and expected to be adopted within the timeframe of the Project:
- **Table A9:** Amber Valley Local Plan (2022-2040), currently at Local Plan Examination (Ref A9).
- A.1.3 No policies specifically relevant to design in this context have been identified in the following documents:
- City of Derby Local Plan Review, 2006 (Ref A10);
 - Derbyshire and Derby Minerals Local Plan (amended 2002), adopted in 2000 (Ref A11);
 - Derbyshire and Derby Waste Local Plan, adopted in 2005 (Ref A12);
 - Derbyshire and Derby Minerals Local Plan (2022-2038), currently at Local Plan Examination (Ref A13); and
 - Derbyshire and Derby draft Local Waste Plan, currently in development prior to being examined (2022-2038) (Ref A14).
- A.1.4 Relevant local policies will continue to be reviewed throughout the evolution of the Project design.
- A.1.5 For completeness, where a policy relating to good design has been identified, the entire policy text has been included, although it should be noted that some of the identified policies, or parts thereof, may not be relevant to the Project in their entirety.

Table A1: Policies from the North East Derbyshire Local Plan (2014-2034)

North East Derbyshire Local Plan (2014-2034)	
Policy Reference	Policy Text
Policy SS1: Sustainable Development	<p>In order to contribute to sustainable development in North East Derbyshire, development proposals will:</p> <ul style="list-style-type: none"> a. Meet development needs within defined settlements or other allocated areas having regard to the defined settlement hierarchy and the need to enhance their role as a focus for new services and facilities (Policy SS2 & Table 4.2); b. Promote the efficient use of land and the re-use of previously developed land (including the remediation of contaminated land) buildings and existing infrastructure in sustainable locations (Policies SS2-4, SS6 & SS10); c. Locate development where there is access to a broad range of jobs, services and facilities which are accessible by foot, cycle or public transport with reduced reliance on the private car (Policy SS2); d. Support the local economy by contributing towards business expansion and growth, attracting and supporting a skilled labour force, and improving skills and access for local people to job opportunities including targeted recruitment and training, and the use of Local Labour Agreements (Policies WC1-3); e. Reduce the need for energy in new development and ensure that it can use energy efficiently through the life time of the development (Policy SDC12); f. Promote the social and economic wellbeing of North East Derbyshire’s communities and contribute to reducing social disadvantages and inequalities (Policies LC2-4, LC9, WC1, WC3, WC5 and ID10); g. Create well designed places that are accessible, durable, adaptable and enhance local distinctiveness (Policy SDC12); h. Protect and enhance the character, quality and settings of towns and villages and heritage assets (Policies SS8, SDC1 & SDC5-9); i. Protect and/or enhance the character, quality and diversity of the District’s green infrastructure and local landscapes, the wider countryside and ecological and biodiversity assets (Policies SS2, SS11, SDC3-4, ID1 and ID7-10); l. Play a positive role in adapting to and mitigating the effects of climate change, including through the use of sustainable drainage systems, to contribute to the health and wellbeing of communities and the environment through the location, design and operation of development (Policies SDC10-11); and m. Take account of any coal-mining related land stability and / or other public safety risks, and where necessary, incorporate suitable mitigation measures to address the risk (Policies SDC14-15).

North East Derbyshire Local Plan (2014-2034)

Policy Reference	Policy Text
Policy SS9: Development in the Countryside	<ol style="list-style-type: none">1. Development proposals in countryside locations outside the Settlement Development Limits will be approved where it can be demonstrated to fall within one or more of the following categories:<ol style="list-style-type: none">a. It involves a replacement building for the same use and is not significantly larger than the building it replaces;b. It involves the re-use of buildings and accords with policy SDC1;c. It is necessary for the efficient or viable operation of agriculture, horticulture, forestry and other appropriate land based businesses, including the diversification of activities on an existing farm unit;d. It involves small scale employment uses related to local farming, forestry, recreation, or tourism;e. It involves new visitor accommodation, or extensions to existing visitor accommodation in accordance with Policies WC5 & WC6;f. It involves the change of use, re-use, limited infilling or redevelopment of vacant, derelict or previously developed land which would not have a greater impact on the character of the countryside than the existing development;g. It involves the use for a Traveller Site in accordance with Policy LC9;h. It involves the provision, expansion, or improvement of social infrastructure and accords with Policy ID4, or relates to a development which has a demonstrable community and/or social benefit; ori. It is in accordance with the policies of an adopted Neighbourhood Plan.2. In all cases, where development is considered acceptable, it will be required to respect the form, scale and character of the landscape, through careful siting, scale, design and use of materials.3. Where development falls within the Green Belt the provisions of Policy SS10: North East Derbyshire Green Belt apply.
Policy SDC2: Trees, Woodland and Hedgerows	<ol style="list-style-type: none">1. Proposals for development should provide for the protection and integration of existing trees, woodland and hedgerows for their wildlife, landscape, and/or amenity value.2. Development that would result in the unacceptable loss of, or damage to, or threaten the continued well-being of protected trees, hedgerows, orchards, veteran trees or woodland (including those not protected but considered worthy of protection), will not be permitted.3. Where trees, woodland or hedgerows will be lost to development and this is considered to be acceptable, suitable replacement planting on-site where it is practicable to do so, or off-site if not, will be required.4. New planting which uses species and varieties native to the area, of local provenance wherever possible, and that maximise the benefits to the local landscape, wildlife and air quality will be preferred.

North East Derbyshire Local Plan (2014-2034)

Policy Reference	Policy Text
Policy SDC12: High Quality Design and Place-Making	<p>All new development should be of a high quality design and make a positive contribution to the quality of the local environment. Proposals for development will only be permitted provided that they:</p> <ol style="list-style-type: none">Respond positively to local character and context to preserve and, where possible, enhance the quality and local identity of existing communities and their surroundings;Provide an integrated network of public open space and green and blue infrastructure which connects with existing green/blue infrastructure wherever possible;Create good design which is well-related to its site and surroundings in terms of its layout, form, height, massing, scale, plot size, elevational treatment, materials, streetscape, and rooflines which effectively integrate buildings into their local setting;Include boundary treatments and landscaping which are well designed and create strong physical features which provide visual and functional separation from the site's surroundings. Where appropriate, effective landscape buffers will be required which create appropriate transition between urban and rural environments;Protect the amenity of existing occupiers and create a good quality of amenity for future occupants of land or buildings including in relation to privacy, overlooking, overshadowing and/or any overbearing impacts;Create well-connected places that are easy to move around and which give priority first to pedestrian and cycle movements; and second, wherever possible, facilitate access to public transport;Provide streets and spaces within a well-considered public realm which are legible and shaped by recognisable landmark features, and which are overlooked, active, and promote inclusive access;Make efficient use of land by optimising housing densities, particularly in and around town centres and other locations where there is good access to frequent public transport services, whilst reflecting the particular characteristics of the site and its surrounding area;Maintain or enhance important existing site features of landscape, ecological, heritage or amenity value as integral elements of the design;Include measures to promote environmental sustainability, including those which address energy and water efficiency where practicable and viable to do so;Make provision for private amenity space, storage and recycling facilities, and vehicle and cycle parking;Incorporate measures to minimise opportunities for crime and anti-social behaviour; andCreate good design which can be accessed by, and is inclusive for all users.

Table A2: Policies from the Bolsover District Council Local Plan

Bolsover District Council Local Plan	
Policy Reference	Policy Text
Policy SS1: Sustainable Development	<p>In order to contribute to sustainable development in Bolsover District, development proposals should:</p> <ul style="list-style-type: none"> a) Support the local economy by providing employment opportunities suitable for local people, contributing towards business expansion and growth in key sectors, and providing for lifelong learning and skills development; b) Promote the efficient use of land and the re-use of previously developed land in sustainable locations; c) Locate development in close proximity to trip generators with the aim of reducing the need to travel by non-sustainable modes of transport; d) Reduce the need for energy in new development and ensure that it can use energy efficiently through the life time of the development, promoting high standards of low carbon and energy efficient design and renewable energy production where possible and appropriate; e) Demonstrate the sustainable use of resources and the management of waste in accordance with the waste hierarchy; f) Promote the social and economic wellbeing of Bolsover District’s communities, contribute to reducing social disadvantages and inequalities and create a positive image of the District; g) Support the hierarchy of centres and / or enhance their role as a focus for new services and facilities. Create well designed places that are accessible, durable, adaptable and enhance local distinctiveness; h) Protect and enhance the character, quality and settings of towns and villages and heritage assets through an appropriate mix of good quality, well-designed developments; i) Protect, create and / or enhance the character, quality and diversity of the District’s green infrastructure and local landscapes, the wider countryside and ecological and biodiversity assets; j) Protect and create the productive potential of the District’s best quality agricultural land and avoid sterilisation of mineral resources; k) Support the provision of essential public services and infrastructure; l) Play a positive role in adapting to and mitigating the effects of climate change to contribute to the health and wellbeing of the community and the environment, through the location, design and operation of the development and the use of sustainable drainage systems to ensure that new development is not affected by, and does not increase elsewhere, flood risk;

Bolsover District Council Local Plan

Policy Reference

Policy Text

m) Take account of any coal mining-related land stability and / or other public safety risks and, where necessary, incorporate suitable mitigation measures to address them; and

n) Protect and enhance water and air quality.

All major planning applications shall be accompanied by a Planning / Sustainability Statement which addresses all of the above points.

Policy SS9: Development in the Countryside

Development proposals in the countryside outside development envelopes will only be granted planning permission where it can be demonstrated that they fall within one or more of the following categories

a) Involve a change of use or the re-use of previously developed land, provided the proposed use is sustainable and appropriate to the location;

b) Are necessary for the efficient or viable operation of agriculture, horticulture, forestry or other appropriate land based businesses, including the diversification of activities on an existing farm unit;

c) Are small scale employment uses related to local farming, forestry, recreation or tourism;

d) Secure the retention and / or enhancement of a community facility;

e) Secure the retention and / or enhancement of a vacant or redundant building that makes a positive contribution to the character or appearance of the area and can be converted without complete or substantial reconstruction;

f) Are in accordance with a made Neighbourhood Development Plan; and

g) The building is of exceptional quality or innovative design.

In all cases, where development is considered acceptable it will be required to respect the form, scale and character of the landscape, through careful location, design and use of materials.

Policy SC2: Sustainable Design and Construction

The Council will permit proposals for new development, including extensions, where it

a) Promotes the efficient use of land and infrastructure, including developments which include a sustainable and complementary mix of uses;

b) Mitigates and adapts to the effects of climate change;

c) Supports and promotes the efficient use of energy and resources including renewable energy schemes, water management, waste minimisation and re-cycling, and water efficiency measures;

Bolsover District Council Local Plan

Policy Reference

Policy Text

- d) Minimises levels of pollution, and protects and enhances the quality of natural resources including water, air, land and biodiversity;
 - e) Has regard to flood risk, and does not put new development in areas liable to flood or existing settlements at increased risk of flooding;
 - f) Adopts sustainable drainage principles* and avoids detrimental changes to the characteristics of groundwater drainage and surface water run-off, and protects the capacity of natural surface water drainage systems and access to them for maintenance and improvement;
 - g) Makes use of locally sourced sustainable, quality materials appropriate for the development and its surroundings including recycled materials wherever feasible;
 - h) Protects and enhances the character and quality of local landscapes and the wider countryside;
 - i) Protects and enhances the distinctiveness, character, townscape and setting of settlements;
 - j) Conserves and enhances heritage assets and their setting;
 - k) Supports the provision of essential public services and infrastructure;
 - l) Has regard to the mineral assets and mineral safeguarding areas: and the waste strategies of Nottinghamshire, and Derbyshire Mineral and Waste Local Plans County Councils;
 - m) Ensures that development takes account of any coal mining related land stability and / or other public safety risks and proposes any necessary remediation or treatment measures;
 - n) Ensures that any development on brownfield sites affected by contamination is remediated;
 - o) Ensures that development does not increase Health and Safety risks either for future occupiers or nearby occupiers (for example by radon gas); and
 - p) Is not in close proximity to hazardous substances, or hazardous substance zones, unless it can be proved that there would be no risk to the potential users of the proposed development, and it would not undermine the operation and potential expansion of existing hazard sites.
- * Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable:
- 1) into the ground (infiltration);
 - 2) to a surface water body;
 - 3) to a surface water sewer, highway drain, or another drainage system;
 - 4) to a combined sewer.

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Policy SC3: High Quality Development

Development will be required to achieve a high quality of design in terms of place making, buildings and landscaping.

Proposals for development will be permitted provided that they:

- a) Create good quality, attractive, durable and connected places through well designed locally distinctive development that will integrate into its setting;
 - b) Respond positively to the context and contributes to local identity and heritage in terms of height, scale massing, density, layout and materials;
 - c) Protect important local and longer distance views of important landmarks or landscapes, such as Bolsover Castle, Creswell Crags, and Hardwick Hall and Estate;
 - d) Promote vibrant mixed use proposals that support the vitality of the communities where opportunities arise;
 - e) Provide a positive sense of place through well designed streets and spaces which are safe, attractive and appropriate to their context;
 - f) Take account of the need to reduce opportunities for crime and the fear of crime, disorder and antisocial behaviour, and promote safe living environments;
 - g) Provide streets and spaces that are shaped by buildings, clearly defined boundaries and incorporate recognisable vehicular and pedestrian routes;
 - h) Provide appropriate access for people with physical and/or mobility difficulties to both individual buildings and the wider built environment;
 - i) Address opportunities for biodiversity, conservation, and enhancement ensuring that local semi-natural features including watercourses are created or enhanced as integral parts of development;
 - j) Accord with and respond to the established character and local distinctiveness of the surrounding landscape;
 - k) Create conditions for active travel choices through provision of connected places that are easy to move around, integrated with their surroundings and which facilitate access through sustainable forms of transport including walking, cycling, and bus and rail public transport;
 - l) Promote the health, economic and social well-being, amenity and safety of the population, through both overall design; and the provision of open and public spaces;
 - m) Incorporate opportunities for sport and physical activity; and
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Policy Reference

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n) Ensure a good standard of amenity is maintained for the occupants of existing neighbouring properties as well as the future occupants of new development, including levels of privacy and light, position and avoiding overbearing relationships and the provision of adequate amenity space.

All proposals in excess of 1,000 sq metres floorspace, 1 hectare in land area or 10 dwellings, should demonstrate a design led approach which demonstrates an understanding of site context, constraints and opportunities, and use of this information to develop conceptual ideas and design responses.

All proposals in excess of 10,000 sq metres floorspace, or 100 dwellings, or 3 hectares in land area should make provision for new works of public art which enhance the local sense of place, and are designed and established, with the engagement and support of the local community.

Policy SC10: Trees, Woodland and Hedgerows

Trees, woodlands and hedgerows are important visual and ecological assets. In order to help retain local distinctiveness, trees, woodland and hedgerows will be protected from damage and retained, unless it can be demonstrated that removal is necessary and appropriate mitigation can be achieved. Potential long-term conflict between retained trees, hedgerows, and buildings should be designed out at the planning stage.

Development should contribute to the protection, enhancement, and where possible expansion of woodlands, trees and hedgerows in the area. The loss of woodland, healthy trees and hedgerows with visual, historic or wildlife importance will be resisted. In particular ancient woodland and aged (or ancient) and veteran trees are irreplaceable habitats and will be protected from development that would have an adverse impact on them.

Development proposals should:

- a) Incorporate important woodlands, trees and hedgerows into the overall design and landscape scheme wherever possible;
- b) Prevent damage to root systems and ensure a satisfactory spatial relationship between trees and hedgerows and new development, taking account of expected future growth;
- c) Where possible incorporate retained trees and hedgerows within public open space rather than just private space to safeguard their long-term management;
- d) Ensure robust protection measures before, during, and after the development process and appropriate management and protection thereafter;
- e) Take opportunities for new planting consistent with landscape, wildlife and historic interests; and
- f) Be designed so as to avoid any future conflict between trees and development.

Table A3: Policies from the Amber Valley Borough Local Plan

Amber Valley Borough Local Plan	
Policy Reference	Policy Text
Policy LS1: Sustainable Development	<p>Proposals for development should be located taking account of the following sustainability criteria by:</p> <ul style="list-style-type: none"> a) being well-related to existing patterns of development; b) re-using previously developed land and buildings in preference to greenfield sites, except where circumstances such as location or accessibility preclude their use; c) protecting and enhancing the quality of the built and natural environment; d) minimising the need to travel between home, work and other activities and providing opportunities for journeys other than by car; e) ensuring the capacity of existing infrastructure to absorb further development; and f) managing waste generated from the construction and occupation of, and operations resulting from new development (all applicants for major new developments will be required to supply full information regarding the waste production implications of the proposals).
Policy LS3: Design	<p>The Borough Council will require development proposals to reflect the principles of good design, by:</p> <ul style="list-style-type: none"> a) conserving or enhancing the quality and local distinctiveness of the natural and built environment; b) respecting the character of the locality in terms of the scale and nature of development, its layout, density, height, massing, architectural style, materials and landscaping; and c) taking account of the relationship between the development proposals and neighbouring buildings, and the spaces between and around those buildings.
Policy ER11 Quality and Design Of Business And Industrial Development	<p>In considering proposals for business and industrial development, the Borough Council will require that the proposals:</p> <ul style="list-style-type: none"> a) are compatible with their surroundings; b) have regard to distinctive landscape features and nature conservation interests; c) provide supplementary landscaping, particularly where the development is visually prominent or situated on the established urban fringe; d) provide satisfactory vehicular access to the road network;

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Policy Reference	Policy Text
	<p>e) provide utility infrastructure as appropriate;</p> <p>f) provide parking and servicing to the appropriate standards;</p> <p>g) provide necessary improvements to the road network to accommodate traffic generated by the development; and</p> <p>h) promote access to the rail network where practicable.</p>

Table A4: Policies from the Erewash Core Strategy

Erewash Core Strategy

Policy Reference	Policy Text
Policy A: Presumption in Favour of Sustainable Development	<p>1. When considering development proposals the Council will take a positive approach that reflects the presumption in favour of sustainable development contained in the National Planning Policy Framework. It will always work proactively with applicants jointly to find solutions which mean that proposals can be approved wherever possible, and to secure development that improves the economic, social and environmental conditions in the area.</p> <p>2. Planning applications that accord with the policies in the Development Plan (and, where relevant, with policies in neighbourhood plans) will be approved without delay, unless material considerations indicate otherwise.</p> <p>3. Where there are no policies relevant to the application or relevant policies are out of date at the time of making the decision then the Council will grant permission unless material considerations indicate otherwise – taking into account whether:</p> <ul style="list-style-type: none"> • Any adverse impacts of granting permission would significantly and demonstrably outweigh the benefits, when assessed against the policies in the National Planning Policy Framework taken as a whole; or • Specific policies in that Framework indicate that development should be restricted.
Policy 1: Climate Change Sustainable Design and Adaptation	<p>1. All development proposals will be expected to mitigate and adapt to climate change, and to comply with national targets on reducing carbon emissions and energy use.</p>

Erewash Core Strategy

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Policy Text

2. Relevant development, including refurbishment where it requires planning permission, will be expected to take account of the following:

- a) how it makes effective use of sustainably sourced resources and materials, minimises waste, and water use. For residential development, planned water use should be no more than 105 litres per person per day;
- b) how it is located, laid out, sited and designed to withstand the long- and short-term impacts of climate change, particularly the effect of rising temperatures, sustained periods of high temperatures and periods of intense rain and storms;
- c) that the building form and its construction allows for adaptation to future changes in climate; and
- d) that the building form and its construction permits further reduction in the building's carbon footprint, where feasible and viable.

Reducing Carbon Dioxide Emissions

3. Relevant development should demonstrate how carbon dioxide emissions have been minimised in accordance with the following energy hierarchy:

- a) using less energy through energy efficient building design and construction, including thermal insulation, passive ventilation and cooling;
- b) utilising energy efficient supplies – including connecting to available heat and power networks; and
- c) maximising use of renewable and low carbon energy generation systems.

Decentralised Energy Generation

4. The extension of existing or development of new decentralised renewable and low-carbon energy schemes appropriate for the plan area will be promoted and encouraged, including biomass power generation, combined heat and power, and micro generation systems. In line with the energy hierarchy, adjacent new developments will be expected to utilise such energy wherever it is feasible and viable to do so.

Flood Risk and Sustainable Drainage

5. Development proposals that avoid areas of current and future flood risk and which do not increase the risk of flooding elsewhere and where possible reduce flood risk, adopting the precautionary principle, will be supported.

6. Where no reasonable site within Flood Zone 1 is available, allocations in Flood Zone 2 and Flood Zone 3 will be considered on a sequential basis.

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7. Where it is necessary to apply the Exception Test within the urban areas, it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk.
8. Where appropriate, further guidance on the application of the sequential and exception test will be set out in Local Development Documents.
9. All new development should incorporate measures to reduce surface water run-off, and the implementation of Sustainable Urban Drainage Systems into all new development will be sought unless it can be demonstrated that such measures are not viable or technically feasible.

Policy 10: Design and Enhancing Local Identity

1. All new development should be designed to:
- a) make a positive contribution to the public realm and sense of place;
 - b) create an attractive, safe, inclusive and healthy environment;
 - c) have regard to the local context and reinforce valued local characteristics; and
 - d) reflect the need to reduce the dominance of motor vehicles.
2. Development will be assessed in terms of its treatment of the following elements:
- a) structure, texture and grain, including street patterns, plot sizes, orientation and positioning of buildings and the layout of spaces;
 - b) permeability and legibility to provide for clear and easy movement through and within new development areas;
 - c) density and mix;
 - d) massing, scale and proportion;
 - e) materials;
 - f) impact on the amenity of nearby residents or occupiers;
 - g) incorporation of features to reduce opportunities for crime and the fear of crime, disorder and anti-social behaviour, and promotion of safer living environments; and
 - h) the potential impact on important views and vistas, including of townscape, landscape, and other individual landmarks, and the potential to create new views.
3. Outside of settlements, new development should protect, conserve or where appropriate, enhance landscape character. Proposals will be assessed with reference to the Derbyshire Landscape Character Assessment.
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Table A5: Policies from the City of Derby Local Plan – Core Strategy

City of Derby Local Plan – Core Strategy	
Policy Reference	Policy Text
CP1(a) - Presumption in Favour of Sustainable Development:	<p>When considering development proposals the Council will take a positive approach that reflects the presumption in favour of sustainable development contained in the National Planning Policy Framework (NPPF).</p> <p>The Council will:</p> <ul style="list-style-type: none"> (a) always work proactively with applicants, adjoining authorities, statutory partners and service providers, land owners and communities to find solutions which mean that proposals can be approved wherever possible, and to secure development that improves the economic, social and environmental conditions in the area; and (b) approve planning applications that accord with the policies in this Local Plan (and, where relevant, with policies in neighbourhood plans) without delay, unless material considerations indicate otherwise. <p>Where there are no policies relevant to the application or relevant policies are out of date at the time of making the decision, then the Council will grant permission unless material considerations indicate otherwise – taking into account whether:</p> <ul style="list-style-type: none"> 1. any adverse impacts of granting permission would significantly and demonstrably outweigh the benefits, when assessed against the policies in the National Planning Policy Framework taken as a whole; or 2. specific policies in that Framework indicate that development should be restricted.
CP2 - Responding to Climate Change:	<p>The Council is committed to tackling the causes and effects of climate change, ensuring that all development takes account of opportunities to reduce greenhouse gas emissions and minimise the impacts caused as a result of a changing climate.</p> <p>The Council will:</p> <ul style="list-style-type: none"> (a) ensure that development is located in the most sustainable locations where it is well related to complementary uses and has access to a range of travel choices, including public transport; (b) reduce reliance on travel by private car and encourage and enable the use of forms of transport other than the private car. Where people choose to travel by car, encourage car sharing; (c) seek to improve the resilience of the transport network to the effects of climate change; (d) encourage an approach to the production and use of energy which is consistent with the Energy Hierarchy and seeks to tackle fuel poverty;

City of Derby Local Plan – Core Strategy

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(e) encourage the use of renewable and decentralised forms of energy provided that the public benefits of implementing the renewable energy outweigh any adverse impacts on the natural, built or historic environment and do not inhibit the ability of other strategic objectives of the Plan from being realised. Micro-generation and community led renewable energy and heat generation schemes will be welcomed;

(f) encourage and where possible ensure the efficient management and use of water, protect water resources and have regard to the water hierarchy;

(g) have regard to the important role which green and blue infrastructure plays in the mitigation of greenhouse gases and adapting to the effects of climate change including carbon sinks, air quality, cooling, biodiversity and flood prevention;

Sustainable Design and Construction:

(h) ensure that the design and layout of development takes account of opportunities to mitigate greenhouse gas emissions and to adapt to the effects of a changing climate. The Council will have regard to best practice and guidance in considering sustainable design and construction. Developers will be required to deliver the most sustainable form of development achievable in terms of building and site design and layout. They should demonstrate how they are planning to achieve this using the most appropriate sustainability assessment tools for the proposal. Further guidance on these sustainable design matters will be set out in a separate design guidance document;

(i) support and encourage developers to maximise carbon reduction on-site;

(j) require developers to deliver appropriate forms of carbon reduction including renewable and decentralised energy within their development;

Flood Risk and Water Management:

(k) ensure that development takes account of the need to provide access to watercourses;

(l) apply the sequential test when considering proposals for development in areas at risk of flooding. Where a development is proposed in an area at risk, it should be demonstrated why the use cannot be located in an area at a lower risk of flooding. When considering compliance with the sequential test, the Council will take account of the availability and suitability of alternative sites and where appropriate, apply the exception test in line with national policy;

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(m) ensure that development is flood resilient and resistant, that unacceptable harm would not be caused to people or property through flooding and that development will not lead to an increased risk of flooding elsewhere;

(n) ensure that where appropriate, development meets the objectives of the Water Framework Directive;

(o) implement the ‘Our City Our River’ programme to reduce flood risk through the development of appropriate sites along the River Derwent corridor; and

(p) encourage the use of Sustainable Drainage Systems (SuDS) in all new developments and require developments of 10 dwellings or more and major commercial development to be designed and laid out to incorporate SuDS, unless it is demonstrated to be inappropriate to do so. The Council will seek to ensure that water run-off is directed to areas where it does not cause harm to people or property. All new developments in areas at risk of flooding should give priority to the use of Sustainable Drainage Systems.

CP3 – Placemaking Principles:

High quality design should promote Derby as an evolving modern city and contribute to improving the life of the City’s residents. It should enhance the experience of the place for visitors, workers and inward investors and help create a vibrant city that all residents are proud of.

The Council will expect high quality, well designed developments that will help raise the overall design standard of the city, particularly in the City Centre and other areas of significant change. In order to achieve this aim, applicants should work collaboratively with the Council and should follow a logical design process.

Proposals of all scales should embrace the principles of sustainable development and take account of current best practice guidance.

More specifically proposals will be required to:

- (a) make efficient use of land by optimising development densities;
- (b) incorporate high quality architecture which is well integrated into its setting and exhibits locally inspired or distinctive character;
- (c) provide good standards of privacy, safety and security to create a pleasant, safe and secure environment;
- (d) maximise opportunities for low-carbon, decentralised energy and resource efficiency and incorporate flexibility and adaptability to provide resilience to environmental, economic and social change;
- (e) contribute to the creation of vibrant and mixed communities;

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(f) exhibit a variety of well designed streets and spaces that are shaped by buildings, are well connected, easy to navigate, encourage non-vehicular activity and function as social spaces;

(g) respond positively to existing topography, landscape features, wildlife habitats, heritage assets, existing buildings, site orientation and contribute to the urban rural interface;

(h) provide well-integrated vehicle and cycle parking and adequate external storage space that does not dominate the street scene; and

(i) make provision for the appropriate maintenance and management of infrastructure related to the development. All proposals will be assessed in terms of their response to these placemaking principles, taking account of context and function. Proposals that do not appropriately respond will be resisted, unless acceptable reasons for them doing so are provided.

The Council will:

(j) encourage the incorporation of public art as part of an overall approach to the delivery of high quality streets and spaces. The Council will particularly encourage developments in prominent, highly visible locations to incorporate public art where it will contribute to the quality and appearance of new developments or to the general townscape.

Where appropriate, the Council will seek to enter into a legal agreement to secure the provision of public art from developers of ‘major’ development proposals, either through on-site provision and / or financial contributions

(k) encourage developers to refer major development proposals to an independent panel such as the Architecture Centre in the East Midlands (or equivalent) for critical review, helping to further improve design quality in the city; and

(l) encourage developers of residential proposals to install sprinkler systems where feasible and viable to do so in order to ensure that properties provide adequate safety throughout the occupiers’ life.

Further guidance on urban design in Derby and the practical implementation of the placemaking principles will be set out in a design guidance document to be produced by the Council.

Table A6: Policies from the South Derbyshire Local Plan Part 1

South Derbyshire Local Plan Part 1	
Policy Reference	Policy Text
Policy S2 Presumption in Favour of Sustainable Development	<p>When considering development proposals the Council will take a positive approach that reflects the presumption in favour of sustainable development contained in the National Planning Policy Framework. It will work proactively with applicants to seek solutions, which mean that proposals secure development that improves the economic, social and environmental conditions in the area.</p> <p>Planning applications received by the Council that accord with the policies in the Local Plan Part 1 & 2 (and where relevant, with policies in neighbourhood plans) will be dealt with positively and without delay, unless material considerations indicate otherwise.</p> <p>Where there are no policies relevant to the application or relevant policies are out of date at the time of making the decision, then the Council will grant permission unless material considerations indicate otherwise - taking into account whether:</p> <ul style="list-style-type: none"> i) any adverse impacts of granting permission would significantly and demonstrably outweigh the benefits, when assessed against the policies in the national planning policy framework taken as a whole; or ii) specific policies in that framework indicate that development should be restricted.
Policy BNE1 Design Excellence	<p>A All new development will be expected to be well designed, embrace the principles of sustainable development, encourage healthy lifestyles and enhance people’s quality of life by adhering to the Design Principles below.</p> <p>i) Design Principles:</p> <ul style="list-style-type: none"> a) Community safety: New development should be designed to ensure that people feel comfortable and safe by minimising opportunities for crime and anti-social behaviour, providing good natural surveillance and appropriate demarcations between public and private areas; b) Street design, movement and legibility: Streets should be designed to relate to their context, with a balance being struck between place-making needs and vehicle movement needs. Streets should be attractive, pedestrian and cycle friendly and meet the needs of all users. New development should be easy to find your way around, have a clear hierarchy of streets and take advantage of available opportunities for connections to local services, including public transport; c) Diversity and community cohesion: New development should be designed to be diverse, vibrant, possess a sense of place and encourage social interaction;

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- d) Ease of use: New development should be accessible to all user groups, well managed and should be able to adapt to changing social, environmental, technological and economic conditions, including the needs of an ageing society;
 - e) Local character and pride: New development should create places with a locally inspired character that respond to their context and have regard to valued landscape, townscape and heritage characteristics;
 - f) National Forest: Within the National Forest, new development should be encouraged to follow National Forest Design Charter¹ and Guide for Developers & Planners 2 and fully reflect the forest context;
 - g) Visual attractiveness: New development should be visually attractive, appropriate, respect important landscape, townscape and historic views and vistas, contribute to achieving continuity and enclosure within the street scene and possess a high standard of architectural and landscaping quality;
 - h) Neighbouring uses and amenity: New development should not have an undue adverse effect on the privacy and amenity of existing nearby occupiers. Similarly, the occupiers of new development should not be unduly affected by neighbouring land uses;
 - i) Cross boundary collaboration: New areas of growth that span administrative, land ownership, developer parcel or phase boundaries should be considered and designed as a whole through a collaborative working approach;
 - j) Healthy Lifestyles: New development should address social sustainability issues, by supporting healthy lifestyles, including through the promotion of active travel, the provision of public open space, sports and other leisure facilities;
 - k) Resource Use: New development should be designed to facilitate the efficient use of resources and support the reuse and recycling of waste throughout the lifecycle of all developments from design, construction, use and after use. New development should provide adequate space for the storage of waste and where appropriate the treatment or collection of waste;
 - ii) All proposals for new development will be assessed against the Council's Design SPD; and
 - iii) The council will decide which development proposals should be taken to a formal panel for design review.
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Table A7: Policies from the South Derbyshire Local Plan Part 2

South Derbyshire Local Plan Part 2	
Policy Reference	Policy Text
Policy BNE7 Trees, Woodland and Hedgerows	<p>A Where development is proposed that could affect trees, woodland and/or hedgerows which are important in terms of their amenity, ecological, landscape or historic value, developers will be expected to demonstrate that:</p> <ul style="list-style-type: none"> i) the layout and form of development have been informed by an appropriate arboricultural and/or hedgerow surveys; ii) development would not suffer from undue shading either now or in the future; and iii) appropriate measures are secured to ensure adequate root protection and buffers around trees, woodland and hedgerows. <p>B The felling of protected trees, groups of trees or woodland and/or removal of important hedgerows, will be considered in accordance with the relevant national guidance and regulations, taking account in particular of their amenity, ecological, landscape and historic value. Where protected trees and/or hedgerows are subject to felling or removal, a replacement of an appropriate number, species, size and in an appropriate location will normally be required.</p> <p>C Development proposals which will have a detrimental effect on important trees, woodland or hedgerows must satisfactorily demonstrate how the impact on biodiversity has been minimised and, wherever possible, a net biodiversity gain delivered through appropriate mitigation, compensation or offsetting, including through new planting or improved management of retained trees and hedgerows. New planting will be expected to be adequately managed to reach full maturity.</p> <p>D Where new planting is proposed on development sites, principal consideration should be given to planting tree species which are in keeping with the urban or rural character of the area. However, where appropriate, wider environmental or amenity benefits including improvements to local air quality, erosion control, land drainage or shading should be considered.</p>

Table A8: Policies from the Chesterfield Borough Local Plan

Policy CLP20: Design	
Policy Reference	Policy Text
Policy CLP20: Design	<p>All development should identify and respond positively to the character of the site and surroundings and respect the local distinctiveness of its context. The Council will support outstanding or innovative designs which promote high levels of sustainability, or help raise the standard of design more generally in an area, provided that they complement the character and appearance of their surroundings.</p> <p>All development will be expected to:</p> <ul style="list-style-type: none">a) promote good design that positively contributes to the distinctive character of the borough, enriches the quality of existing places and enhances the quality of new places;b) respect the character, form and setting of the site and surrounding area by virtue of its function, appearance and architectural style, landscaping, scale, massing, detailing, height and materials;c) be at a density appropriate to the character of the area whilst not excluding higher densities in and close to designated local, district and town centres;d) contribute to the vitality of its setting through the arrangement of active frontages, accesses, and functions, including servicing;e) ensure that the interface between building plots and streets and also the boundaries of development sites and their surroundings are attractive and take account of the relationship between public and private spaces;f) provide appropriate connections both on- and off-site, including footpath and cycle links to adjoining areas to integrate the development with its surroundings;g) provide adequate and safe vehicle access and parking;h) provide safe, convenient and attractive environment for pedestrians and cyclists;i) preserve or enhance the landscape character and biodiversity assets of the borough;j) be designed to be adaptable and accessible for all;k) have an acceptable impact on the amenity of users and neighbours;l) be designed to be safe and secure and to create environments which reduce the potential for crime;m) minimise the impact of light pollution; andn) be able to withstand any long-term impacts of climate change.

Policy CLP20: Design

Policy Reference

Policy Text

Reducing Emissions

Major development should, as far as is feasible and financially viable minimise CO2 emissions during construction and occupation, and also maximise both the use of and the generation of renewable energy.

Planning applications for major new development should be accompanied by a statement (as part of or in addition to a design and access statement) which sets out how the development would do this in terms of:

- i. following the steps in the energy hierarchy by seeking to use less energy, source energy efficiently, and make use of renewable energy before efficiently using fossil fuels from clean technologies;
- ii. optimising the efficient use of natural resources; and
- iii. reducing emissions through orientation and design.

When considering the feasibility and viability of reducing emissions and also use of renewable energy in any major development, the council will take into account matters such as the development's scale and nature, its operational requirements, any site-specific constraints and also the need to meet other planning policy requirements.

Percent for Art

On major developments, the council will encourage developers to incorporate public art on-site into structures and public spaces where reasonable.

Table A9: Policies from the Amber Valley Local Plan (2022-2040)

Amber Valley Local Plan (2022-2040)

Policy Reference

Policy Text

Policy SS1 Presumption in favour of Sustainable Development

When considering development proposals the Borough Council will take a positive approach that reflects the presumption in favour of sustainable development contained within the National Planning Policy Framework, provided the application is in accordance with the policies of this Local Plan. It will work proactively with applicants to find solutions, so that proposals can be approved wherever possible, and to secure development that improves the economic, social, cultural and environmental conditions in the Borough. Planning applications that accord with

Amber Valley Local Plan (2022-2040)

Policy Reference

Policy Text

the policies in this Local Plan (and with policies in adopted neighbourhood plans) will be approved without delay unless material considerations indicate otherwise.

Where there are no policies relevant to the application, or relevant policies are out-of-date at the time of making the decision, the Borough Council will grant permission unless material considerations indicate otherwise, taking into account whether any adverse impacts of granting permission would significantly and demonstrably outweigh the benefits, when assessed against the policies in the National Planning Policy Framework taken as a whole or specific policies in that Framework indicate that development should be restricted.

Policy EN1 Climate Change

1. All development proposals will be required to maximise opportunities to reduce emissions and meet the Government's net zero target by:

- a) reducing embodied carbon through the reuse of the existing buildings and materials on the site, where possible;
- b) demonstrating the use of sustainably sourced materials in construction;
- c) using design and location to minimise travel distances and incorporate opportunities for sustainable modes of travel, such as walking and cycling;
- d) reducing energy consumption through construction by having regard to landform, layout, building orientation, massing, landscaping and by following the Energy Hierarchy;
- e) generating and using energy from renewable or decentralised energy sources - where this is not practical at the time of construction, proposals must demonstrate that the buildings are 'net zero ready' and able to incorporate renewable energy solutions in the future;
- f) retaining existing trees and hedges wherever possible; and
- g) protecting and where possible enhancing land that acts as a carbon sink, such as woodland.

2. All development proposals will be required to incorporate measures to help to mitigate and adapt to the impacts of climate change and to take the opportunity to provide gains for nature, and the health and wellbeing of residents. The following will be sought where appropriate:

- a) the provision of multi-functional green infrastructure, with climate change mitigations such as street trees and hedges for shading and rain gardens for surface water drainage;

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- b) water management solutions such as including natural flood management, green roofs and grey water recycling, and adherence to the Drainage Hierarchy, and to ensure the use of Sustainable Urban Drainage Systems (SuDS) wherever practical;
 - c) measures to reduce surface and other types of flood risk to the site and beyond and taking the opportunities to improve water quality wherever practical; and
 - d) measures to avoid overheating including through orientation and design.
3. All development proposals will need to demonstrate how climate change issues have been considered through the submission of a climate change assessment in conjunction with a planning application.
4. All proposals for new dwellings will also need to:
- a) meet the water efficiency standards of 110 litres/person/day as set out in Requirement G2, Part G of Schedule 1 and regulation 36 to the Building Regulations 2010, as amended.
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EN15 Quality and Design of Development

- All development proposals should:
- a) create high quality, sustainable and connected places that reflect the local character in terms of height, scale and massing, density, layout and use natural and high quality materials;
 - b) contribute to the local and distinctive sense of place, which varies across the Borough; this shall be supported by an understanding of context through site analysis and demonstrating how this has informed good urban design principles which recognise sense of place and consider safety, residential amenity and sustainability;
 - c) to be located in accessible locations which maximise or improve the opportunities for active travel through the provision of direct, safe and attractive pedestrian and cycling routes and the use of public transport to enable car-based travel to be reduced;
 - d) create inclusive places for all demographics of people; through considered use of materials to accommodate a range of mobility; sufficient widths of pedestrian and cycle routes; places to rest; lighting for safety; and places which are easy to navigate (with orientation points);
 - e) make the most effective use of land, maximising the use of previously developed land where appropriate ensuring that densities are optimised; safeguarding natural resources, including high quality agricultural land, geology, minerals, air, soil and water, through initiatives such as the use of water butts, grey water recycling and anaerobic digesters;
-

Amber Valley Local Plan (2022-2040)

Policy Reference

Policy Text

f) contribute to mitigation of and be adaptable to the effects of climate change, including through the use of modern methods of construction and maximising the use of materials with low embodied energy

g) be maintainable, durable and adaptable;

h) not unduly affect the amenities of privacy of adjoining or adjacent properties, including through loss of light, external lighting, overshadowing, overlooking, or by residential tandem development immediately behind existing properties sharing the same access;

i) provide satisfactory access to the transport network and provide necessary improvements to the network to accommodate traffic generated by the development;

j) promote health, well-being, social and civic inclusion through the overall design of development and by enhancing existing and/or providing public open space, sports and recreational facilities where appropriate;

k) give due consideration to active design principles such as those developed by Public Health England to create the right conditions for individuals to be able to lead active and healthy lifestyles;

l) avoid the development of existing open land that has amenity value, where this contributes to the visual character of the surrounding urban area and where built development would be visually inappropriate;

m) provide high quality public realm and recognise the importance of space between and around buildings, taking opportunities to making improvements to biodiversity where possible;

n) provide sufficient outdoor space for residential development;

o) in respect of residential development, provide adequate space for the storage of recycling (including community recycling schemes where appropriate) and access for refuse collection vehicles;

p) in respect of commercial development, provide adequate space and access for service vehicles, which is proportionate to the use of the buildings and is not detrimental to the public realm;

q) recognise the importance of conserving the heritage assets and their setting and be designed to respect their significance and local context; and

r) retain existing trees and hedgerows and incorporate new trees and hedgerows where possible, including new streets.

The Borough Council will require all new housing development to be at a density that respects the character and appearance of the locality and makes the most effective use of land, unless it can be demonstrated that there are significant constraints to development, or where the circumstances provide the opportunity to improve the character of the area through development that it is a density that differs from existing development.

Appendix References

- Ref A1 North East Derbyshire District Council (2021). Adopted North East Derbyshire Local Plan (2014-2034). Available at: <https://www.ne-derbyshire.gov.uk/planning-and-local-plan/planning-policy-and-local-plan/development-plan#ANE> [Accessed: 08/2025].
- Ref A2 Bolsover District Council (2020). Local Plan for Bolsover District. Available at: <https://www.bolsover.gov.uk/services/p/planning-policy/planning-policy-documents/development-plan> [Accessed: 08/2025].
- Ref A3 Amber Valley Borough Council (2006). Amber Valley Borough Local Plan. Available at: https://www.cartogold.co.uk/AmberValley/text/00_cont.htm [Accessed: 08/2025].
- Ref A4 Erewash Borough Council (2014). Erewash Core Strategy. Available at: <https://www.erewash.gov.uk/planning/planning-information/erewash-core-strategy-review/erewash-core-strategy> [Accessed: 08/2025].
- Ref A5 Derby City Council (2017). Derby City Local Plan – Part 1 Core Strategy. Available at: https://www.derby.gov.uk/media/derbycitycouncil/contentassets/documents/environmentandplanning/planning/localplan/evidencebase/Core-Strategy_ADOPTED_DEC-2016_V3_WEB.pdf [Accessed: 08/2025].
- Ref A6 South Derbyshire District Council (2016). South Derbyshire Local Plan Part 1. Available at: <https://www.southderbyshire.gov.uk/our-services/planning-and-building-control/planning/planning-policy/local-plan/adopted-local-plan> [Accessed: 08/2025].
- Ref A7 South Derbyshire District Council (2017). South Derbyshire Local Plan Part 2. Available at: <https://www.southderbyshire.gov.uk/our-services/planning-and-building-control/planning/planning-policy/local-plan/adopted-local-plan> [Accessed: 08/2025].
- Ref A8 Chesterfield Borough Council (2020). Chesterfield Borough Local Plan. Available at: <https://www.chesterfield.gov.uk/planning-and-building-control/planning-policy-and-the-local-plan/development-plan-the-local-plan/> [Accessed: 08/2025].
- Ref A9 Amber Valley Borough Council (2024). Amber Valley Borough Local Plan 2022-2040. Available at: <https://www.ambervalley.gov.uk/planning/planning-policy/local-plan/> [Accessed: 08/2025].
- Ref A10 Derby City Council (2006). City of Derby Local Plan Review. Available at: <https://www.derby.gov.uk/environment-and-planning/planning/local-plan/emerging/> [Accessed: 08/2025].
- Ref A11 Derby City Council (2000). Derby and Derbyshire Minerals Local Plan. Available at: <https://www.derby.gov.uk/environment-and-planning/planning/local-plan/minerals-local-plan/> [Accessed: 08/2025].
- Ref A12 Derby City Council (2005) Derbyshire and Derby Waste Local Plan. Available at: <https://www.derby.gov.uk/environment-and-planning/planning/local-plan/waste-local-plan/> [Accessed: 08/2025].
- Ref A13 Derby City Council (2024). Derbyshire and Derby Minerals Local Plan (2022-2038). Available at: <https://www.derbyshire.gov.uk/environment/planning/planning-policy/minerals-waste-development-framework/minerals-plan/minerals-local-plan.aspx> [Accessed:08/2025].
- Ref A14 Derby City Council (n.d.) Derbyshire and Derby draft Local Waste Plan.

**Appendix B.
Chapter 5
(Review of the
Corridor Presented
at Stage 1
Consultation)
Figures**



Figure 5B.1 : Preliminary Preferred Alignment

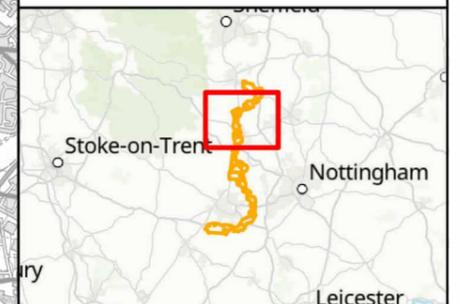
Legend

- CPRSS Emerging Preferred Corridor (EPC)
- Sections of the Preliminary Preferred Alignment for which alternative routing options are not under consideration
- Sections of the Preliminary Preferred Alignment for which alternative routing options are under consideration
- Overhead Line 132kV
- Statutory Main River
- Listed Buildings (England)**
- Grade I
- Grade II*
- Grade II
- World Heritage Sites & Buffer Zone
- Peak District National Park
- Conservation Areas
- Scheduled Monuments
- Historic Landfill Sites
- Local Wildlife Sites
- Registered Parks and Gardens
- Sites of Special Scientific Interest
- Ancient Woodland
- Local Nature Reserves
- Special Areas of Conservation
- Special Protection Areas
- Flood Map for Planning (Rivers and Sea) - Flood Zone 2
- Flood Map for Planning (Rivers and Sea) - Flood Zone 3

Notes

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Sheet X Centroid Coordinate: 440195.38E Sheet Y Centroid Coordinate: 359626.33N



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Issue	Date	Remarks	Drawn	Checked	Approved
1	Dec 2025	FIRST ISSUE	RS	BS	LM

Title

Chesterfield to Willington
Preliminary Preferred Alignment

Figure Number: Figure 5B.1

Drawing Reference: EDN2-WSP-CONS-ZZZZZ-DRW-OC-000107

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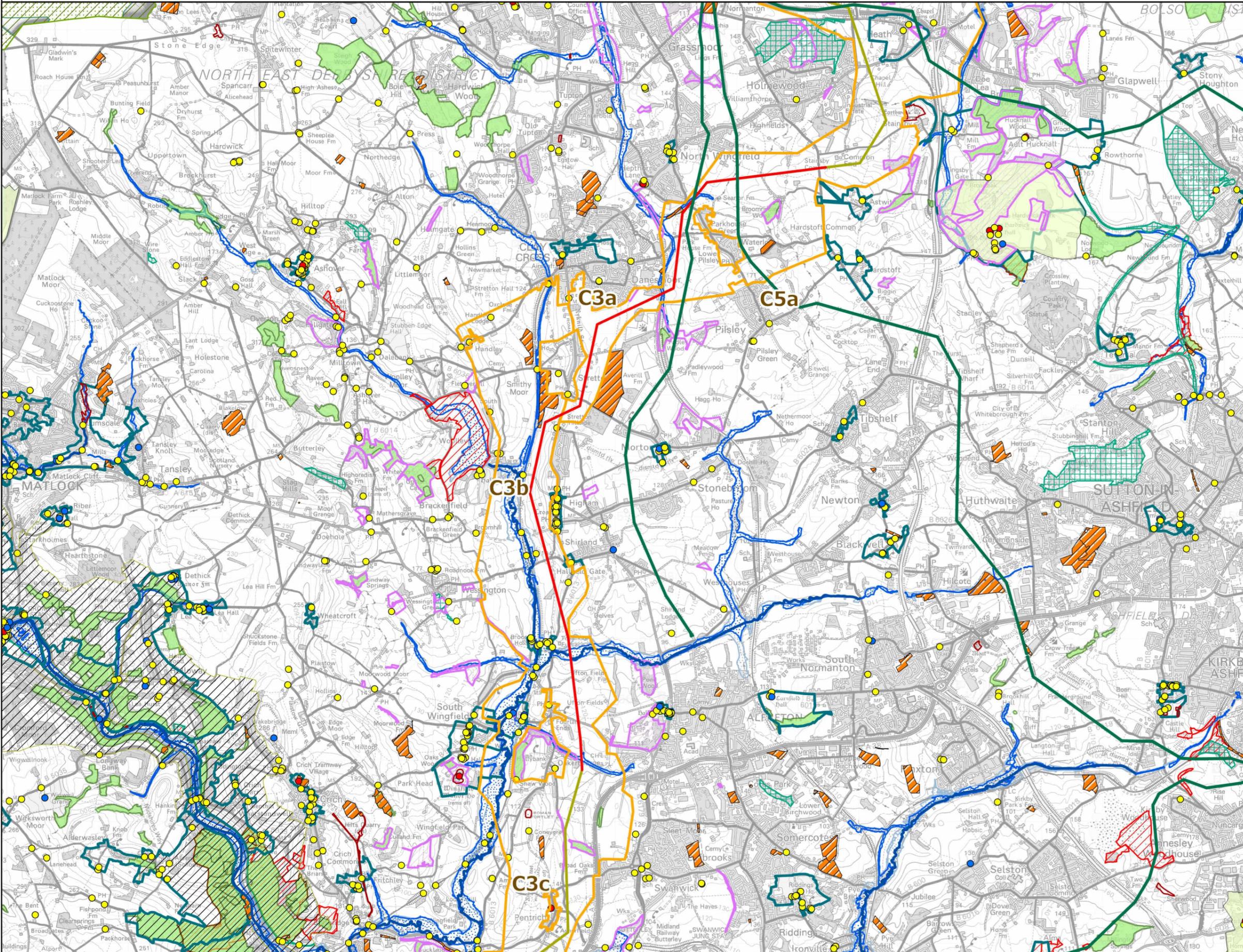




Figure 5B.2 :
Extent of Alternative Routing Option 1

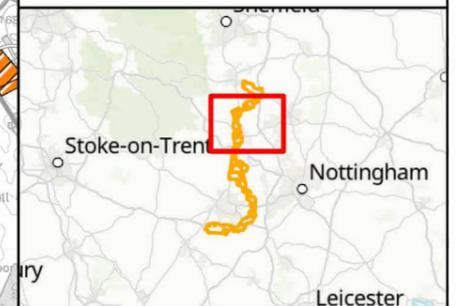
Legend

- CPRSS Refined Corridor Sections C3a, C3b, C3c and C5a
 - Section of the Preliminary Preferred Alignment not utilised by this option
 - Sections of the Preliminary Preferred Alignment for which alternative routing options are not under consideration
 - Alternative Routing Option 1
 - Overhead Line 132Kv
 - Statutory Main River
- Listed Buildings (England)
- Grade I
 - Grade II*
 - Grade II
- World Heritage Sites & Buffer Zone
 - Local Wildlife Sites
 - Historic Landfill Sites
 - Conservation Areas
 - Scheduled Monuments
 - Registered Parks and Gardens
 - Sites of Special Scientific Interest
 - Ancient Woodland
 - Local Nature Reserves
 - Flood Map for Planning (Rivers and Sea) - Flood Zone 2
 - Flood Map for Planning (Rivers and Sea) - Flood Zone 3

Notes

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Sheet X Centroid Coordinate: 441707.66E Sheet Y Centroid Coordinate: 358604.4N



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Issue	Date	Remarks	Drawn	Checked	Approved

Title

Chesterfield to Willington
Extent of Alternative Routing Option 1

nationalgrid

Figure Number: Figure 5B.2

Drawing Reference: EDN2-WSP-CONS-ZZZZZ-DRW-0C-000108

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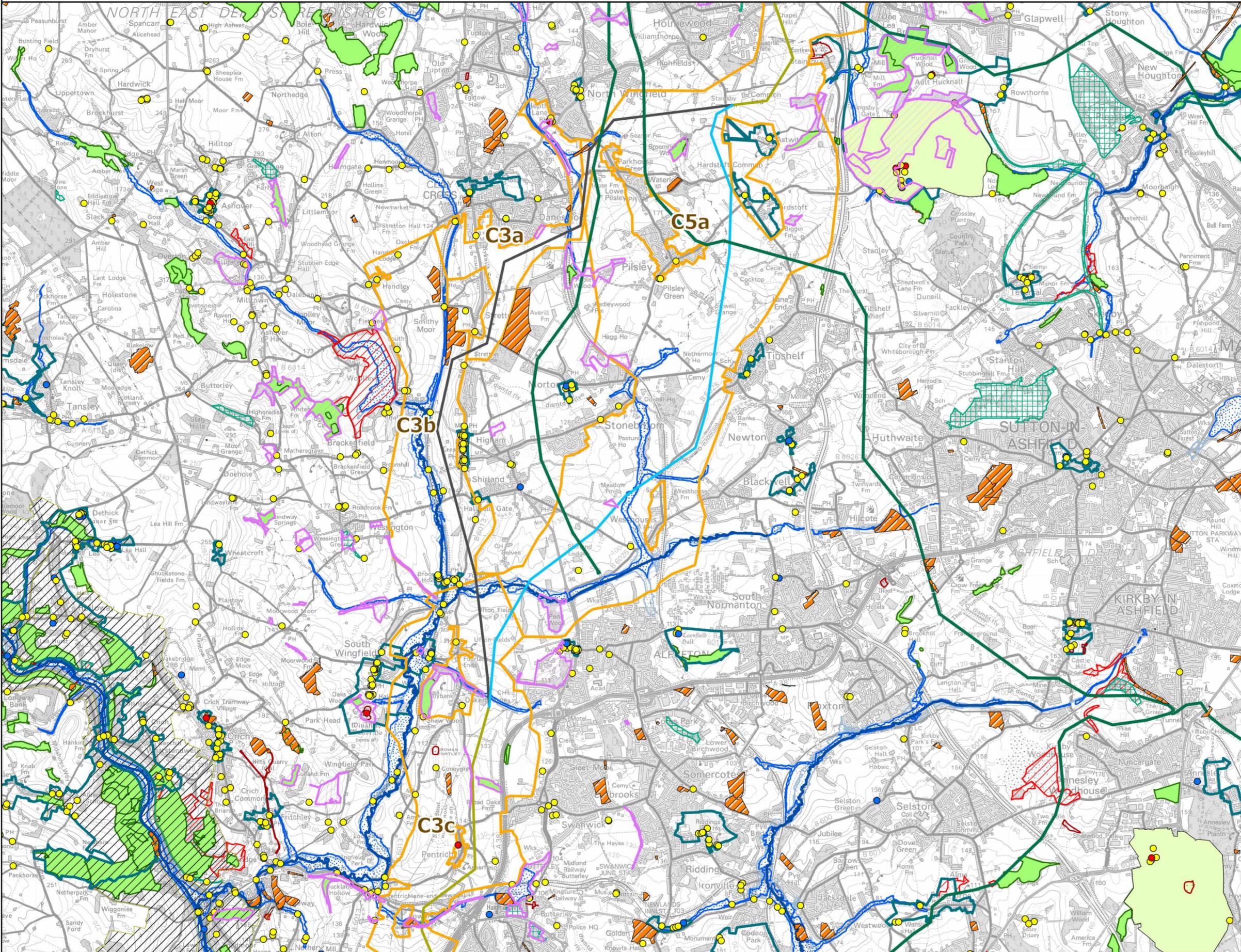
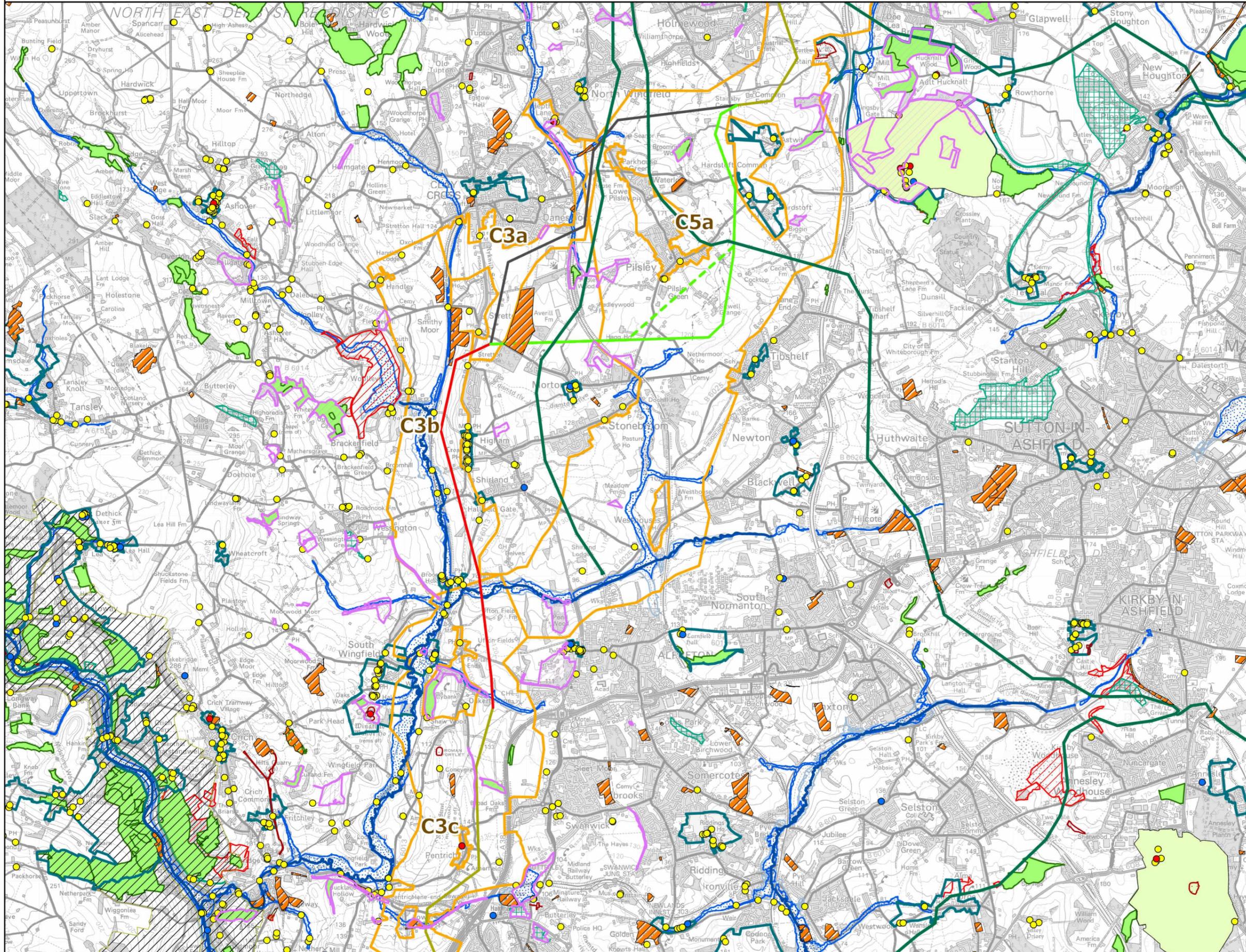




Figure 5B.3 :
Extent of Alternative Routing Option 2



- Legend**
- CPRSS Refined Corridor Sections C3a, C3b, C3c and C5a
 - Sections of the Preliminary Preferred Alignment for which alternative routing options are not under consideration
 - Section of the Preliminary Preferred Alignment not utilised by this option
 - Section of the Preliminary Preferred Alignment utilised by this option
 - Overhead Line 132Kv
 - Alternative Routing Option 2
 - Alternative Routing Option 2b
 - Statutory Main River
- Listed Buildings (England)**
- Grade I
 - Grade II*
 - Grade II
- World Heritage Sites & Buffer Zone**
- Conservation Areas
 - Scheduled Monuments
 - Historic Landfill Sites
 - Local Wildlife Sites
 - Registered Parks and Gardens
 - Sites of Special Scientific Interest
 - Ancient Woodland
 - Local Nature Reserves
 - Flood Map for Planning (Rivers and Sea) - Flood Zone 2
 - Flood Map for Planning (Rivers and Sea) - Flood Zone 3

Notes

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 Sheet X Centroid Coordinate: 441707.66E Sheet Y Centroid Coordinate: 358604.4N

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Title

Chesterfield to Willington
 Extent of Alternative Routing Option 2

nationalgrid

Figure Number: Figure 5B.3

Drawing Reference: EDN2-WSP-CONS-ZZZZZZ-DRW-OC-000109

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Figure 5B.4 :
Extent of Alternative Routing Option 3

- Legend**
- CPRSS Refined Corridor Sections C3a, C3b, C3c and C5a
 - Sections of the Preliminary Preferred Alignment for which alternative routing options are not under consideration
 - Section of the Preliminary Preferred Alignment not utilised by this option
 - Section of the Preliminary Preferred Alignment utilised by this option
 - Alternative Routing Option 3
 - Overhead Line 132kV
 - Statutory Main River
- Listed Buildings (England)**
- Grade I
 - Grade II*
 - Grade II
- World Heritage Sites & Buffer Zone
 - Historic Landfill Sites
 - Local Wildlife Sites
 - Conservation Areas
 - Scheduled Monuments
 - Registered Parks and Gardens
 - Sites of Special Scientific Interest
 - Ancient Woodland
 - Local Nature Reserves
 - Flood Map for Planning (Rivers and Sea) - Flood Zone 2
 - Flood Map for Planning (Rivers and Sea) - Flood Zone 3

Notes

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 Sheet X Centroid Coordinate: 441707.66E Sheet Y Centroid Coordinate: 358604.4N

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1	Dec 2025	FIRST ISSUE	PN	BS	LM
Issue	Date	Remarks	Drawn	Checked	Approved

Title

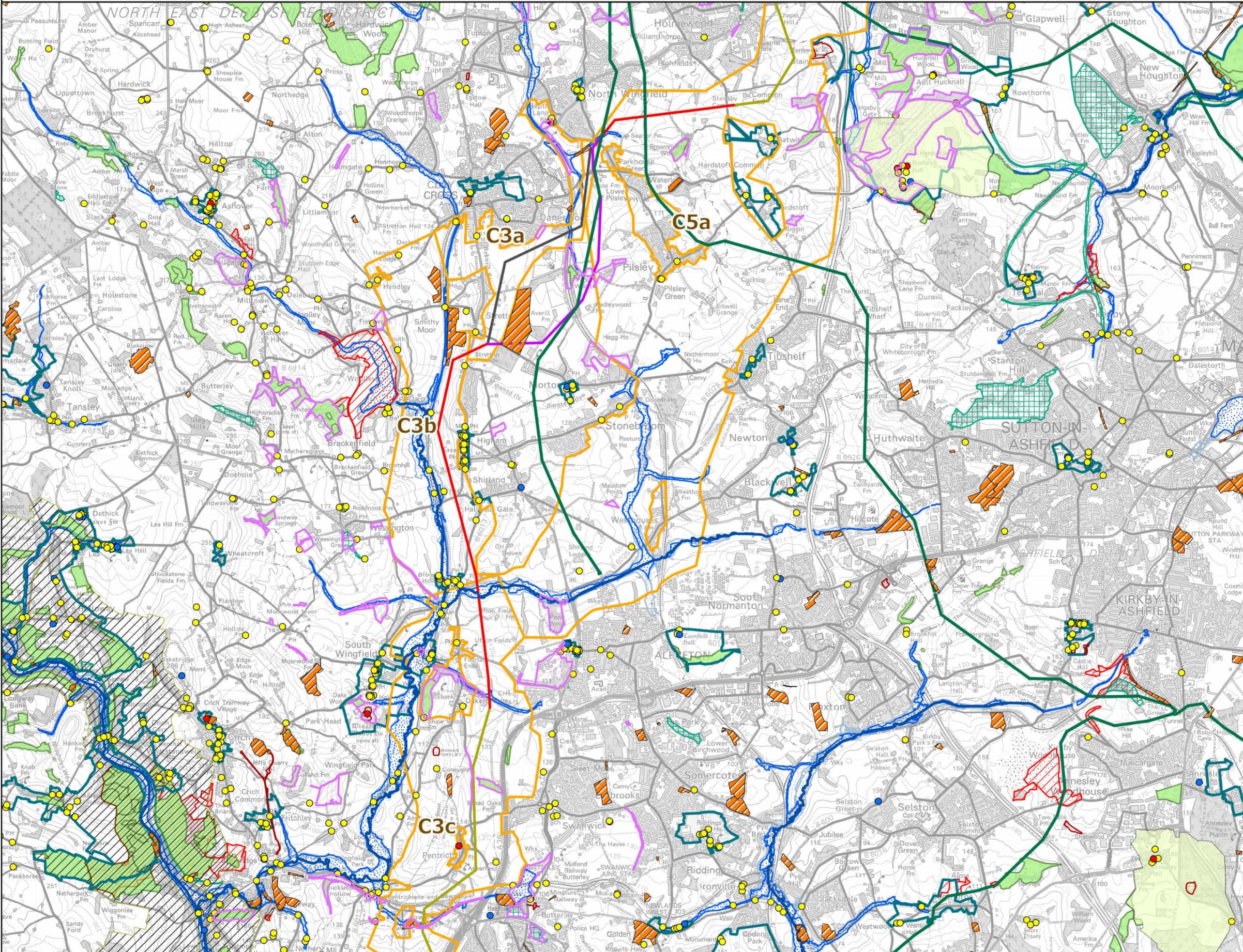
Chesterfield to Willington
 Extent of Alternative Routing Option 3

nationalgrid

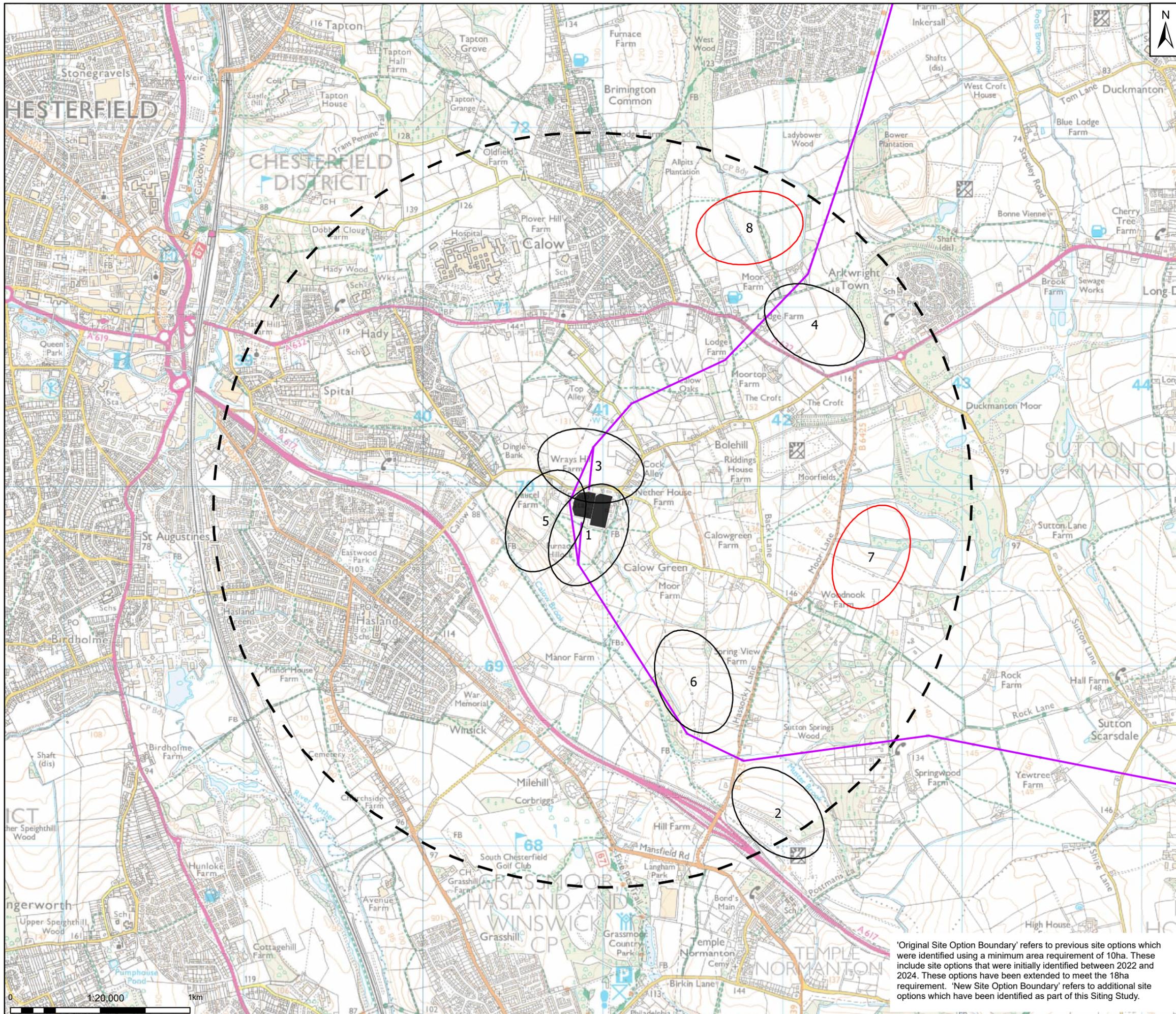
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**Appendix C.
Chapter 7
(Development
of the Proposed
Route Alignment
and Substation Siting)
Figures**



Legend

- New Site Option Boundary
- Original Site Option Boundary
- Chesterfield 2km Study Area
- Existing 275kV and 400kV Overhead Lines
- Existing Chesterfield Substation

Notes
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 Contains data from OS Zoomstack



Rev	Date	Description	Drawn	Check	Approv
01	03/01/25	INITIAL ISSUE	RC	RA	HJ

Client:

PROJECT: BRINSWORTH TO HIGH MARNHAM

nationalgrid

Site Chesterfield
Client 1-3 Strand London WC2N 5EH

ARCADIS

Registered office: 80Fen 80 Fenchurch Street London EC3M 4BY
 Coordinating Office: Suite 1A 4 Piccadilly Place Manchester M1 3BN
www.arcadis.com

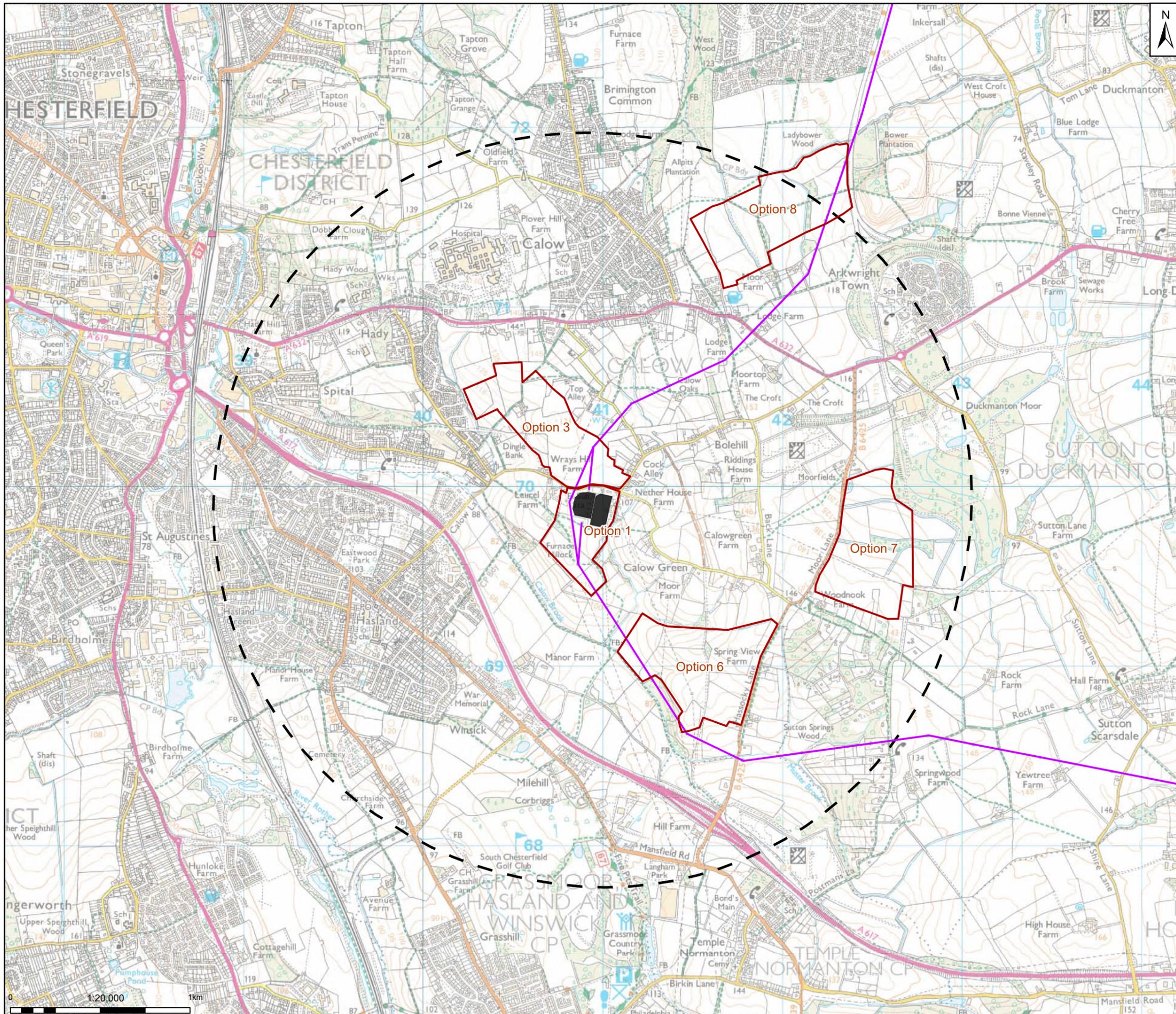
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Drawn	R.C.	Date	03 JAN 24	Signed
Checked	R.A.	Date	03 JAN 24	Signed
Approved	H.J.	Date	03 JAN 24	Signed
Scale:	1:20,000	Datum:	AOD	
Original Size:	A3	Grid:	OS	
Suitability Code:	S2	Project Number:	30184504	

Suitability Description: For Information

Drawing Number: 30184504-ARC-EGN-ZZ-DR-ZZ-00070
 Revision: P01

'Original Site Option Boundary' refers to previous site options which were identified using a minimum area requirement of 10ha. These include site options that were initially identified between 2022 and 2024. These options have been extended to meet the 18ha requirement. 'New Site Option Boundary' refers to additional site options which have been identified as part of this Siting Study.



Legend

- Chesterfield Siting Options - Shortlisted Sites
- Chesterfield 2km Study Area
- Existing 275kV and 400kV Overhead Lines
- Existing Chesterfield Substation

Notes
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Rev	Date	Description	Drawn	Check	Approv
01	03/01/25	INITIAL ISSUE	RC	RA	HJ

Client:

PROJECT: BRINSWORTH TO HIGH MARNHAM

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Site Chesterfield
Client 1-3 Strand London WC2N 5EH

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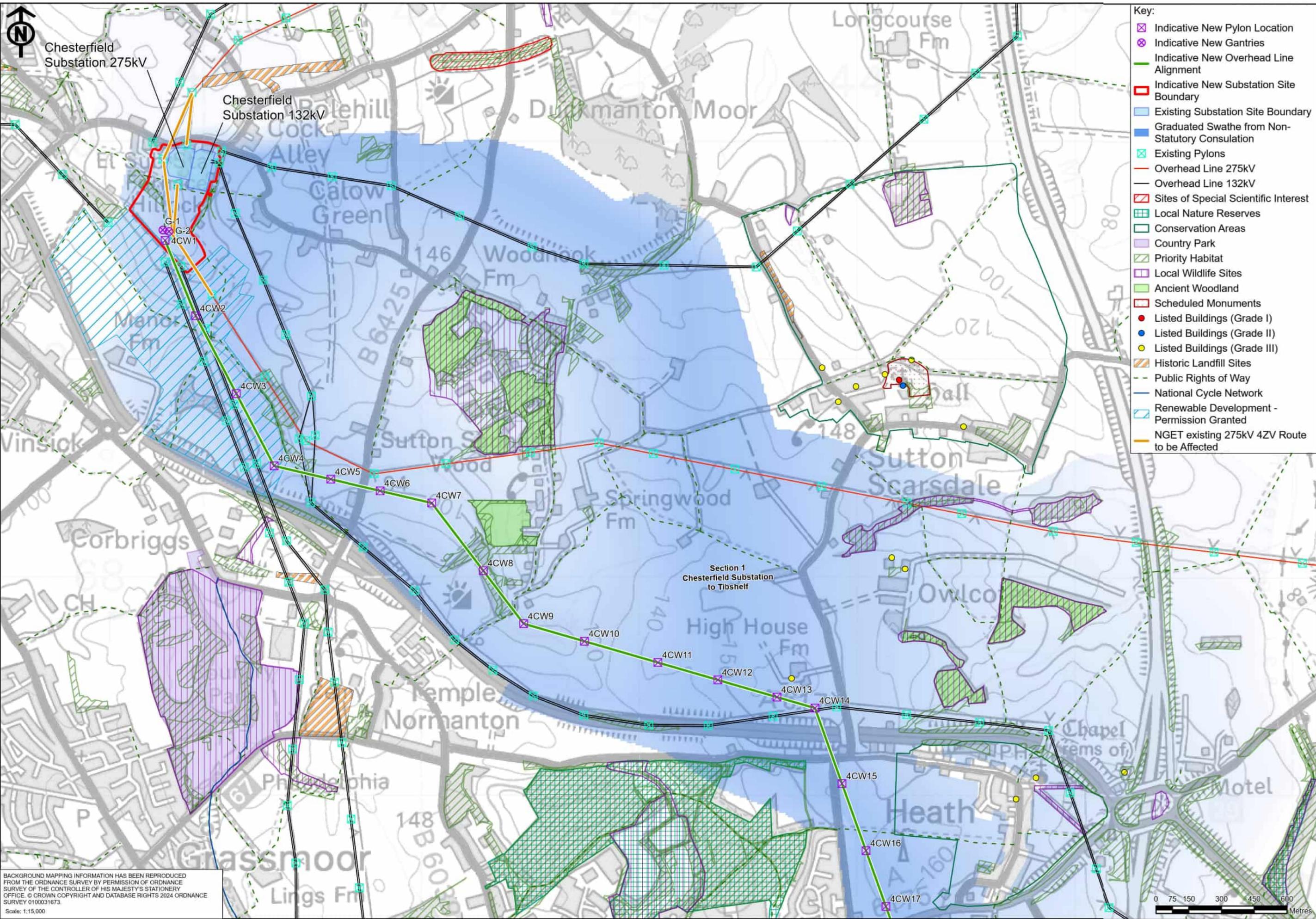
Coordinating Office: Suite 1A 4 Piccadilly Place Manchester M1 3BN

Title:
 Figure 3A – Shortlisted Siting Options (Snapped Boundaries) – Chesterfield

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Drawn	R.C.	Date	03 JAN 24	Signed
Checked	R.A.	Date	03 JAN 24	Signed
Approved	H.J.	Date	03 JAN 24	Signed
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Suitability Description: For Information

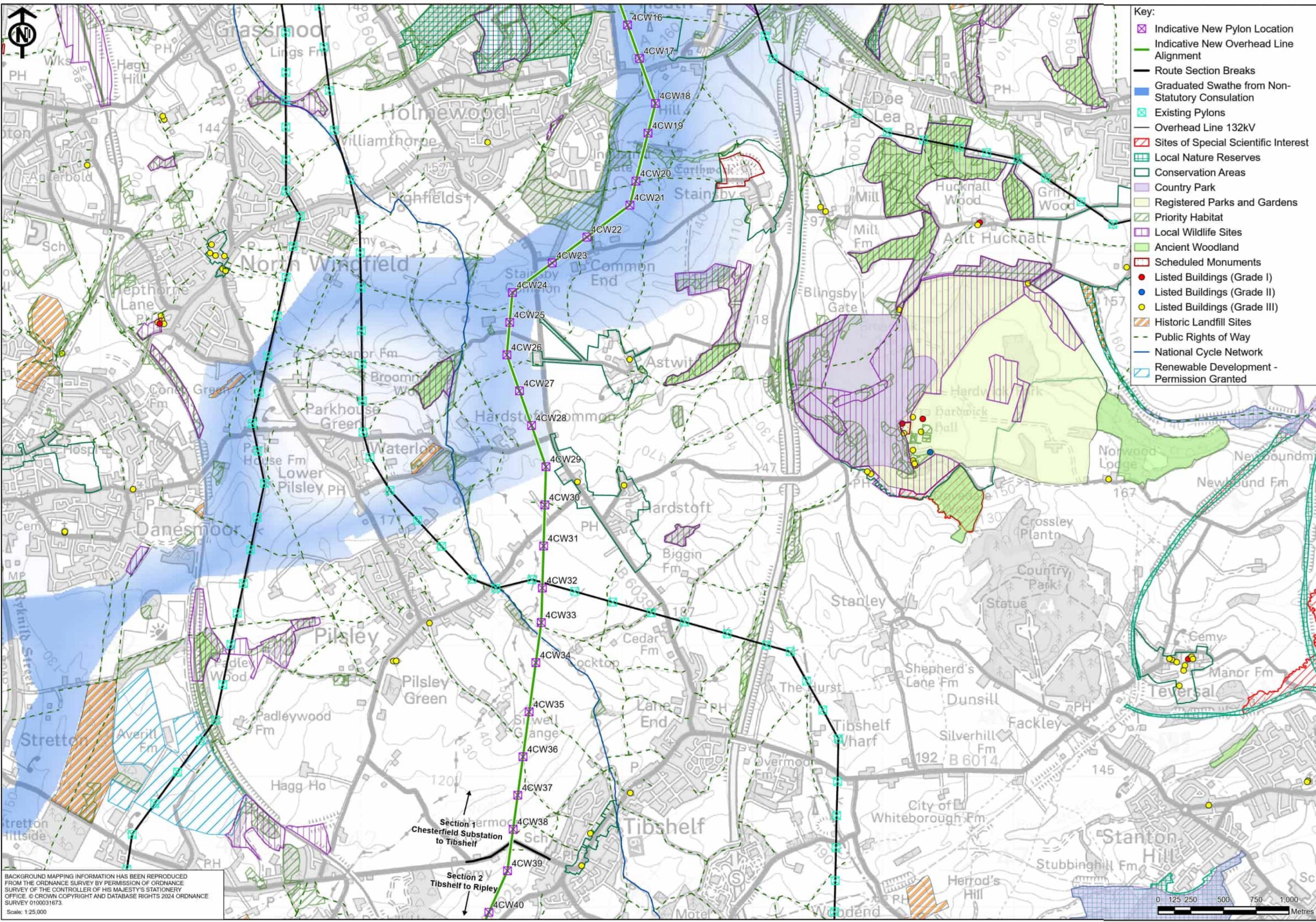
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 Revision: P01



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 - ⊗ Indicative New Ganties
 - Indicative New Overhead Line Alignment
 - Indicative New Substation Site Boundary
 - Existing Substation Site Boundary
 - Graduated Swathe from Non-Statutory Consultation
 - ⊠ Existing Pylons
 - Overhead Line 275kV
 - Overhead Line 132kV
 - Sites of Special Scientific Interest
 - Local Nature Reserves
 - Conservation Areas
 - Country Park
 - Priority Habitat
 - Local Wildlife Sites
 - Ancient Woodland
 - Scheduled Monuments
 - Listed Buildings (Grade I)
 - Listed Buildings (Grade II)
 - Listed Buildings (Grade III)
 - Historic Landfill Sites
 - Public Rights of Way
 - National Cycle Network
 - Renewable Development - Permission Granted
 - NGET existing 275kV 4ZV Route to be Affected

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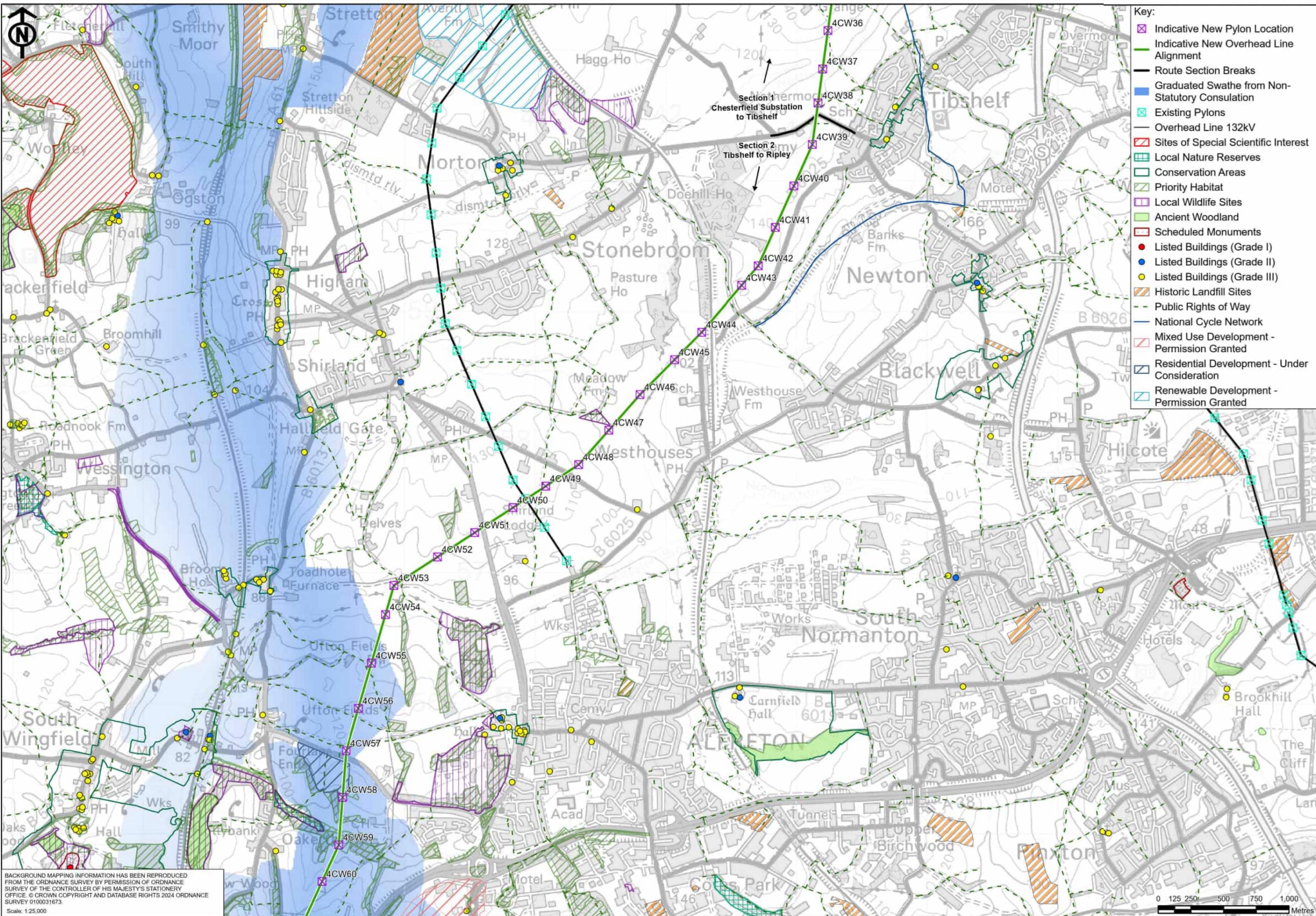
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 - Indicative New Overhead Line Alignment
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 - Graduated Swathe from Non-Statutory Consultation
 - ▨ Existing Pylons
 - Overhead Line 132kV
 - ▨ Sites of Special Scientific Interest
 - ▨ Local Nature Reserves
 - ▨ Conservation Areas
 - ▨ Country Park
 - ▨ Registered Parks and Gardens
 - ▨ Priority Habitat
 - ▨ Local Wildlife Sites
 - ▨ Ancient Woodland
 - Scheduled Monuments
 - Listed Buildings (Grade I)
 - Listed Buildings (Grade II)
 - Listed Buildings (Grade III)
 - ▨ Historic Landfill Sites
 - - - Public Rights of Way
 - National Cycle Network
 - ▨ Renewable Development - Permission Granted

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Scale: 1:25,000

Section 1
Chesterfield Substation to Tibshelf

Section 2
Tibshelf to Ripley

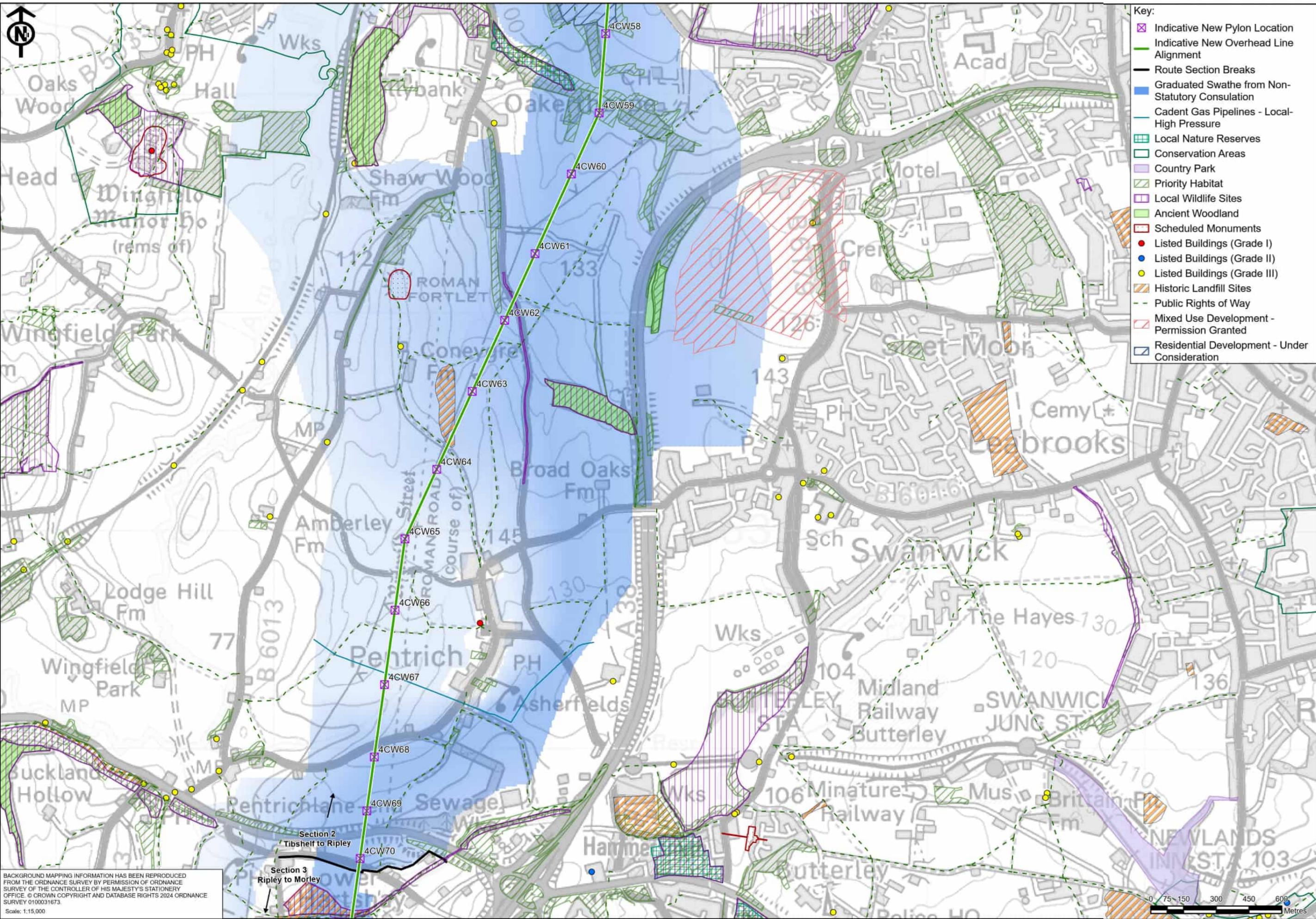




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 - Indicative New Overhead Line Alignment
 - Route Section Breaks
 - Graduated Swathe from Non-Statutory Consultation
 - Existing Pylons
 - Overhead Line 132kV
 - ▨ Sites of Special Scientific Interest
 - ▨ Local Nature Reserves
 - ▨ Conservation Areas
 - ▨ Priority Habitat
 - ▨ Local Wildlife Sites
 - ▨ Ancient Woodland
 - ▨ Scheduled Monuments
 - Listed Buildings (Grade I)
 - Listed Buildings (Grade II)
 - Listed Buildings (Grade III)
 - ▨ Historic Landfill Sites
 - - - Public Rights of Way
 - National Cycle Network
 - ▨ Mixed Use Development - Permission Granted
 - ▨ Residential Development - Under Consideration
 - ▨ Renewable Development - Permission Granted

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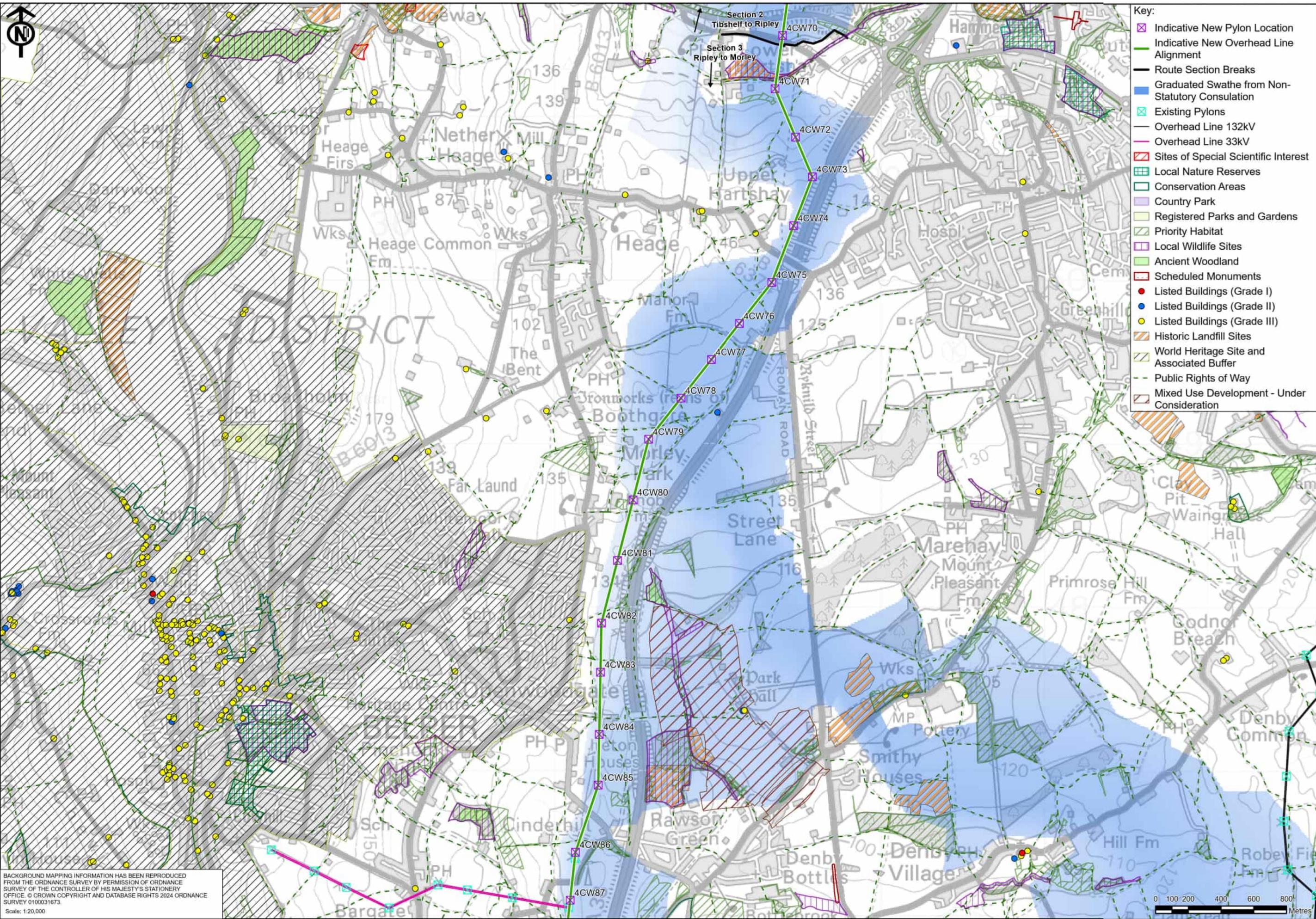
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 - Local Nature Reserves
 - Conservation Areas
 - Country Park
 - Priority Habitat
 - Local Wildlife Sites
 - Ancient Woodland
 - Scheduled Monuments
 - Listed Buildings (Grade I)
 - Listed Buildings (Grade II)
 - Listed Buildings (Grade III)
 - Historic Landfill Sites
 - Public Rights of Way
 - Mixed Use Development - Permission Granted
 - Residential Development - Under Consideration

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Scale: 1:15,000



Section 2
Tibshelf to Ripley

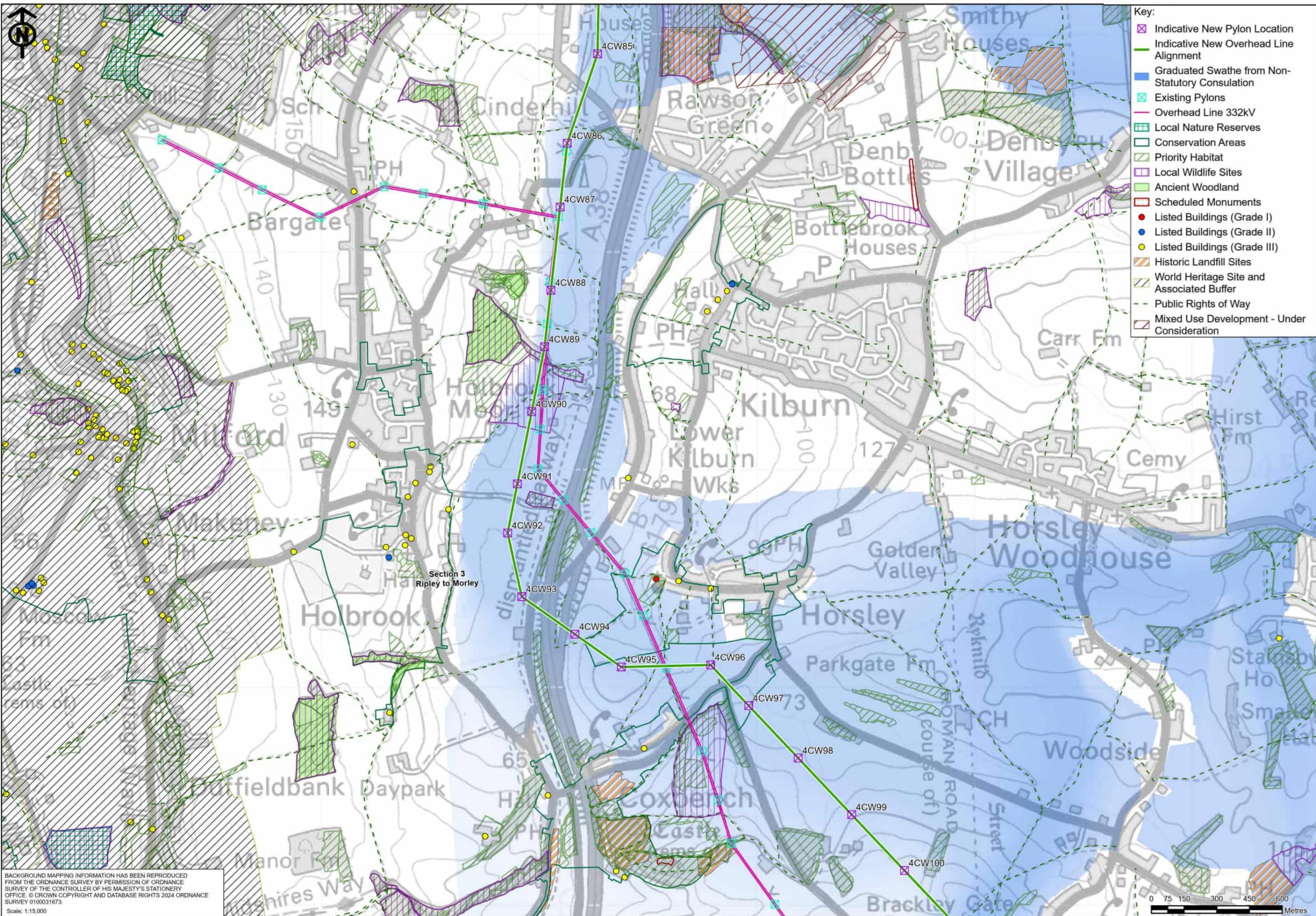
Section 3
Ripley to Morley



- Key:
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 - Indicative New Overhead Line Alignment
 - Route Section Breaks
 - Graduated Swathe from Non-Statutory Consultation
 - Existing Pylons
 - Overhead Line 132kV
 - Overhead Line 33kV
 - Sites of Special Scientific Interest
 - Local Nature Reserves
 - Conservation Areas
 - Country Park
 - Registered Parks and Gardens
 - Priority Habitat
 - Local Wildlife Sites
 - Ancient Woodland
 - Scheduled Monuments
 - Listed Buildings (Grade I)
 - Listed Buildings (Grade II)
 - Listed Buildings (Grade III)
 - Historic Landfill Sites
 - World Heritage Site and Associated Buffer
 - Public Rights of Way
 - Mixed Use Development - Under Consideration

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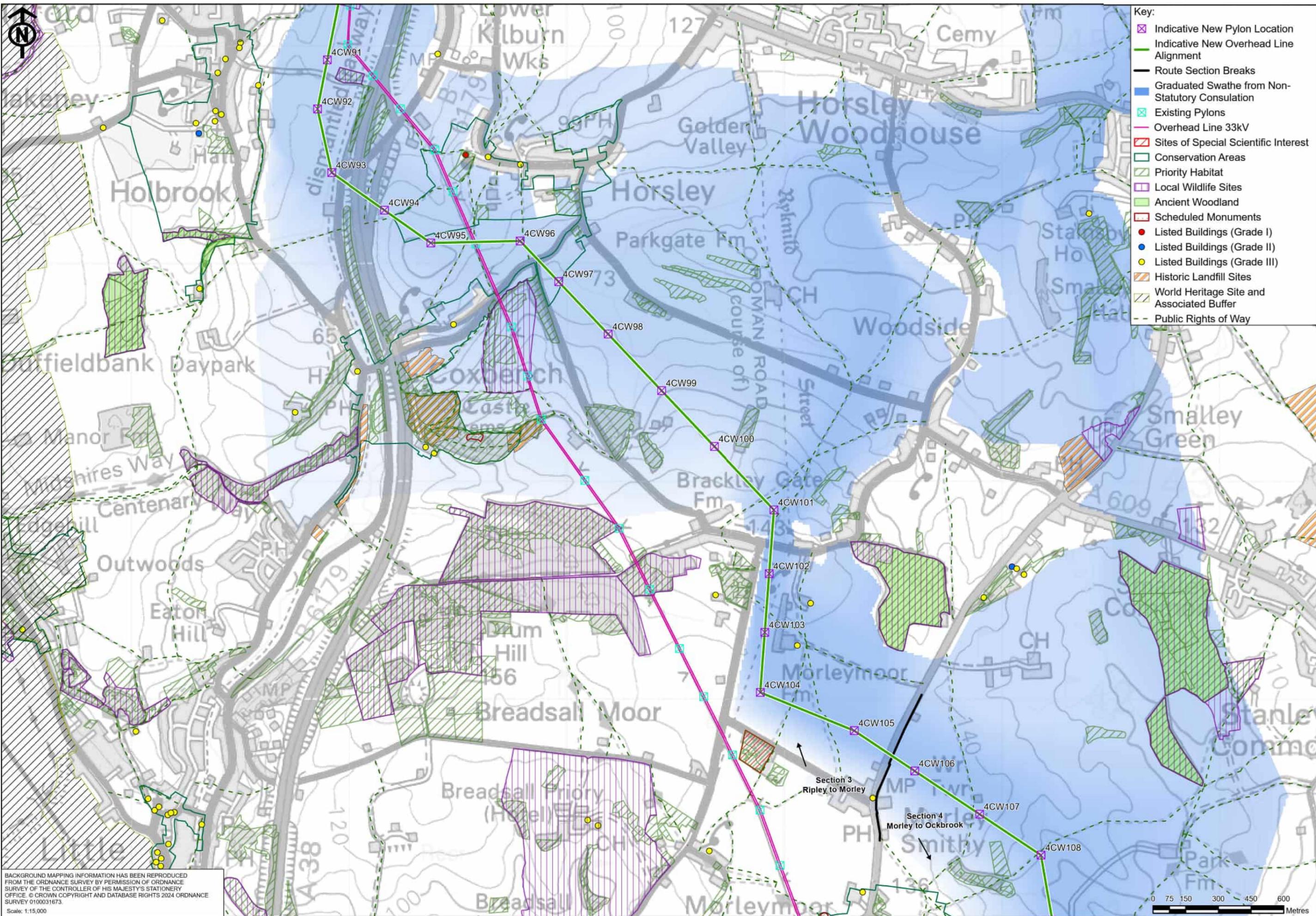




- Key:
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 - Indicative New Overhead Line Alignment
 - Graduated Swathe from Non-Statutory Consultation
 - Existing Pylons
 - Overhead Line 332kV
 - Local Nature Reserves
 - Conservation Areas
 - Priority Habitat
 - Local Wildlife Sites
 - Ancient Woodland
 - Scheduled Monuments
 - Listed Buildings (Grade I)
 - Listed Buildings (Grade II)
 - Listed Buildings (Grade III)
 - Historic Landfill Sites
 - World Heritage Site and Associated Buffer
 - Public Rights of Way
 - Mixed Use Development - Under Consideration

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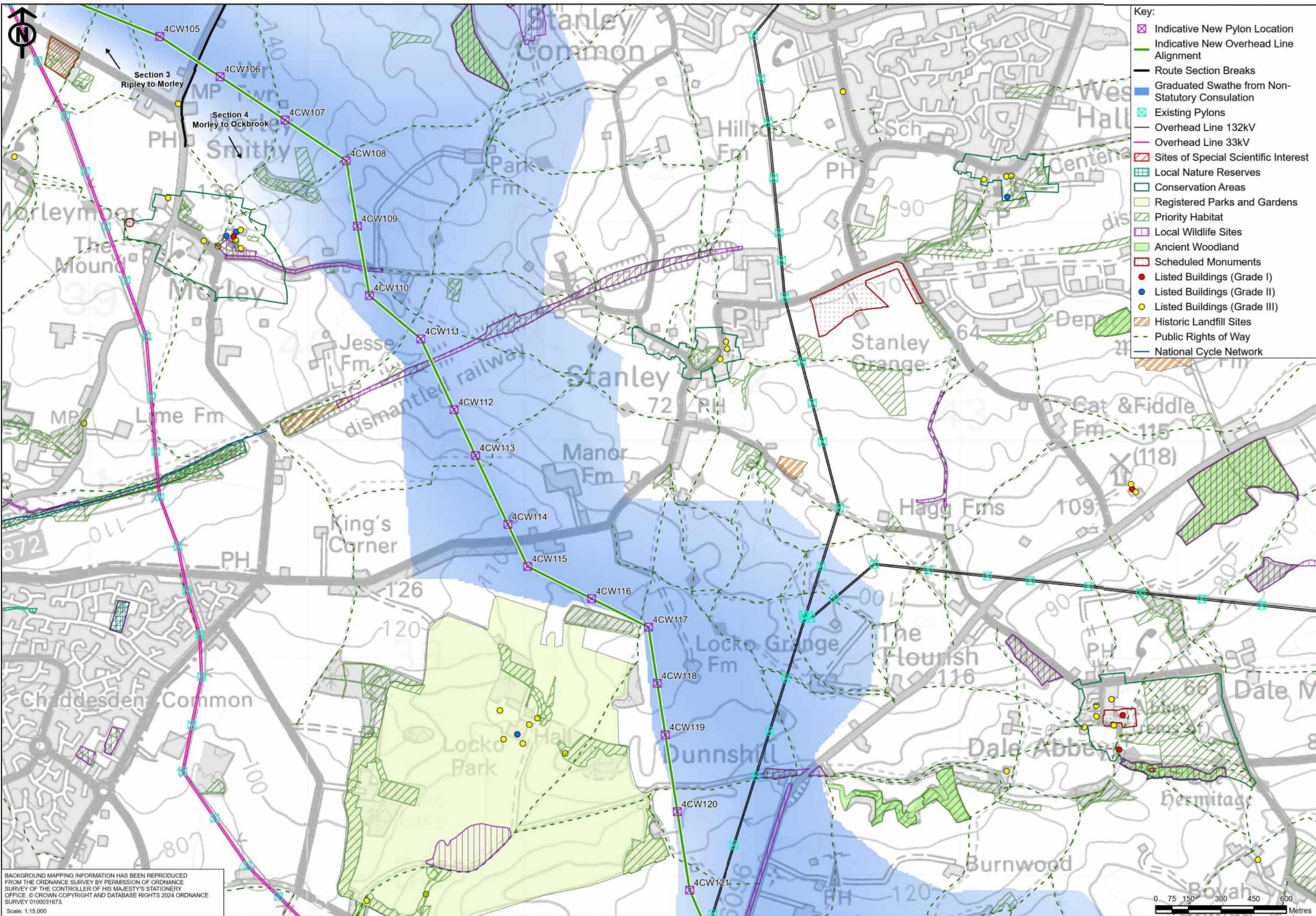




- Key:
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 - Indicative New Overhead Line Alignment
 - Route Section Breaks
 - █ Graduated Swathe from Non-Statutory Consultation
 - █ Existing Pylons
 - Overhead Line 33kV
 - █ Sites of Special Scientific Interest
 - █ Conservation Areas
 - █ Priority Habitat
 - █ Local Wildlife Sites
 - █ Ancient Woodland
 - █ Scheduled Monuments
 - Listed Buildings (Grade I)
 - Listed Buildings (Grade II)
 - Listed Buildings (Grade III)
 - █ Historic Landfill Sites
 - █ World Heritage Site and Associated Buffer
 - - - Public Rights of Way

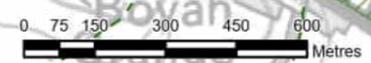
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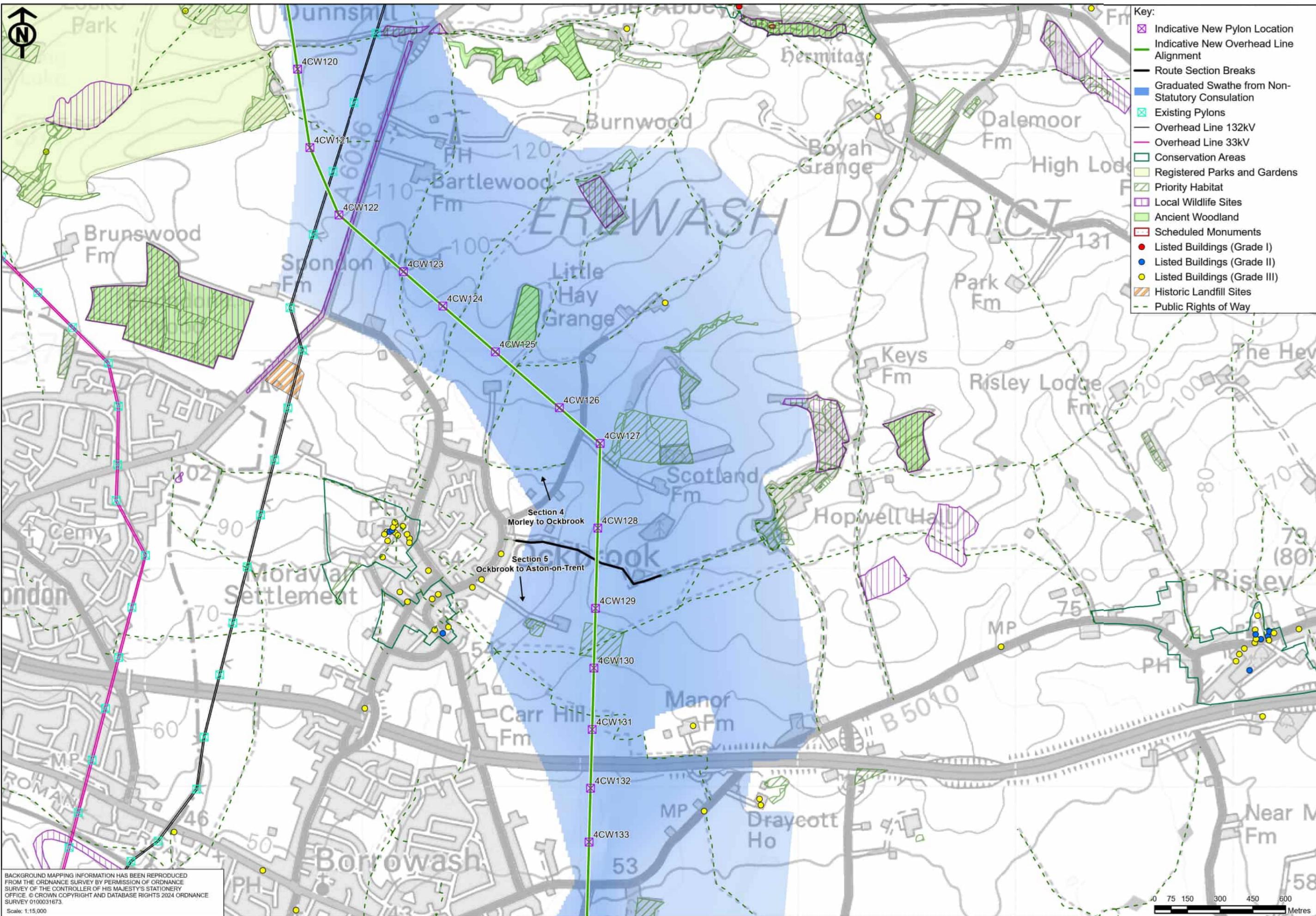




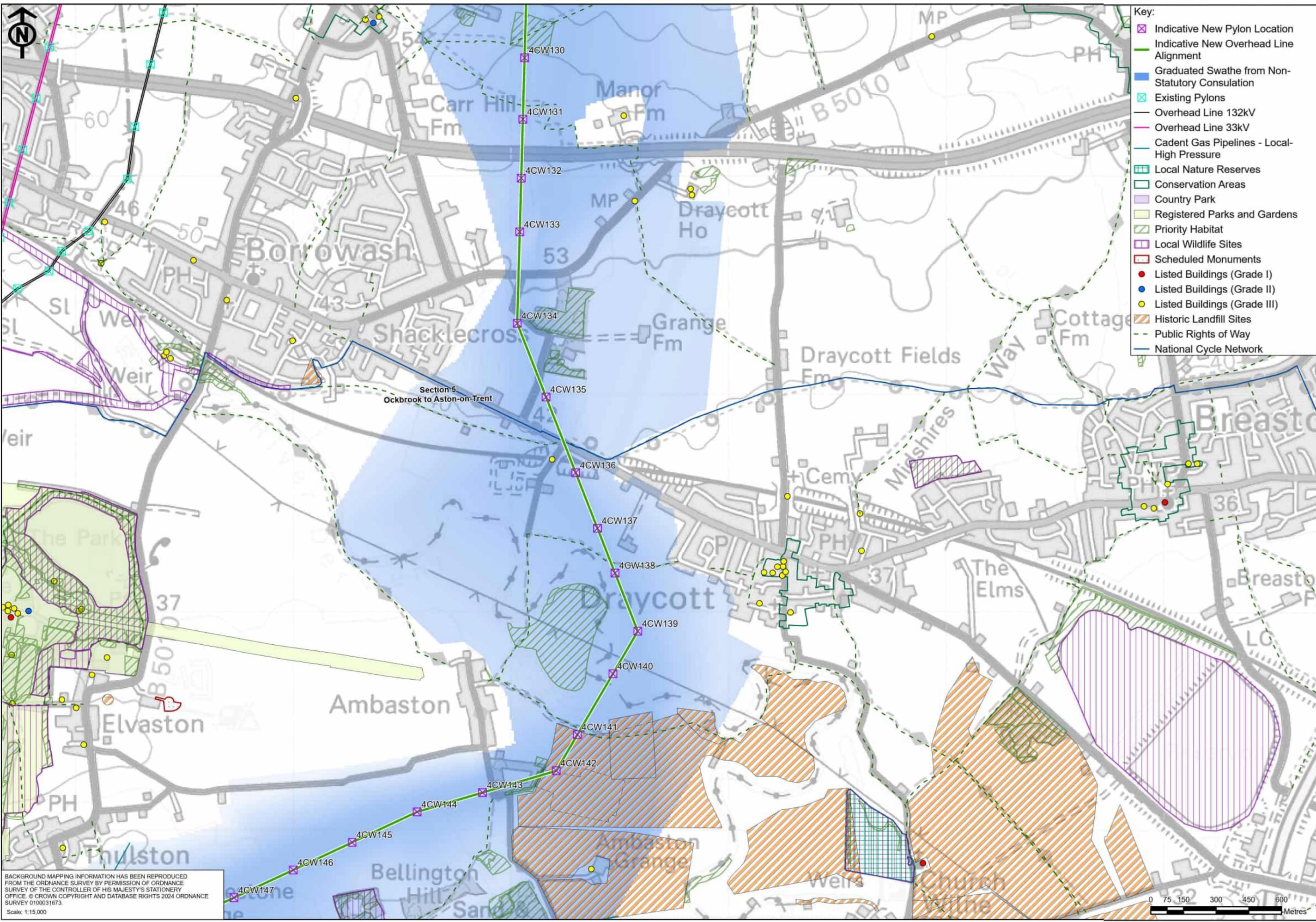
- Key:
- ⊠ Indicative New Pylon Location
 - Indicative New Overhead Line Alignment
 - Route Section Breaks
 - ▭ Graduated Swathe from Non-Statutory Consultation
 - ⊠ Existing Pylons
 - Overhead Line 132kV
 - Overhead Line 33kV
 - ▭ Sites of Special Scientific Interest
 - ▭ Local Nature Reserves
 - ▭ Conservation Areas
 - ▭ Registered Parks and Gardens
 - ▭ Priority Habitat
 - ▭ Local Wildlife Sites
 - ▭ Ancient Woodland
 - ▭ Scheduled Monuments
 - Listed Buildings (Grade I)
 - Listed Buildings (Grade II)
 - Listed Buildings (Grade III)
 - ▭ Historic Landfill Sites
 - - - Public Rights of Way
 - National Cycle Network

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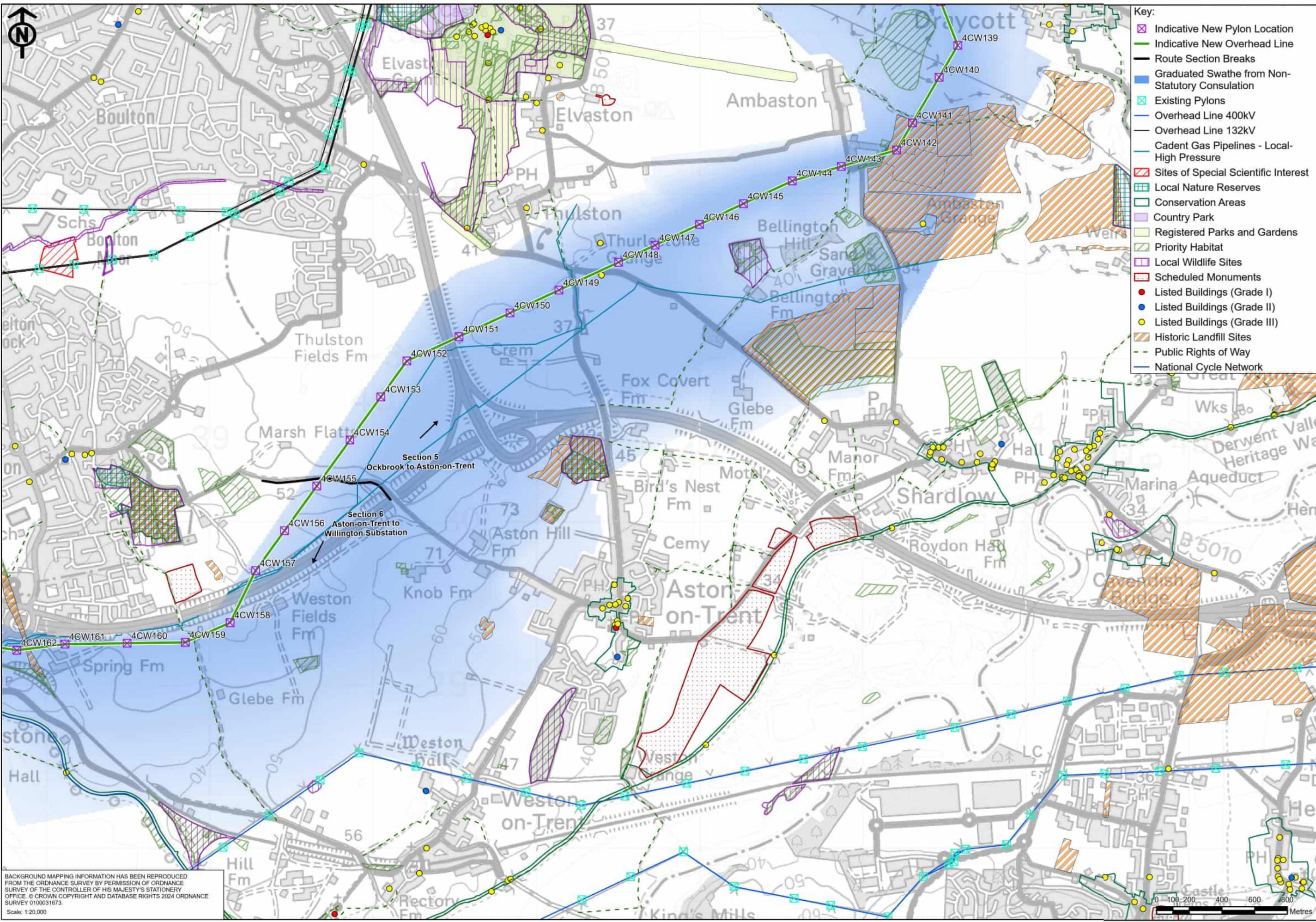
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- Key:**
- Indicative New Pylon Location
 - Indicative New Overhead Line Alignment
 - Graduated Swathe from Non-Statutory Consultation
 - Existing Pylons
 - Overhead Line 132kV
 - Overhead Line 33kV
 - - - Cadent Gas Pipelines - Local-High Pressure
 - Local Nature Reserves
 - Conservation Areas
 - Country Park
 - Registered Parks and Gardens
 - Priority Habitat
 - Local Wildlife Sites
 - Scheduled Monuments
 - Listed Buildings (Grade I)
 - Listed Buildings (Grade II)
 - Listed Buildings (Grade III)
 - Historic Landfill Sites
 - - - Public Rights of Way
 - National Cycle Network

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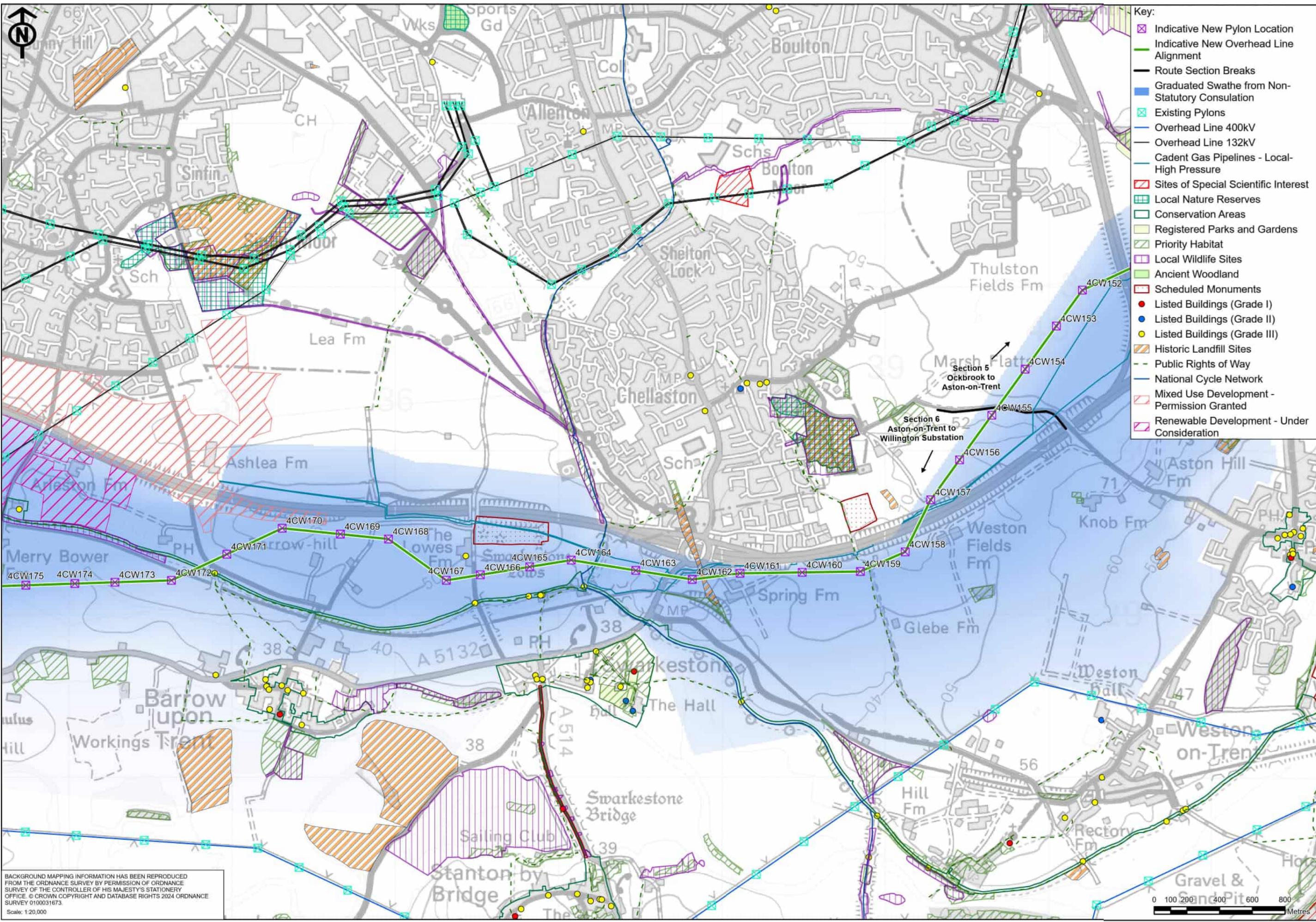
0 75 150 300 450 600 Metres



- Key:
- Indicative New Pylon Location
 - Indicative New Overhead Line
 - Route Section Breaks
 - Graduated Swathe from Non-Statutory Consultation
 - Existing Pylons
 - Overhead Line 400kV
 - Overhead Line 132kV
 - Cadent Gas Pipelines - Local-High Pressure
 - Sites of Special Scientific Interest
 - Local Nature Reserves
 - Conservation Areas
 - Country Park
 - Registered Parks and Gardens
 - Priority Habitat
 - Local Wildlife Sites
 - Scheduled Monuments
 - Listed Buildings (Grade I)
 - Listed Buildings (Grade II)
 - Listed Buildings (Grade III)
 - Historic Landfill Sites
 - Public Rights of Way
 - National Cycle Network

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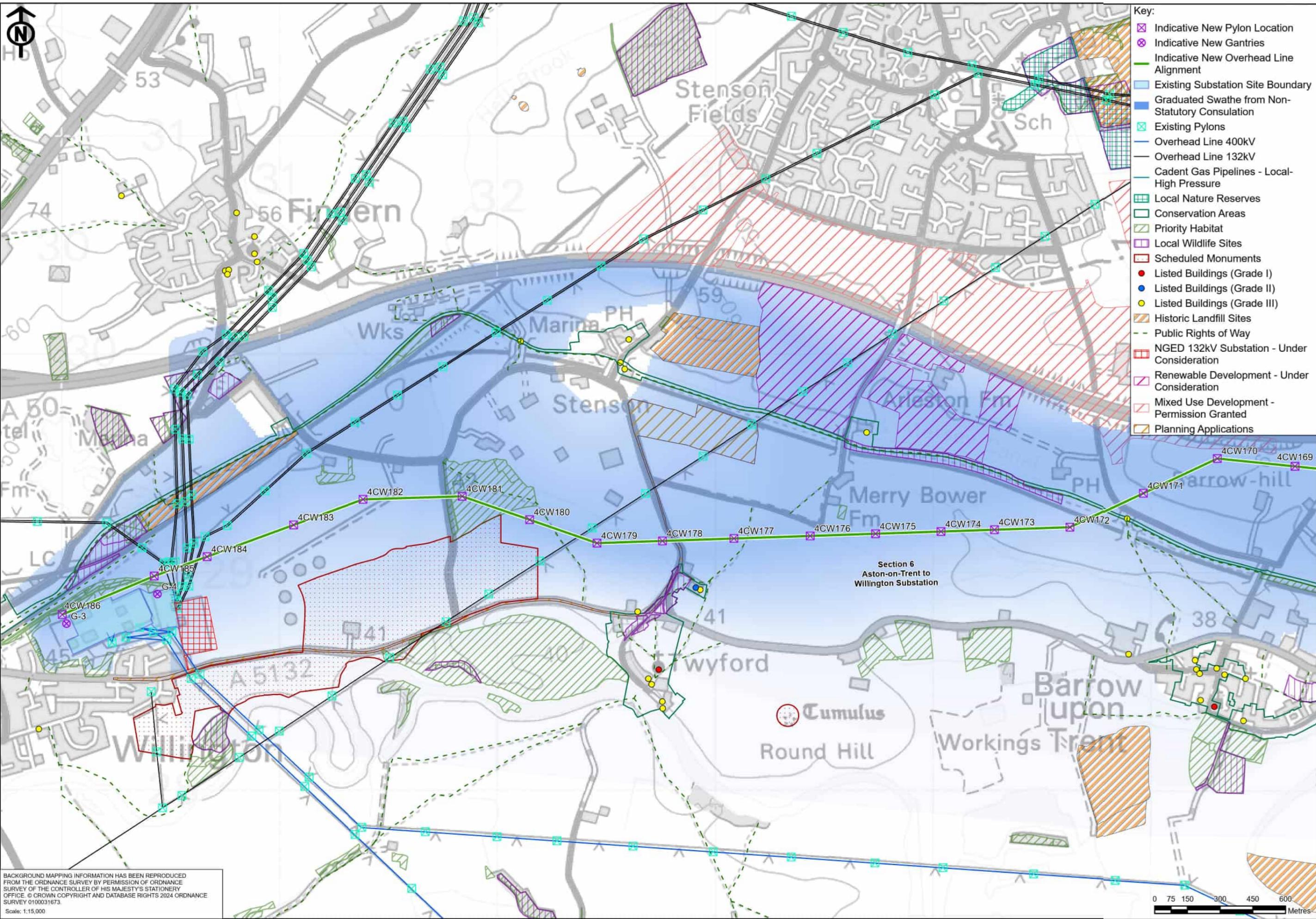




- Key:
- Indicative New Pylon Location
 - Indicative New Overhead Line Alignment
 - Route Section Breaks
 - Graduated Swathe from Non-Statutory Consultation
 - Existing Pylons
 - Overhead Line 400kV
 - Overhead Line 132kV
 - Cadent Gas Pipelines - Local-High Pressure
 - ▨ Sites of Special Scientific Interest
 - ▨ Local Nature Reserves
 - ▨ Conservation Areas
 - ▨ Registered Parks and Gardens
 - ▨ Priority Habitat
 - ▨ Local Wildlife Sites
 - ▨ Ancient Woodland
 - ▨ Scheduled Monuments
 - Listed Buildings (Grade I)
 - Listed Buildings (Grade II)
 - Listed Buildings (Grade III)
 - ▨ Historic Landfill Sites
 - - - Public Rights of Way
 - National Cycle Network
 - ▨ Mixed Use Development - Permission Granted
 - ▨ Renewable Development - Under Consideration

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- Key:
- Indicative New Pylon Location
 - Indicative New Gantries
 - Indicative New Overhead Line Alignment
 - Existing Substation Site Boundary
 - Graduated Swathe from Non-Statutory Consultation
 - Existing Pylons
 - Overhead Line 400kV
 - Overhead Line 132kV
 - Cadent Gas Pipelines - Local-High Pressure
 - Local Nature Reserves
 - Conservation Areas
 - Priority Habitat
 - Local Wildlife Sites
 - Scheduled Monuments
 - Listed Buildings (Grade I)
 - Listed Buildings (Grade II)
 - Listed Buildings (Grade III)
 - Historic Landfill Sites
 - Public Rights of Way
 - NGED 132kV Substation - Under Consideration
 - Renewable Development - Under Consideration
 - Mixed Use Development - Permission Granted
 - Planning Applications

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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