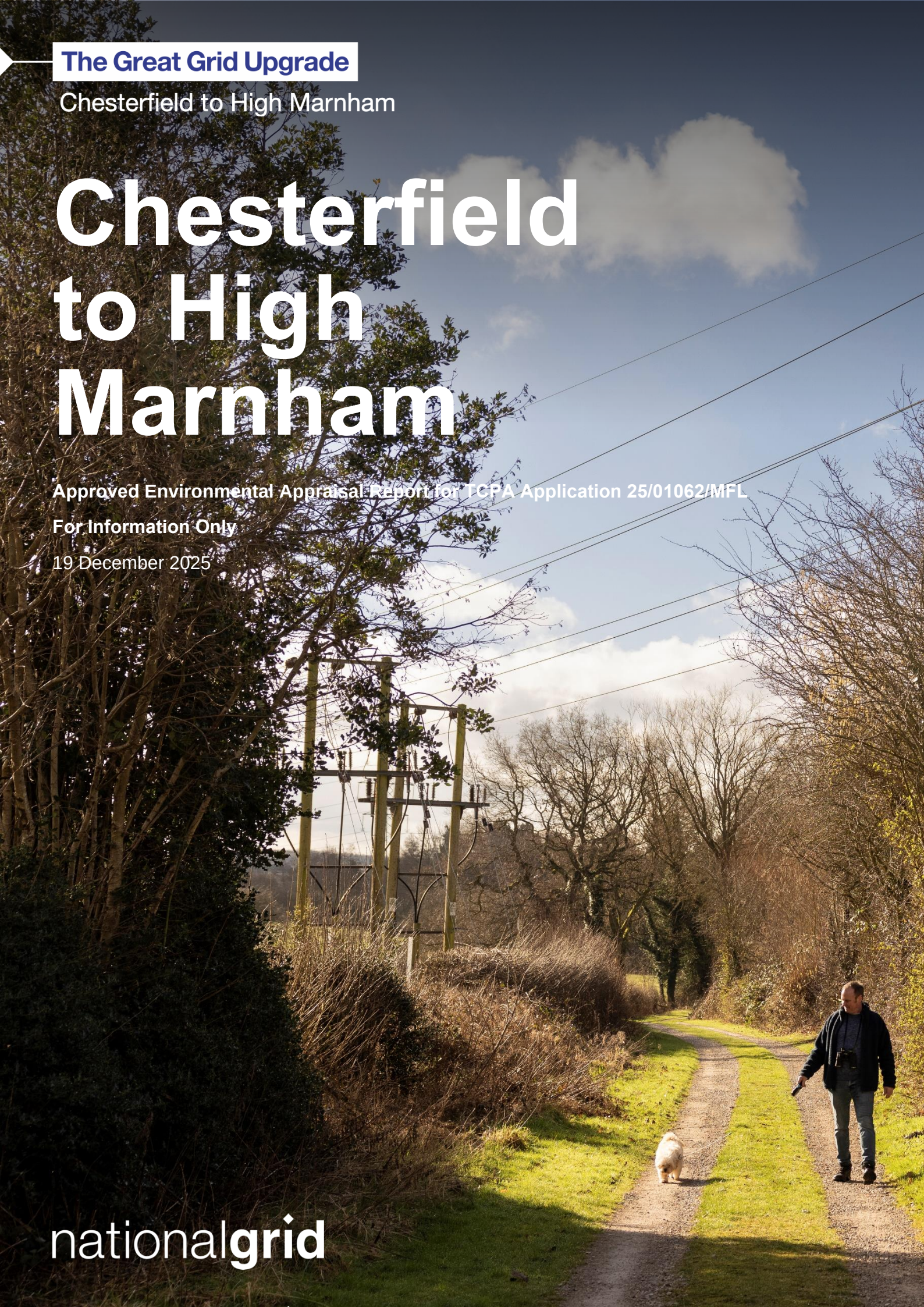




The Great Grid Upgrade

Chesterfield to High Marnham

Chesterfield to High Marnham

Approved Environmental Appraisal Report for TCPA Application 25/01062/MFL

For Information Only

19 December 2025

nationalgrid

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Appendix A	Glossary and Abbreviations
Appendix B	Methodology

1. Introduction

1.1 Purpose and Scope of the Environmental Appraisal Report (EAR)

- 1.1.1 This Environmental Appraisal Report (EAR) has been prepared by Arcadis Consulting (UK) Ltd on behalf of National Grid Electricity Transmission plc ('National Grid'), who is proposing to develop a new 400kV substation ('the Scheme') on land near Chesterfield ('the Site').
- 1.1.2 The Scheme is located within the administrative area of North East Derbyshire District Council (NEDDC).
- 1.1.3 The purpose of this EAR is to provide NEDDC with a summary of the environmental information contained in the environmental reports submitted with the planning application for the Scheme.

1.2 Background to the Scheme and its Context

- 1.2.1 The Site is 14.5 hectares (ha) and is located to the south east of Chesterfield, south of Cock Alley. The location of the Scheme is shown in Appendix E, Chesterfield New 400kV Substation Drawings, Figure 1.1.
- 1.2.2 The Scheme is part of the National Grid 'Great Grid Upgrade', which aims to provide additional resilience within the electricity network. The Great Grid Upgrade will enable the electricity grid to carry more clean energy from renewable sources to communities, homes and businesses in every part of England and Wales, helping the UK to reach net zero. The proposals will also increase the security and resilience of the UK's electricity network. For further information on the need for the Scheme, please refer to the Planning and Design and Access Statement (PDAS).
- 1.2.3 The Scheme will reinforce the network and also assist in rationalising this part of the transmission system to improve operational flexibility, meet localised demand and address anticipated customer connections in this location.
- 1.2.4 Within the national electricity system, substations operate within the transmissions network to enable electricity to be transmitted at different voltages, safely and effectively. Substations can transform the voltage of electricity either up or down as required. This is needed so that electricity can be safely transmitted throughout the country and into homes, businesses and buildings.
- 1.2.5 Redundant substation equipment within the existing 275kV National Grid Chesterfield Substation, and three pylons, will be removed in parallel with the Scheme, under permitted development. The removal of this equipment is therefore not assessed within the scope of this appraisal.

1.3 Planning Context

- 1.3.1 National Grid is seeking consent from NEDDC for the Scheme under the Town and Country Planning Act (TCPA) 1990.
- 1.3.2 Section 37 of the Electricity Act 1989 establishes the statutory consenting process to install and keep installed overhead electric lines. It requires the consent of the Secretary of State to install an electric line above ground unless the electric line either: a) has a nominal voltage of less than 20kV and is used for supplying a single customer; or b) is within premises either occupied or controlled by the person responsible for the installation. The equipment required to connect the proposed substation with the transmission network will be above 20kV but will be partially on land within National Grid's control.
- 1.3.3 The equipment required to connect the Scheme to the transmission network will be located on land currently occupied or controlled by National Grid. Consequently, these components do not require planning permission under Section 37 of the Electricity Act 1989 and, accordingly, National Grid is not intending to seek consent (including deemed planning permission) from the Secretary of State for these works.
- 1.3.4 Certain works will be undertaken using National Grid's permitted development rights, such as the removal of redundant substation equipment and three pylons within the existing 275kV National Grid Chesterfield Substation. These rights will also be used to consent temporary works and construction working areas.
- 1.3.5 The planning context for the Scheme is detailed further in the PDAS.

Requirement for Environmental Impact Assessment (EIA)

- 1.3.6 The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (the EIA Regulations) define EIA development as either:
- Schedule 1 development, where an EIA is required; or
 - Schedule 2 development likely to have significant effects on the environment by virtue of factors such as its nature, size or location, taking into account the selection criteria set out in Schedule 3, identified through the process of screening.
- 1.3.7 The Scheme does not fall under the activities listed in Schedule 1 of the EIA Regulations, and neither are substations specifically listed under the developments within Schedule 2.
- 1.3.8 The Scheme also does not fall within a sensitive area as defined by Regulation 2 of the EIA Regulations:
- a) land notified under section 28(1) (sites of special scientific interest) of the Wildlife and Countryside Act 1981;
 - b) a National Park within the meaning of the National Parks and Access to the Countryside Act 1949;
 - c) the Broads;
 - d) a property appearing on the World Heritage List kept under article 11(2) of the 1972 UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage;

- e) a scheduled monument within the meaning of the Ancient Monuments and Archaeological Areas Act 1979;
- f) an area of outstanding natural beauty designated as such by an order made by Natural England under section 82(1) (areas of outstanding natural beauty) of the Countryside and Rights of Way Act 2000 as confirmed by the Secretary of State; and
- g) a European site.

- 1.3.9 An EIA Screening Assessment was undertaken to consider the Scheme in relation to the criteria set out in Schedule 3 of the EIA Regulations. This assessment determined that significant effects on the environment are not likely to occur with the application of appropriate mitigation. A request for an EIA Screening Opinion was submitted to NEDCC in April 2024, who returned a Screening Opinion in April 2024 that the Scheme will not be subject to an EIA.
- 1.3.10 Following the progression of design development, a revised EIA Screening Request for the Scheme was issued to NEDDC on 31 October 2025. A Screening Opinion was received from NEDDC on 18 November 2025. The Screening Opinion confirmed that EIA was not required.

1.4 Stakeholder Engagement

Public Consultation

- 1.4.1 National Grid carried out pre-application public consultation to introduce the Scheme, and to provide local communities and key stakeholders with an opportunity to learn more about the Scheme and put questions to the project team.
- 1.4.2 Public consultation ran for four weeks between Monday 22 April to Monday 20 May 2024. An online webinar was held on 1 May 2024 and in-person public consultation events were held at Calow Community Centre, on 10 and 11 May 2024. Feedback could also be provided via a consultation website, freephone Community Relations helpline and a feedback email address.
- 1.4.3 Further information on the public consultation process can be found in the Statement of Community Involvement.

1.5 Report Structure

- 1.5.1 The structure of the EAR is outlined below with further details provided in Section 3 of the scope of each topic chapter:
- Chapter 1 Introduction;
 - Chapter 2 Scheme Description;
 - Chapter 3 Methodology;
 - Chapter 4 Ecology;
 - Chapter 5 Landscape and Visual;
 - Chapter 6 Cultural Heritage and Archaeology;
 - Chapter 7 Air Quality;

- Chapter 8 Water Resources and Flood Risk;
- Chapter 9 Land and Ground Conditions;
- Chapter 10 Noise and Vibration;
- Chapter 11 Traffic and Transport;
- Chapter 12 Agriculture and Soils;
- Chapter 13 Socioeconomics and Human Health;
- Chapter 14 Cumulative Impacts;
- Chapter 15 Summary;
- Appendix A Chesterfield New 400kV Substation Glossary and Abbreviations;
- Appendix B Chesterfield New 400kV Substation Methodology;
- Appendix C Chesterfield New 400kV Substation Proposed Site Layout;
- Appendix D Chesterfield New 400kV Substation Chesterfield New 400kV Outline Construction Environmental Management Plan;
- Appendix E Chesterfield New 400kV Substation Drawings;
- Appendix F Chesterfield New 400kV Substation and Overhead Lines Ecology Report;
- Appendix G Chesterfield New 400kV Substation Biodiversity Net Gain Report;
- Appendix H Chesterfield New 400kV Substation Landscaping Proposals and Visualisations;
- Appendix I Chesterfield New 400kV Substation Gazetteer of Heritage Assets;
- Appendix J Chesterfield New 400kV Substation Cultural Heritage Desk-based Assessment;
- Appendix K Chesterfield New 400kV Substation Construction Dust Assessment and Methodology;
- Appendix L Flood Risk Assessment;
- Appendix M Surface Water Drainage Strategy;
- Appendix N Chesterfield New 400kV Substation Ground Conditions and Contaminated Land Desk Study Report;
- Appendix O Noise Impact Assessment;
- Appendix P Chesterfield New 400kV Substation Outline Construction Traffic Management Plan;
- Appendix Q Chesterfield New 400kV Substation Agricultural Land Classification Report;
- Appendix R Chesterfield New 400kV Substation Outline Soil Management Plan;
- Appendix S Chesterfield New 400kV Substation Arboricultural Impact Assessment; and
- Appendix T Chesterfield New 400kV Substation Outline Site Waste Management Plan.

1.6 The Team

- 1.6.1 The environmental appraisal has been compiled by Arcadis (Consulting) UK Ltd. In addition to the team preparing the EAR, National Grid, Jacobs and JBP Consulting Limited have contributed to the preparation of the planning application and have provided information that has been used in the EAR.

1.7 Bibliography

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- The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 [online] Available at: <https://www.legislation.gov.uk/uksi/2017/571/contents> [Accessed 21/10/2025].
- Town and Country Planning Act 1990. [online] Available at: <https://www.legislation.gov.uk/ukpga/1990/8/contents> [Accessed 21/10/2025].

2. Scheme Description

- 2.1.1 This chapter provides a description of the Scheme subject to environmental appraisal in support of the planning application.

2.2 Introduction

- 2.2.1 This chapter of the EAR provides a description of the application proposal (hereafter 'the Scheme') and forms the basis of the appraisal presented in Chapters 4-15. It provides an overview of the existing site, a description of the layout and physical characteristics of the Scheme and the land use requirements during the construction and operational phase of the development. This chapter also describes the construction programme and anticipated construction activities.
- 2.2.2 All dimensions described are approximate.

2.3 Existing Site and Surroundings

- 2.3.1 The existing layout and the boundary of the Site is shown on Appendix C Chesterfield New 400kV Substation Proposed Site Layout. The extent of the Site is approximately 14.5ha. The Site is located to the south east of Chesterfield, south of Cock Alley.
- 2.3.2 Currently, the Site comprises two parts. Part of the site comprises the existing 275kV National Grid Chesterfield Substation (which is located within the western part of an existing 132kV substation compound) with the majority of the remainder of the site being agricultural land, located to the south of the existing 132kV substation compound. A number of existing pylons are also present within the Scheme boundary, as shown in Appendix C Chesterfield New 400kV Substation Proposed Site Layout.
- 2.3.3 The Site is bound to the north by Calow Lane and to the east by Hallflash Lane. The A617 is present to the south west of the Site, beyond which are the southern residential and commercial areas of Chesterfield. The land parcels that immediately surround the Site are predominantly agricultural. Land to the north, south and east is more rural in character, while developed land is predominantly to the west of the Site.
- 2.3.4 There are no designated sites within the Site, however the 'Duckmanton Railway Cutting' Derbyshire Wildlife Trust (DWT) Reserve and Site of Special Scientific Interest (SSSI) is 1km to the north east, discussed further in Chapter 4 Ecology, and there are 16 listed buildings within 2km of the Site, discussed further in Chapter 6 Cultural Heritage and Archaeology.
- 2.3.5 Furnace Hillock is a copse of trees located within the western part of the Site. These trees are protected by a Tree Preservation Order, and further details are provided in Appendix E Chesterfield New 400kV Substation Drawings.

- 2.3.6 Four residential receptors are located adjacent to the western and eastern boundaries of the Site. Additional residential receptors are located to the north east of the Site. Larger residential areas in the surrounding area include (distances approximate):
- Hasland 500m to the west;
 - Hady 400m to the north west;
 - Calow 1km to the north; and
 - Winsick 700m to the south.
- 2.3.7 A tributary of Calow Brook is located to the east (180m at its closest point) and Calow Brook itself is located to the south (250m at its closest point) of the Site.
- 2.3.8 The Site topography ranges from approximately 104-117m Above Ordnance Datum (AOD). The Site is gradually sloped from north to south with the steepest areas being in the south of the Site. The landscape is generally open with small woodland blocks and field boundary hedgerows forming some containment within the local landscape. Farm buildings and agricultural fields provide the main features, with the existing substation infrastructure, pylons and overhead lines forming the main detracting features in the skyline. The Site is partially screened by woodland and intervening topography in the surrounding area.
- 2.3.9 There are no statutory designated ecological sites within the Site. There is one statutory designated site within 2km of the Site, which is the Duckmanton Railway Cutting DWT Reserve and SSSI 1km to the north east of the Site. There are 16 non-statutory sites within 2km of the Site, including Local Wildlife Sites (LWS), potential LWS (pLWS), and DWT Reserves (see Chapter 4 Ecology).
- 2.3.10 The Site is not located within areas designated nationally or locally for their landscape. There are no National Landscapes or National Parks within 2km of the Site (see Chapter 5 Landscape and Visual).
- 2.3.11 There are no World Heritage Sites, scheduled monuments, Registered Battlefields, or Registered Parks and Gardens within 2km of the Site. There are no listed buildings within the Site, but there is one listed building within 1km of the Site and a further 15 within 2km of the Site (see Chapter 6 Cultural Heritage and Archaeology).
- 2.3.12 The Site is not within an Air Quality Management Area (AQMA) (see Chapter 7 Air Quality).
- 2.3.13 No Environment Agency designated main rivers are located within the Site. A tributary of the Calow Brook flows north to south directly to the east of the Site (see Chapter 8 Water Resources and Flood Risk).
- 2.3.14 There are no Noise Important Areas within the Site; the closest is 500m to the south west of the Site, associated with the A617 (see Chapter 10 Noise and Vibration).
- 2.3.15 There are three Public Rights of Way (PRoWs) which interact with the Scheme. The three PRoWs are:
- PRoW NE5/25/1 – currently routed on an east-west alignment to the south of the existing substation;
 - PRoW NE5/17/2 and NE5/17/1 – currently following Hallflash Lane; and

- PRoW NE5/16/1 – currently following an alignment to the north and east of Furnace Hillock before routing to the south of the existing substation and joining Hallflash Lane.

2.4 Scheme Proposal

Town and Country Planning Application

2.4.1 The Scheme described in the planning application is as follows:

‘Erection of a 400kV Gas Insulated Switchgear (GIS) substation including three super grid transformers, gantries, internal access roads, a GIS building, parking, drainage, diesel generator, lighting and CCTV, permanent access road from Calow Lane, earthworks, landscaping and biodiversity enhancement, and fencing the permanent realignment of footpaths NE5/25/1 and NE5/16/1 and felling of trees subject to TPO W1/171.’

2.4.2 Biodiversity Net Gain (BNG) has been agreed to ensure the Scheme achieves the 10% BNG as required under government legislation (see Chapter 4 Ecology).

2.4.3 The planning application is supported by the following documents which have been produced as the basis of the EAR:

- Application form and certificate(s);
- Planning drawings (in accordance with national validation requirements);
- Location Plan;
- Existing and proposed site plan;
- Contours and cross sections;
- Elevations and roof plan (of plant, equipment and GIS building);
- Landscaping proposals and visualisations;
- Access roads and cross sections;
- Planning and Design and Access Statement (PDAS);
- Environmental Appraisal Report (EAR) and appendices;
- Ecology Report;
- Biodiversity Net Gain (BNG) Report and plans;
- Heritage Desk-based Assessment;
- Agricultural Land Classification;
- Arboricultural Impact Assessment;
- Flood Risk Assessment (FRA);
- Noise Assessment;
- Electric and Magnetic Field (EMF) Report;
- Outline Construction Environmental Management Plan (OCEMP);

- Outline Site Waste Management Plan (OSWMP);
 - Outline Construction Traffic Management Plan (OCTMP);
 - Surface Water Management Plan;
 - Coal Mining Risk Assessment; and
 - Swept path/tracking plans for Abnormal Indivisible Loads (AILs).
- 2.4.4 The Scheme comprises a new 400kV GIS substation and associated infrastructure with three 400/275kV 1100MVA super grid transformers (SGTs). This includes 13 bays, six overhead line gantries, protection and control equipment, typical substation plant and new substation control infrastructure.
- 2.4.5 The GIS substation will be within a compound of up to 150m x 210m and include up to three SGTs. The tallest structure within the substation compound will be the GIS building, which will be approximately 76m long by 25m wide and 15m high.
- 2.4.6 There will be six overhead line gantries, which are bridge-like structures with platforms used to support equipment and cabling. The gantries will be approximately 12m high.
- 2.4.7 Three permanent buildings are proposed within the Site and further detail is provided in Section 2.5. The buildings range from 4.5m to 15m in height, 6m to 76m long, and 2.5m to 25m wide.
- 2.4.8 The compound will be surrounded by a 2.4m high palisade security fence with a 4m high electric pulse fence installed to the rear of the palisade to secure the site and avoid trespassers, including closed-circuit television (CCTV) surveillance.
- 2.4.9 The substation includes electrical plant for controlling directing, switching and transforming high voltage electricity. This plant includes:
- SGTs and associated cooler banks;
 - GIS switchgear;
 - Gas Insulated Busbar (GIB) connecting the GIS switchgear to other plant;
 - Capacitor Voltage Transformers (CVT);
 - Cable Sealing Ends (CSEs);
 - earth switches;
 - surge arresters;
 - diesel generator; and
 - protection and control equipment.
- 2.4.10 The proposed layout of the Site, including removal and temporary works, is shown in Appendix C Chesterfield New 400kV Substation Proposed Site Layout.

Section 37 Proposals and Consenting Requirements

- 2.4.11 Three permanent pylons will be located within the Site. One will be located to the west of the substation, the other two will be located to the south of the substation. These pylons will be up to 15m x 15m in size, with heights of up to 50m, connected by overhead lines.

- 2.4.12 One temporary pylon will be located within the Site, to the south of the proposed substation. This pylon will be 15m x 15m in size, with a height of 46m. Three existing pylons are to be removed.
- 2.4.13 Section 37 of the Electricity Act 1989, as amended, sets out, with certain exceptions, that consent must be obtained to “install or keep installed” electric lines above ground. ‘Electric lines’ are defined in Section 64 of the Electricity Act 1989.
- 2.4.14 For National Grid, Section 37 consent is therefore required for new above ground overhead line (outside of National Grid’s land) that are:
- new overhead lines less than 2km in length; and
 - replacing an existing overhead line (which meets certain tests, unless it is exempted).
- 2.4.15 Section 37 of the Electricity Act 1989 does provide an exemption from the requirement to obtain consent for any overhead line that is on land that “is, or will be”, in National Grid’s “occupation or control”. This means that above ground electric lines (busbars, conductors or gantries that are part of the “electric line”) can be installed and kept installed on National Grid land, i.e. within its substations, without requiring Section 37 consent, or relying on any electricity exemptions. In addition, the Overhead Lines (Exemption) (England and Wales) Regulations 2009 provide further exemptions for minor works to existing overhead lines requiring Section 37 consent.

2.5 Construction Phase

- 2.5.1 This section sets out the construction programme and outlines the key assumptions that have been made within the EAR with regards to the construction approach and working methods for the Scheme.

Outline Construction Environmental Management Plan

- 2.5.2 An Outline Construction Environmental Management Plan (OCEMP) has been produced and will be submitted for agreement with NEDDC prior to the commencement of the Scheme. Following the receipt of planning approval, the OCEMP will then be updated by the construction contractor to a full Construction Environmental Management Plan (CEMP) which will be in accordance with the OCEMP.
- 2.5.3 The purpose of the OCEMP is to identify potential adverse environmental issues arising from the construction of the Scheme, to specify measurable limits and targets, and to detail the mitigation measures to be undertaken during construction and the management tools and procedures required. The OCEMP therefore provides an operational manual detailing the management, monitoring, auditing and training procedures to be followed during the construction of the works to ensure compliance with relevant legislation. It would also set out the specific roles and responsibilities of the Contractors and wider project team personnel. The OCEMP includes the following:
- available details regarding the phasing of works;
 - details of the works to be undertaken highlighting any operations likely to result in adverse environment impacts, with an indication of the specific detailed mitigation measures to be employed;

- prohibited or restricted operations;
- a framework for compliance with relevant legislation and guidance;
- details of plant to be used;
- construction working hours including any weekend or public holiday works proposed and, if so, their working hours;
- roles and responsibilities of key staff including training of staff, liaison with stakeholders and management of enquiries and complaints;
- details of emergency procedures to be implemented on the Site;
- details of general Site management practices, including working hours, hoarding, access, lighting, Site facilities, energy and water use, waste, materials procurement and storage;
- details of environmental management and control procedures, covering ecology, traffic and access, noise and vibration, dust, contamination, hazardous materials, drainage and pollution control;
- requirements for auditing, monitoring and record-keeping;
- mechanisms for third parties to register complaints and the procedures for responding to complaints; and
- provisions for reporting, public liaison and prior notification, especially where dispensations are required.

2.5.4 All proposed mitigation measures relating to the construction phase identified in Chapters 4-15 of the EAR are included within the OCEMP.

Outline Construction Traffic Management Plan

2.5.5 An Outline Construction Traffic Management Plan (OCTMP) has been produced and will be submitted for approval by NEDDC prior to the commencement of Scheme. Following the receipt of planning approval, the OCTMP will then be updated by the Contractor to a full Construction Traffic Management Plan (CTMP), which will be in accordance with the OCTMP.

2.5.6 The purpose of the CTMP is to outline the measures to be followed to manage construction traffic. The CTMP would typically include the following:

- the construction programme and anticipated peak two-way traffic movement flows broken down into vehicle types (Heavy Goods Vehicles (HGVs) and Cars/Light Goods Vehicles (LGVs));
- details of proposed routes for HGVs travelling to and from the Site;
- peak numbers of anticipated construction workers;
- Abnormal Indivisible Load (AIL) numbers and the vehicle types/sizes;
- details of any PRoW realignment/diversions/closures and any alternative routes being proposed and the duration of closure/diversion;
- confirmation of the substation site access and the site access locations for the overhead lines; and
- site access drawings, including visibility splays and swept path analysis.

Outline Site Waste Management Plan

- 2.5.7 An Outline Site Waste Management Plan (OSWMP) has been produced and will be submitted for approval by NEDDC prior to the commencement of Scheme. Following the receipt of planning approval, the OSWMP will then be updated by the construction contractor to a full Site Waste Management Plan (SWMP) which will be in accordance with the OSWMP.
- 2.5.8 The OSWMP outlines measures to be undertaken during construction to appropriately manage construction waste.

Outline Soil Management Plan

- 2.5.9 An Outline Soil Management Plan (OSMP) has been produced and will be submitted for approval by NEDDC prior to the commencement of the Scheme. Following the receipt of planning approval, the OSMP will then be updated by the Contractor to a full Soil Management Plan (SMP) which will be in accordance with the OSMP.
- 2.5.10 The OSMP outlines measures to be undertaken during construction to appropriately manage construction waste.

Pre-commencement Works

- 2.5.11 Pre-commencement works will consist of vegetation clearance where necessary to enable the construction works. Vegetation clearance will be required to the south of the existing 132kV compound to facilitate drainage installation. The following sections of vegetation will be retained:
- a section of Furnace Hillock;
 - the line of trees bordering the south western corner of the existing 275kV substation;
 - a portion of the species-rich native hedgerow with trees associated with the bank or ditch bordering the southern boundary of the existing 275kV substation; and
 - the hawthorn scrub, modified grassland and the line of trees to the north east corner of the existing substation.
- 2.5.12 Vegetation clearance will be undertaken along the western part of Furnace Hillock to enable the construction of a temporary access road. Vegetation clearance will also be undertaken at the eastern side of Furnace Hillock to enable permanent earthworks, overhead lines and temporary cables.
- 2.5.13 The existing PRow NE5/16/1 will be temporarily closed and diverted south of the new substation, following the Scheme boundary to the south, to facilitate construction works.
- 2.5.14 During the construction phase of the Scheme, PRow NE5/16/1 will be temporarily diverted to the south of its current alignment. Following the construction phase, a slight realignment of PRow NE5/16/1 will be put in place between the two substations.
- 2.5.15 There may also be a need to temporarily close PRow NE5/17/2 for a short period to facilitate drainage works.
- 2.5.16 Ground remediation works may be required depending on the results of the Ground Investigation.

Temporary Works

- 2.5.17 Prior to the removal of some overhead line entries into the 275kV compound equipment (see Removal Works section below), temporary works will be required to ensure continuity of connection throughout the grid works while the new substation is constructed. This will involve part of the existing substation being supported by two temporary CSE compounds. These temporary CSE compounds will be located to the west and south west of the existing substation. The dimensions for the western temporary CSE compound are 38m wide by 25.5m long (accommodating for an access road); the highest structures in the CSE are the overhead line gantries which are approximately 12.5m high. The dimensions south west CSE compound will be 22m x 18.5m; the highest structures in the CSE are the overhead line gantries which will be approximately 12.5m high.
- 2.5.18 The CSE compounds will connect to the existing substation with four CSE cables, two cables per compound. These cables will be below ground and up to 2,500mm² in cross sectional area and 335m in length. The southern temporary CSE compound will connect to one temporary overhead line pylon located along the southern edge of the Scheme boundary. The dimension of the pylon is 15m x 15m, with a height of 46m. Overhead cables of 568m length will connect the pylon and CSE.

Removal Works

- 2.5.19 Some redundant equipment within the 275kV substation will be removed. The perimeter fence will be retained for security purposes. Gravel or other suitable low maintenance substrate will be installed across this part of the Site. Any known contamination or potential sources of contamination will be removed/remediated including assets below ground (such as oil filled cables).
- 2.5.20 Three pylons will be removed as part of this Scheme. One is located to the north of the western part of the existing substation, one is to the north of the new substation, and one is to the south of the new substation. These locations are shown on Appendix C Chesterfield New 400kV Substation Proposed Site Layout. There will be temporary overhead cables connecting the pylon for removal to the north of the new substation and the new pylon to the south west of the new substation.
- 2.5.21 Several underground cables connecting the western part of the existing 275kV substation will be removed and replaced with new cables in the construction phase which will connect the existing 275kV substation to the GIS compound.
- 2.5.22 Additionally, an existing 132kV underground cable that currently travels southward from the existing substation will be removed.

Construction Programme

- 2.5.23 The indicative programme identifies pre-commencement works are due to start in July 2026 and will be completed by August 2026. Construction works will span from August 2026 and will be completed by March 2030. Temporary connection works will be in place from June 2026 to March 2030.

- 2.5.24 The indicative construction and commissioning stage will consist of the following phrases:
- pre-commencement works: July 2026 – August 2026;
 - site establishment and enabling works: August 2026 – October 2026;
 - substation works: September 2026 – December 2029; and
 - demobilisation: January 2030 – March 2030.

Construction Compound

- 2.5.25 The location of the construction compound for the Scheme is still to be confirmed and therefore it is not covered within the scope of this EAR as it is not part of this TCPA application. Pending confirmation of the final location of a temporary compound, National Grid will implement the works under deemed planning permission¹ or, if required, seek a separate planning consent from NEDDC as the local planning authority (LPA).
- 2.5.26 Standard construction compound lighting and palisade security fences for construction compounds will be used.

Working Hours

- 2.5.27 Typical working hours would likely be 7am to 7pm on Monday to Friday, except during system outages, and 8am to 1pm on Saturday. System outages are assumed to only be permitted from the end of March to the end of October. During outages, some weekend working may be required.
- 2.5.28 Any works proposed outside of the hours specified above are to be agreed with NEDDC prior to any of the proposed works being carried out.

Site Access and Routes

- 2.5.29 The Site will be accessed via a new access from Calow Lane into the northern part of the Site. Vehicles will travel along the A617, the B6425, the A632 and then Calow Lane before entering the Site.
- 2.5.30 From the site entrance off Calow Lane, an access road will be constructed that goes southward from Calow Lane into the proposed substation where it will split off in five directions throughout the proposed substation.
- 2.5.31 The access route crosses proposed underground cables in four places along the route. Two of these cables are permanent and located within the footprint of the proposed substation. The remaining two cables are temporary and will be located in the north west of the Site, in association with the temporary CSE compounds.
- 2.5.32 Two temporary access tracks will be used during construction. One is to the north west of the proposed substation and loops around a temporary CSE compound. The other goes from the north west of the proposed substation and down along the western side of the Site, along an existing track within Furnace Hillock, to a second CSE compound to the west of the proposed new 400kV substation.

¹ Using The Town and Country Planning (General Permitted Development) (England) Order 2015, Schedule 2, Part 4 Class A

2.6 Operational Phase

Substation

- 2.6.1 The Scheme involves the construction of a new 400kV GIS substation and associated infrastructure, including three 400/275kV 1100MVA SGTs which will be located to the south of the existing substation. The SGTs, including the coolers attached to them, will be approximately 20m by 10m with heights of 10m. The SGTs will be surrounded by a perimeter of reinforced concrete bunds, supported on a base slab continuous with the wall and a central plinth for supporting the SGTs. The bunds would also act as a secondary oil containment measure for the insulation oil in the transformers.
- 2.6.2 There is proposed to be a noise enclosure around each transformer to reduce operational noise. The noise enclosures will be around the SGTs only (not the attached cooler banks) and will be up to 12m long, 8m wide and 6m high to contain the primary noise emitting components. Other equipment includes protection and control equipment, switching devices, cooler banks for each transformer, a diesel generator and a water tank emergency firewater supply.
- 2.6.3 Six overhead line gantries will be constructed; two to the west of the proposed substation and four to the south of the proposed substation. The gantries are 2.5m x 22m with heights of 12.5m. The two western gantries will tie into the northernmost pylon and the four southern gantries will tie into the remaining two pylons to the south.
- 2.6.4 Four CSE cables will connect the new substation to the eastern part of the existing substation. These cables will be underground with dimensions of up to 2500mm² cross sectional area and lengths of 340m.
- 2.6.5 A new 400kV GIS building will be located to the south of the SGTs and be 76m by 25m and 15m high from ground level. The GIS building will be of steel frame construction with complete metal cladding.
- 2.6.6 The GIS building will house 13 GIS bays with each bay 3m wide and up to 8m long. Each GIS bay will connect to the wider substation through a series of overground GIBs with diameters of 400mm and lengths of up to 180m.
- 2.6.7 A small storage unit and workshop building will be located within the eastern part of the Site.
- 2.6.8 Within the substation, the majority of electrical equipment will be mounted on steel posts fixed to concrete foundations. The top of the electrical equipment, and GIB or GIS busbars connecting equipment, will be typically up to 9m above ground level.

Drainage

- 2.6.9 Appropriate drainage structures will be put in place across the Site. Two attenuation ponds will be constructed as per the following:
- One in the north of the Site alongside the new access road. This attenuation pond will discharge into an existing chamber and utilise the existing site discharge arrangement. The attenuation pond will have a storage volume water depth of 0.5-65m³, a pond invert level of 111.0m AOD, total pond depth of 1.0m, and pond earthworks side slopes of 1:3;

- One will be located to the south east of the proposed substation. The attenuation pond will discharge to a cut-off ditch, which will ultimately lead to an unnamed tributary of the Calow Brook. The attenuation pond will have a storage volume water depth of 0.9-750m³, a pond invert level of 106.9m AOD, total pond depth of 1.2m and pond earthworks side slopes of 1:3.

- 2.6.10 In addition, a new drainage outfall will be constructed at the eastern side of the Site, adjacent to Hallflash Lane.
- 2.6.11 Filter drains will be located throughout the Site, adjacent to access routes and parking areas, at a shallow depth to collect surface water runoff. Oily water from SGT bunds will be filtered through a suitably sized Oil Water Interceptor, which will discharge to an attenuation pond.

Permanent Buildings

- 2.6.12 There are three permanent buildings proposed as part of the Scheme:
- A new 400kV GIS building will be located in the eastern part of the proposed substation. The building will be 76m long by 25m wide and 15m high from ground level. The GIS building will be of steel frame construction with complete metal cladding. Welfare facilities, including toilets, showers, a mess hall, and offices, will be located within the GIS building. The GIS building will house 13 GIS bays with each bay 3m wide and up to 8m long. Each GIS bay will connect to the wider substation through a series of overground GIBs with diameters of 400mm and lengths of up to 180m.
 - A small workshop building will also be located on the Site. It will be 6.5m long by 2.5m wide with a height of 4.5m.
 - A small storage unit will also be located on the Site. It will be 6.5m long by 2.5m wide with a height of 4.5m.

Other Permanent Structures

- 2.6.13 Permanent security fencing will be located around the substation. The substation will have a 2.4m high palisade security/safety fence with 4m high electric pulse fence installed to the rear of the palisade to secure the Site and avoid trespass.
- 2.6.14 Provision for the parking of six vehicles, including the provision of two electric vehicle parking spots, will be located to the east of the GIS building.
- 2.6.15 Welfare facilities, including toilets and showers, will be located within the GIS building.
- 2.6.16 A diesel generator will be located in the east of the Site. The diesel generator will be located within an acoustic container to minimise noise.

Access

- 2.6.17 During operation, access to the Site will be via Calow Lane, to the north of the Site. This access will be used when maintenance is required. It is anticipated that maintenance will be carried out by 10 staff 10 times a year.

- 2.6.18 PRow NE5/25/1 will need to be realigned onto a slightly amended alignment to the south of the existing substation but it will broadly maintain its existing west to east alignment. The PRow will be appropriately screened and will be outside the security fencing of the substation. The only parts of the PRow without screening will be the sections that cross over two underground cables that connect the proposed substation with the existing substation; screening cannot be installed here due to potential interaction between vegetation roots and the cables.
- 2.6.19 PRow NE5/16/1 will need to be permanently diverted to ensure that an accessible route remains open to the west and south of the proposed substation. The PRow will be temporarily realigned during construction before being permanently diverted for the operational phase. The diverted route would run parallel to the south western part of the Scheme boundary. The PRow will be suitably screened to maintain the amenity value of the PRow.
- 2.6.20 Engagement is ongoing with Derbyshire County Council, NEDDC and various user groups to discuss permanent footpath diversion options.

Operations

- 2.6.21 Throughout the operational phase, the substation will not generally be manned. Welfare facilities, including toilets, showers, mess hall, and meeting rooms, will be located within the GIS building. When maintenance of the substation is undertaken, the number of staff on-site will increase to 10 for the duration of the works.
- 2.6.22 Vehicle movements throughout operation and when maintenance is undertaken are anticipated to be a maximum of 10 movements per day.
- 2.6.23 Day-to-day operational noise associated with staff on-site will be minimal and contained within normal working hours.
- 2.6.24 Substations are not generally lit or permanently illuminated. Floodlights, 4-6m in height, will be installed but only used if access is required in an emergency during the hours of darkness. Security lighting will also be used when an intruder alarm is activated at night; in this scenario, a light will be activated for approximately 3 minutes whilst the alarm is remotely assessed by National Grid.

Environmental Mitigation and Biodiversity Net Gain (BNG)

- 2.6.25 The landscaping on the Scheme has been designed to provide environmental mitigation and BNG.
- 2.6.26 The landscaping design comprises:
- re-instating the existing vegetation habitat along Calow Lane after the completion and removal of the temporary works;
 - species rich hedgerow planting along the re-routed PRow NE5/25/1;
 - native scrub planting along the east side of the new 400kV substation to provide screening for Hall Flash Farm and Hallflash Lane;
 - existing vegetation to be retained along the boundary with Hall Flash Farm;
 - wetland species planting around the attenuation ponds;

- reinstating hedgerow planting along the south west boundary of the Site after completion of the temporary works to provide screening;
- species rich hedgerow planting along the re-routed PRoW NE5/16/1;
- native species woodland planting in the west of the Site to mitigate the loss of existing broadleaved woodland;
- mixed scrub planting along the existing hedgerow on the south and south west Scheme boundary;
- retaining the existing woodland habitat in the west of the Site where possible;
- re-instating existing woodland habitat in the west of the Site after the completion and removal of the temporary works;
- native species woodland planting in the north west of the Site to mitigate the loss of existing broadleaved woodland;
- new native hedgerow with intermittent broadleaved tree planting along the north west Scheme boundary to provide screening for Laurel Farm; and
- native species rich hedgerow planting adjacent to the west of existing substation boundary to replace that removed to facilitate the overhead line route.

2.7 Bibliography

- Electricity Act 1989. [online] Available at: <https://www.legislation.gov.uk/ukpga/1989/29/contents> [Accessed 21/10/2025].
- The Overhead Lines (Exemption) (England and Wales) Regulations 2009. [online] Available at: <https://www.legislation.gov.uk/uksi/2009/640/contents/made> [Accessed 21/10/2025].
- The Town and Country Planning (General Permitted Development) (England) Order 2015. [online] Available at: <https://www.legislation.gov.uk/uksi/2015/596/contents> [Accessed 21/10/2025].

3. Methodology

3.1 EAR Approach

3.1.1 This chapter outlines the methodology which has been used to assess the potential impacts on the natural, human and built environment as a result of the Scheme.

3.1.2 The process of undertaking the environmental appraisal and preparing this EAR has comprised:

- data review and initial site surveys – collating and reviewing available data and undertaking site surveys;
- Screening Report – requesting a Screening Opinion from NEDDC;
- baseline surveys – undertaking baseline surveys to confirm existing conditions;
- assessment and iteration – assessing potential impacts of the Scheme, providing feedback to the design team on any adverse impacts, incorporating mitigation and assessing the residual impacts;
- preparation of environmental reports and the EAR; and
- preparation of the OCEMP and OCTMP including monitoring and implementation.

3.2 EIA Screening

3.2.1 An EIA Screening Request for the Scheme was issued to NEDDC on 5 April 2024. A Screening Opinion was received from NEDDC on 19 April 2024. The Screening Opinion confirmed that EIA was not required. The approach to the EAR is guided by good practice guideline documents and standards set by other similar projects.

3.2.2 A subsequent EIA Screening Request for the Scheme was issued to NEDDC on the 31 October 2025. A Screening Opinion was received from NEDDC on 18 November 2025. The Screening Opinion confirmed that EIA was not required.

3.3 Scope of the EAR

3.3.1 The scope of the appraisal has been informed by the environmental information submitted with the planning application.

3.3.2 The study area for the appraisal is based on the distance over which an impact is likely to occur. The study areas are specific to each environmental discipline and are outlined within the discipline chapters.

3.3.3 The EAR considers the impacts from the construction and operational phases of the Scheme. Removal of existing substation infrastructure is not within the scope of this appraisal.

3.4 Baseline Data Collation

- 3.4.1 Baseline data for the Scheme has been collated through a combination of desktop studies and field surveys.
- 3.4.2 Baseline data has been collated for each discipline chapter to understand the existing baseline conditions of the Site and the surrounding area which formed the basis of the environmental appraisal reported in the EAR. The methodology of how each discipline carried out their desktop baseline studies is outlined in Appendix B Chesterfield New 400kV Substation Methodology.
- 3.4.3 Environmental surveys were carried out in 2023, 2024 and 2025 to inform the environmental appraisal. Where applicable, details about the scope and duration of surveys are presented in the relevant discipline chapter.

3.5 Assessment of Impacts in the EAR

- 3.5.1 The appraisal identifies impacts and receptors relevant to the construction and operation of the Scheme. Information is provided on the nature of the impacts and the sensitivity and/or value of the receptors identified.
- 3.5.2 Control measures have been detailed within each discipline chapter for the potential receptor and/or impact to which they relate. There will be control measures applied for the construction and operational phases of the Scheme. The appraisal has been undertaken assuming these measures are in place.

Cumulative Impacts

- 3.5.3 The EAR identifies the potential for inter-project cumulative impacts (impacts arising from the construction and operational phases of the Scheme in combination with other developments within the study area).
- 3.5.4 A full methodology for assessing cumulative impacts is presented in Appendix B Chesterfield New 400kV Substation Methodology.

4. Ecology

4.1 Introduction

- 4.1.1 This chapter details the ecology baseline conditions and the environmental appraisal of the potential ecological impacts associated with the construction and operation of the above elements of the Scheme. Where potential environmental impacts are identified, relevant control measures are prescribed to reduce or avoid these impacts.
- 4.1.2 This chapter should be read in conjunction with Appendix A Chesterfield New 400kV Substation Glossary and Abbreviations; Appendix B Chesterfield New 400kV Substation Methodology; Appendix E Chesterfield New 400kV Substation Drawings; Appendix F, Chesterfield New 400kV Substation and Overhead Line Ecology Report and Appendix G, Chesterfield New 400kV Substation Biodiversity Net Gain Report.

4.2 Baseline Conditions

- 4.2.1 This section details the baseline sites or features of particular nature conservation interest in relation to the Scheme. The locations of the ecological constraints confirmed as present across the Site and within the immediate vicinity are presented in Appendix E Chesterfield New 400kV Substation Drawings:
- Figure 4.1 Designated Sites;
 - Figure 4.2 Phase 1 Habitat Plan;
 - Figure 4.3 Pond Location Map;
 - Figure 4.4 Bat PRF Tree Locations Map;
 - Figure 4.5 Bat Activity Survey Map;
 - Figure 4.6 Invasive Non-Native Species Map; and
 - Figure 4.7 Baseline Habitat Map.

Designated Sites

- 4.2.2 Table 4.1 summarises the non-statutory and statutory designated sites within the relevant Zone of Influence (Zoi) for the Scheme.

Table 4.1 Statutory and non-statutory designated sites within the study area and their geographical importance

Site Name and Designation	Distance from the Site (km)	Reason for Designation
Statutory Designated Sites		
Peak District Moors Special Protection Area (SPA)	8.8km west	<p>The SPA covers an area of 45,270.52 ha and comprises an extensive tract of moorland and moorland-fringe habitat. It includes most of the unenclosed moorland areas of the north, eastern and south western Peak District, where it also extends into enclosed farmland of wet rushy pasture, hay meadows and small wetlands in the valley bottoms. The moorland habitats include extensive tracts of blanket bog and dry heath, which together with wet heath, acid grassland, small flushes, gritstone edges and boulder slopes, streams and moorland reservoirs, fringing semi-natural woodland and enclosed farmland, represents the full range of upland vegetation characteristic of the South Pennines. The site supports several important species assemblages, including higher plants, lower plants and insects, as well as breeding birds.</p> <p>The following ‘qualifying’ species form the internationally important breeding populations across this area:</p> <ul style="list-style-type: none"> • merlin (<i>Falco columbarius</i>): 30–36 pairs, 2.3–2.8% of the GB population; • European golden plover (<i>Pluvialis apricaria</i>): 435–445 pairs, 1.9–2.0% GB population; and • short-eared owl (<i>Asio flammeus</i>): 22–25 pairs, 2.2–2.5% GB population. <p>The SPA also supports an important assemblage of rich upland breeding bird assemblage, non-qualifying species such as important numbers of peregrine (<i>Falco peregrinus</i>), lapwing (<i>Vanellus vanellus</i>), dunlin (<i>Calidris alpina schinzii</i>), snipe (<i>Gallinago gallinago</i>), curlew (<i>Numenius arquata</i>), redshank (<i>Tringa totanus</i>), common sandpiper (<i>Actitis hypoleucos</i>), whinchat (<i>Saxicola rubetra</i>), wheatear (<i>Oenanthe oenanthe</i>), ring ouzel (<i>Turdus torquatus</i>) and twite (<i>Carduelis flavirostris</i>).</p>
South Pennine Moors Special Area of Conservation (SAC)	8.8km west	<p>Annex I (of the Habitats Directive) habitats that are a primary reason for selection of this site:</p> <ul style="list-style-type: none"> • 4030 European dry heaths: The site is representative of upland dry heath at the southern end of the Pennine range, the habitat’s most south easterly upland location in the UK. The upland heath of the South Pennines is strongly dominated by heather (<i>Calluna vulgaris</i>). Its main National Vegetation Classification types are H9 <i>Calluna vulgaris</i> – <i>Deschampsia flexuosa</i> heath and H12 <i>Calluna vulgaris</i> – <i>Vaccinium myrtillus</i> heath. More rarely H8 <i>Calluna vulgaris</i> – <i>Ulex gallii</i> heath and H10 <i>Calluna vulgaris</i> – <i>Erica cinerea</i> heath are found. On the higher, more exposed ground H18

Site Name and Designation	Distance from the Site (km)	Reason for Designation
		<p><i>Vaccinium myrtillus</i> – <i>Deschampsia flexuosa</i> heath becomes more prominent. In the cloughs, or valleys, which extend into the heather moorlands, a greater mix of dwarf shrubs can be found together with more lichens and mosses. The moors support a rich invertebrate fauna, especially moths, and important bird assemblages;</p> <ul style="list-style-type: none"> 7130 Blanket bogs (* if active bog): This site represents blanket bog in the South Pennines, the most south easterly occurrence of the habitat in Europe. The bog vegetation communities are botanically poor. Hare's-tail cottongrass (<i>Eriophorum vaginatum</i>) is often overwhelmingly dominant and the usual bog-building <i>Sphagnum</i> mosses are scarce. Where the blanket peats are slightly drier, heather, crowberry (<i>Empetrum nigrum</i>) and bilberry (<i>Vaccinium myrtillus</i>) become more prominent. The uncommon cloudberry (<i>Rubus chamaemorus</i>) is locally abundant in bog vegetation. Bog pools provide diversity and are often characterised by common cottongrass (<i>E. angustifolium</i>); and 91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles: Around the fringes of the upland heath and bog of the South Pennines are blocks of old sessile oak woods, usually on slopes. These tend to be dryer than those further north and west, such that the bryophyte communities are less developed (although this lowered diversity may in some instances have been exaggerated by the effects of 19th century air pollution). Other components of the ground flora such as grasses, dwarf shrubs and ferns are common. Small areas of alder woodland along stream-sides add to the overall richness of the woods. <p>There are two Annex I habitats present as a qualifying feature, but not a primary reason, these are:</p> <ul style="list-style-type: none"> 4010 Northern Atlantic wet heaths with <i>Erica tetralix</i>; and 7140 Transition mires and quaking bogs. <p>There are no Annex II species present as a qualifying feature.</p>
Duckmanton Railway Cutting DWT Reserve and SSSI	1.05km north east	Geology, grassland flowers.
Non-statutory Designated Sites		
Land Between Spital and Hady potential Local	800m north west	No details available.

Site Name and Designation	Distance from the Site (km)	Reason for Designation
Wildlife Site (pLWS)		
Land North of Somerset House, Calow Local Wildlife Site (LWS)	940m north	Semi-improved neutral grassland with a species composition indicative of the MG9 (False Oat-grass sub community) National Vegetation Classification grassland.
Grassmoor Country Park LWS	1.1km south	Two fishing ponds joined by a small stream. The ponds have a resident water vole population and support a diverse amount of marginal vegetation. Nine species of dragonfly have been recorded on this site including ruddy darter (<i>Sympetrum sanguineum</i>).
Corbriggs Marsh LWS	1.15km south	Moderately steep bank with a westerly aspect falling to a watercourse which forms the west boundary. The bank supports species-rich damp neutral grassland. Along the bank there are various areas where either change in soil type or level of wetness give rise to areas of vegetation which are distinctly different from one another in their species composition
Sutton Springs Wood LWS	1.2km south east	A fragmented area of ancient semi-natural Oak (<i>Quercus</i> sp.) woodland.
All Pits Plantation pLWS	1.25km north	No details available.
Arkwright Town Reclamation Site pLWS	1.5km east	No details available.
Arkwright Town Railway LWS	1.6km north east	Disused railway line comprised of sparsely vegetated grassland, bare ground and naturally regenerating oak woodland. Noted for butterflies in the past.
Spital Scrub LWS	1.6km north west	Disused railway cutting with steep embankment. Scrub interspersed with small areas of open grassland, and secondary broad-leaved woodland habitat.
Avenue Country Park LWS	1.8km south west	Restored from an old coking works in 2019, the site comprises a mosaic of neutral unimproved grassland, species-rich neutral semi-natural grassland, ponds, marsh, broad-leaved woodland, plantation woodland. The River Rother runs along the north eastern corner of the site. The majority of habitats on-site have been newly created as part of the restoration work. This area

Site Name and Designation	Distance from the Site (km)	Reason for Designation
		was found to contain snipe, lapwing and skylark (<i>Alauda arvensis</i>).
Land North of Hady Hill Farm pLWS	1.85km north west	No details available.
Birkin Lane Carr LWS	1.9km south	Secondary broad-leaved wet woodland, wet grassland and lowland swamp. Stream and fish ponds with water voles (<i>Arvicola amphibius</i>).
West Wood and Parker's Wood	1.9km north east	West Wood is a large area of ancient woodland situated on a west facing slope which runs down to Trough Brook.
Avenue Country Park DWT Reserve	1.9km south west	Species-rich neutral grasslands, scrub, ponds and ditches.
Piccadilly Cottages Scrub LWS	1.9km north west	Disused spoil heaps which have become vegetated with scrub and secondary broad-leaved woodland which forms a mosaic with more open areas where a more acidic ephemeral-type grassland is present. At the southern end of the site the presence of garden shrub species, along with remnant brick structures, indicate former use of this part of the site as a garden or allotment.

Habitat Survey

- 4.2.3 Full details of the results of the Extended Phase 1 survey are detailed within Appendix F Chesterfield New 400kV Substation and Overhead Lines Ecology Report. The Phase 1 Habitat Plan can be found in Appendix E Chesterfield New 400kV Substation Drawings, Figure 4.2.
- 4.2.4 The desk study identified four Habitats of Principal Importance (HPIs) within 2km of the Site. All four were deciduous woodland; the nearest is within the Scheme boundary.
- 4.2.5 The following habitats have been identified within the Site:
- Broadleaved woodland:
 - A mature semi-natural broad-leaved woodland, known as Furnace Hillock lies within the west of the Site. The canopy was dense and contained predominantly sycamore (*Acer pseudoplatanus*) and pedunculate oak (*Quercus robur*), with occasional ash (*Fraxinus excelsior*). The shrub layer was sparse and supported elder (*Sambucus nigra*), bramble (*Rubus fruticosus agg.*) and holly (*Ilex aquifolium*). The majority of the ground flora comprised ivy (*Hedera helix*) and bluebell (*Hyacinthoides non-scripta*), in addition to lords-and-ladies (*Arum maculatum*). This parcel of woodland is recognised as deciduous woodland HPI.

- Scattered trees:
 - There are two lines of trees within the Site. A line of mature ash trees was recorded along the Scheme boundary to the north west and within the middle of the Site, bordering the existing substation to the south, was comprised of ash, hawthorn, Italian alder (*Alnus cordata*).
- Scrub:
 - There were areas of dense scrub surrounding the existing substation within the north of the Scheme boundary. These comprised a mix of species which included dogwood (*Cornus sanguinea*), hawthorn, sycamore, ash, alder, elder and holly, hazel (*Corylus avellana*) and bramble.
- Improved grassland:
 - Two fields and a small patch within the crop field are within the Site and comprised of grazed improved grassland dominated by meadow-grass (*Poa sp.*) and cock's-foot (*Dactylis glomerata*), with occasional dandelion (*Taraxacum officinale agg.*), creeping buttercup (*Ranunculus repens*) and broad-leaved dock (*Rumex obtusifolius*).
- Cultivated/disturbed land – arable:
 - An arable field lies within the south of the Site. It was fallow at the time of the survey and comprised rye-grass (*Lolium sp.*) ley.
- Hedgerows:
 - Three intact species-poor hedgerows, predominantly hawthorn were present in the middle of the Site, two bordering the woodland.
 - A species-poor hedgerow with trees was present to the east of the Site border.
 - Two intact species-rich hedgerows with trees were present within the Site bordering the existing substation.
 - All hedgerows within the Site consisted predominantly (i.e., 80% or more cover) of at least one woody UK native species and, as such, met the definition of Hedgerow HPI.
- Other habitat:
 - The existing substation and in the west of the Site, south of the woodland.

Protected and Notable Species Survey

Plants

- 4.2.6 There were 45 records of protected and/or notable plant species returned by the desk study. The closest record was bluebell (*Hyacinthoides non-scripta*) located within the Site and verified during the field survey within Furnace Hillock. Bluebell is listed on Schedule 8 of the Wildlife and Countryside Act (WCA) 1981 in respect of Section 13(2) only, which protects it only against sale and not against being picked, uprooted or destroyed.

Invasive Non-Native Species (INNS)

- 4.2.7 There were no INNS identified as present within the Site. The closest record of Himalayan balsam (*Impatiens glandulifera*) was recorded approximately 220m south east of the Scheme boundary.

Invertebrates

- 4.2.8 The desk study returned records of seven notable invertebrate species. The closest record to the Site was of dingy skipper (*Erynnis tages*) and small heath (*Coenonympha pamphilus*) located approximately 1.4km north east.
- 4.2.9 The habitats on Site offered potential to support a limited assemblage of common and widespread terrestrial invertebrate species. The Site does not offer suitable habitat to support notable and/or protected invertebrate species, with the majority of the Site being used as intensively managed arable and so lacks diverse plant species for foraging or commuting. The woodland ride and hedgerows offer a small area of suitable habitat for commuting and foraging, however distribution of the notable invertebrate species recorded in the desk study (1.4km away), and lack of connectivity because of the A632 Chesterfield Road, means the likelihood that the Site would support notable and/or protected species or a significant assemblage of invertebrate species was considered to be negligible.

Amphibians

- 4.2.10 Full details of the results of the great crested newt (*Triturus cristatus*) survey are detailed within Appendix F Chesterfield New 400kV Substation and Overhead Lines Ecology Report. The location of the ponds assessed can be found in Appendix E Chesterfield New 400kV Substation Drawings, Figure 4.3.
- 4.2.11 The desk study returned records of great crested newt, smooth newt (*Lissotriton vulgaris*) and common toad (*Bufo bufo*). The closest record was great crested newt located approximately 480m north west of the Site. Two granted European Protected Species (EPS) licence applications for great crested newt were located within Hunloke Country Park, approximately 1.9km the south west of the Site.
- 4.2.12 The Site does offer limited suitability for amphibians with woodlands, hedgerows, scrub and a rubble pile located within the Site providing suitable shelter and hibernation opportunities for common amphibians. These habitats were relatively well connected to known great crested newt records and to the ponds located within 500m of the sites via hedgerows and woodland.
- 4.2.13 Four ponds were identified within 500m of the Site. It was found that Pond 3 was located approximately 440m to the south west of the Site and Pond 4 was located approximately 460m to the south west of the Site. Both ponds were terrestrially isolated from the Site as they were located on the opposite side of the A617. Targeted surveys were undertaken on Ponds 1 and 2 and found only Pond 1 to be potentially suitable for great crested newt, with the remaining ponds deemed to have limited connectivity to the Site, and Pond 2 had been filled in and so, no longer a water body.
- 4.2.14 A Habitat Suitability Index assessment and environmental DNA (eDNA) test was undertaken on Pond 1 and was found to have poor suitability and returned a negative eDNA result.

- 4.2.15 Great crested newt were assessed as likely absent from the Site and the Site was assessed as offering limited suitability to common and widespread species of amphibians.

Reptiles

- 4.2.16 The desk study returned records of grass snake (*Natrix helvetica*). The majority of grass snake records were located 1.5km south of the Site, and terrestrially isolated from the Site by the A617.
- 4.2.17 The Site has suitability for shelter, hibernation and commuting and foraging habitat for common and widespread reptiles, such as common lizard, within the woodlands, hedgerows, scrub and a rubble pile located within the north west of the Site. However, the wider landscape is dominated by intensively managed agricultural land and urban development and lacked extensive areas of suitable reptile habitat. As such, no significant populations of reptiles are considered to be present within the Site.

Birds

- 4.2.18 The desk study returned records of 56 protected and/or notable birds within 2km the Site, some of which are listed in the local Biodiversity Action Plan (Derbyshire County Council, 2011), in the amber/red lists of Birds of Conservation Concern (Stanbury *et al.*, 2024), under Schedule 1 of the WCA 1981 (as amended) or are Species of Principal Importance (SoPIs) under Section 41 of the Natural Environment and Rural Communities Act 2006. The closest record to the Site was of a yellowhammer (*Emberiza citrinella*) located 330m north. One record of merlin, a qualifying feature of the Peak District Moors SPA, was located approximately 500m north west of the Site.
- 4.2.19 The woodland, trees, scrub and hedgerows within the Site provide breeding and foraging habitat for common and widespread nesting birds, including several of species returned by the data search, such as bullfinch (*Pyrrhula pyrrhula*), dunnock (*Prunella modularis*) and song thrush (*Turdus philomelos*). The arable land and improved grassland were suitable for ground-nesting birds such as lapwing and skylark. Existing data from 2021 surveys identified 28 bird species, mainly common bird species, considered to be an assemblage typical of farmland dominated by hedgerows, and there remains extensive retained habitat in the wider landscape which can be utilised by farmland birds.
- 4.2.20 Although the farmland such as pasture fields can provide limited habitat suitability for wintering merlin, it is not suitable for breeding as their typical habitat preference is upland, heather-dominated moorland (British Trust for Ornithology, 2025a). The habitats on Site are not suitable for the other qualifying species of the Peak District Moors SPA, as short-eared owls prefer mixed rough grasslands and moors, though also breeding in young plantations, lowland rough grassland, marshes and coastal sand dunes (British Trust for Ornithology, 2025b) and golden plover, a migratory species, often prefer coastal lowland farmlands and muddy estuaries around the coast (British Trust for Ornithology, 2025c).
- 4.2.21 The Site is fairly small, with only one arable field and two pasture, predominantly used for grazing by cattle. The woodland is approximately 0.35ha and so woodland specialists are thought unlikely to utilise it for foraging and nesting due to its small size. It is likely that only common and widespread species are associated with the Site, with qualifying species associated with the Peak District Moors SPA unlikely to use the Site.

Roosting bats

- 4.2.22 Full details regarding the results of the bat surveys are presented within Appendix F Chesterfield New 400kV Substation and Overhead Lines Ecology Report. The Bat Potential Roost Feature (PRF) Tree Location Map can be found in Appendix E Chesterfield New 400kV Substation Drawings, Figure 4.4.
- 4.2.23 The desk study returned records of seven bat species within 2km of the Site. The closest record to the Site was of a Brandt's bat (*Myotis brandtii*) and brown long-eared (*Plecotus auritus*) bat roost located approximately 630m south of the Site boundary.
- 4.2.24 The desk study identified two granted EPS licence applications for bats within 2km of the Site. One was for common pipistrelle (*Pipistrellus pipistrellus*) and was located approximately 1.1km north of the Site.
- 4.2.25 All bat species in the UK are EPS under the Conservation of Habitats and Species Regulations 2017 (as amended) and are protected under Schedule 5 of the WCA 1981 (as amended) and the Wild Mammals (Protection) Act 1996. Noctule bat (*Nyctalus noctula*), soprano pipistrelle (*Pipistrellus pygmaeus*) and brown long-eared bat are SoPIs under Section 41 of the Natural Environment and Rural Communities Act 2006 and are listed on the Lowland Derbyshire Biodiversity Action Plan (Derbyshire County Council, 2011).
- 4.2.26 The Site contains Furnace Hillock woodland and several large and mature trees. The initial Ground Level Tree Assessment identified one tree with low potential and three trees within the Site with moderate bat roosting potential, following the Bat Conservation Trust (BCT) Good Practice Guidelines (3rd ed.) (Collins, 2016). An updated daytime walkover to identify potential bat roosts was undertaken within the Scheme boundary and identified a further six trees with the potential to support roosting bats. During further surveys, an additional two trees (Tree ref 16 and 17) were identified in the same woodland. Further surveys to re-categorise the PRFs of these trees following the BCT Good Practice Guidelines (4th ed.) (Collins, 2023) through aerial inspections were undertaken and determined five trees to be categorised as PRF-I (Tree ref 6, 9, 10, 15 and 13), one tree categorised as NONE (Tree ref 8) and four tree categorised as PRF-M (Tree ref 7, 14, 16 and 17) with no bats or residual evidence of roosting bats identified during the survey. The PRF-M trees (Tree ref 7,14, 16 and 17) trees were suitable for hibernating bats (Collins, 2023).
- 4.2.27 Emergence surveys were undertaken on two PRF-M trees that were identified following the daytime walkover in April 2025 and were unsuitable to climb for health and safety reasons.
- 4.2.28 A further three aerial inspection surveys on the PRF-M trees (Tree ref 7, 14, 16 and 17) within the bat active season (May – September) have been undertaken in 2025 and found no evidence of roosting bats.
- 4.2.29 The importance of the roosting bat species assemblage recorded within the entire survey area to date was assessed in line with the UK Bat Mitigation Guidelines (Reason and Wray, 2023). There are two PRF-M within the Site which are suitable for maternity and hibernation. As such, the importance of roost resource has been assessed as being of District value for the assemblage recorded within the Site.

Commuting and foraging bats

- 4.2.30 Full details regarding the results of the bat surveys are presented within Appendix F Chesterfield New 400kV Substation and Overhead Lines Ecology Report. The Bat Activity Survey Map can be found in Appendix E Chesterfield New 400kV Substation Drawings, Figure 4.5.
- 4.2.31 Three Night-time Bat Walk (NBW) and automated static monitoring surveys were undertaken following BCT Good Practice Guidelines (Collins, 2023), to understand bat activity on the Site. The results show the highest level of activity to be to predominantly to the east of the Site, around the Furnace Hillock woodland. Where habitats provide suitable features for commuting and foraging, bats were recorded, this includes the woodland edge and hedgerows. These habitats also provide suitable commuting habitat to the wider landscape with the small woodland and hedgerows within the Site.
- 4.2.32 During the three NBWs between September 2023 and June 2024, a total of 179 bat calls were recorded. There was little activity recorded the nights of the April and June NBWs. The majority of passes recorded came from the September NBW. Nearly all identifications over the survey period were of common pipistrelle (*Pipistrellus pipistrellus*) (90.5%) with 6.15% soprano pipistrelle (*Pipistrellus pygmaeus*) and the remainder being Leisler's bat (*Nyctalus leisleri*), *Nyctalus* sp. and *Myotis* sp.
- 4.2.33 The automated static detectors recorded a total of 13,339 bat passes during the survey period (May to September). Calls recorded were largely pipistrelle bats (common pipistrelles, soprano pipistrelles and *Pipistrellus* sp.), totalling 93% of calls, followed by >5% *Myotis* sp., and the remaining small percentages were *Nyctalus* sp., Leisler's, brown long-eared bat and barbastelle (*Barbastella barbastellus*).
- 4.2.34 There was one recorded barbastelle bat during the static detector deployment period at static detector location 2 (hedgerow bordering the existing substation and arable field), an Annex II species. There are few records of barbastelle bats in Derbyshire. The Derbyshire Bat Group have known records in three locations in north east Derbyshire close to the border with Nottinghamshire (Derbyshire Bat Group, 2025), but the Site is approximately 10km from the Nottinghamshire border. It is known that barbastelles can commute over 20km to favoured foraging patches, although the radius of their Core Sustainance Zone is usually between 5km and 7km (Zeale, Davidson-Watts and Jones, 2012). Furthermore, barbastelle prefer woodland habitats for foraging and roosting. The woodland on the Site is small, and the detector situated at the woodland edge did not record any barbastelle calls, so it is considered unlikely that the barbastelle was utilising the Site for foraging and roosting. As there were little recordings throughout the deployment period, it is likely that the Site was used for commuting of a lone individual.
- 4.2.35 Overall, the results show that the Site was predominantly used by common species such as common pipistrelle, soprano pipistrelle and *Myotis* sp., with the occasional commuting noctule and Leisler's bat.
- 4.2.36 The importance of the bat species assemblage recorded within the entire survey area to date was assessed in line with the UK Bat Mitigation Guidelines (Reason and Wray, 2023). The species assemblage recorded within the survey area to date scored 16 out of a possible 26 points for locations within the Midlands region which is assessed as being of County importance. There was one recorded barbastelle bat pass at static location 2 in the May 2024 deployment period only, which would mean it would actually be of Regional importance following the UK Bat Mitigation

Guidelines; however, County level is more proportionate to the Site as barbastelles are woodland specialists and as such have a preference for woodland habitats for foraging and roosting. The Site has limited habitat preference to barbastelle, with the small Furnace Hillock woodland, and as such the woodland resource is more likely to be within the wider landscape. The Site is not likely to support a locally significant number of barbastelle or contribute to maintaining the favourable conservation status of the species regionally.

Badger

- 4.2.37 The desk study returned several records of badger (*Meles meles*). The closest record to the Site was located approximately 460m south west.
- 4.2.38 The woodland and hedgerows and surrounding agricultural landscape were suitable for foraging, dispersal and sett excavation. The April 2025 survey identified evidence of badger activity within the woodland on-site, although there was no evidence of badger setts during the field surveys.

Otter and water vole

- 4.2.39 The desk study returned no records of otter (*Lutra lutra*) and there were no granted EPS licence applications for otter within 2km of the Site. The desk study returned over 60 records of water vole. The closest records to the Site were located within a ditch 220m east of the Site before joining Calow Brook (200m south west of the Site).
- 4.2.40 The Site does not contain any watercourses or water bodies, and so otter and water vole are likely absent from the Site.

Hedgehog

- 4.2.41 The desk study returned several records of hedgehog (*Erinaceus europaeus*) within 2km of the Site. The nearest record was located approximately 530m east of the Site.
- 4.2.42 The woodland edges and hedgerows on Site provide suitable areas for commuting and foraging for hedgehog. It is likely that hedgehog is present on the Site.

Brown hare

- 4.2.43 The desk study returned seven records of brown hare (*Lepus europaeus*) within 2km of the Site. The nearest record was located approximately 970m east of the Site, on Hassocky Lane.
- 4.2.44 Brown hare occur on open farmland, grassland habitats and at woodland edges, favouring a mosaic of arable fields, grasses and hedgerows. A record of brown hare was recorded to the south of the Site, while undertaking the Extended Phase 1 surveys.

Summary

- 4.2.45 A summary of the receptors within the ZOI of the Scheme is included within Table 4.2. As it is not necessary to carry out detailed assessment of features that are sufficiently widespread, unthreatened and resilient to Scheme impacts, and will remain viable and sustainable (Chartered Institute of Ecology and Environmental Management (CIEEM), 2018), where receptors have been assessed as being of less

than Local importance, or where the Scheme is not considered to have any impacts upon the receptors, these have been scoped out of further assessment.

- 4.2.46 Despite being scoped out of further assessment, many of the receptors will benefit from the control measures detailed in Section 4.3, as well as habitat creation detailed in Appendix G Chesterfield New 400kV Substation Biodiversity Net Gain Report.

Table 4.2 Summary of baseline receptors and scoping impacts in absence of mitigation

Receptor	Importance	Scoped In/Out	Justification for Scoping Out
Designated Sites			
Peak District Moors SPA	International	Out	The qualifying features for designation will not be affected by the Scheme due to type, distance (8.8km west of the Site) and lack of feasible impact pathways.
South Pennine Moors SAC	International	Out	The qualifying features for designation will not be affected by the Scheme due to type, distance (8.8km west of the Site) and lack of feasible impact pathways.
Duckmanton Railway Cutting DWT Reserve and SSSI	National and Local	Out	The qualifying features for designation will not be affected by the Scheme due to type and distance (1.05km north east of the Site) and lack of feasible impact pathways.
Land Between Spital and Hady pLWS	Local	Out	The qualifying features for designation will not be affected by the Scheme due to type and distance (850m north west of the Site) and lack of feasible impact pathways.
Land North of Somerset House, Calow LWS	Local	Out	The qualifying features for designation will not be affected by the Scheme due to type and distance (940m north of the Site) and lack of feasible impact pathways.
Grassmoor Country Park LWS	Local	Out	The qualifying features for designation will not be affected by the Scheme due to type and distance (1.9km south of the Site) and lack of feasible impact pathways.
Corbriggs Marsh LWS	Local	Out	The qualifying features for designation will not be affected by the Scheme due to type and distance (1.15km south of the Site) and lack of feasible impact pathways.
Sutton Springs Wood LWS	Local	Out	The qualifying features for designation will not be affected by the Scheme due to type and distance (1.2km south east of the Site) and lack of feasible impact pathways.

Receptor	Importance	Scoped In/Out	Justification for Scoping Out
All Pits Plantation pLWS	Local	Out	The qualifying features for designation will not be affected by the Scheme due to type and distance (1.25km north of the Site) and lack of feasible impact pathways.
Arkwright Town Reclamation Site pLWS	Local	Out	The qualifying features for designation will not be affected by the Scheme due to type and distance (1.5km east of the Site) and lack of feasible impact pathways.
Arkwright Town Railway LWS	Local	Out	The qualifying features for designation will not be affected by the Scheme due to type and distance (1.6km north east of the Site) and lack of feasible impact pathways.
Spital Scrub LWS	Local	Out	The qualifying features for designation will not be affected by the Scheme due to type and distance (1.6km north west of the Site) and lack of feasible impact pathways.
Avenue Country Park LWS	Local	Out	The qualifying features for designation will not be affected by the Scheme due to type and distance (1.8km south west of the Site) and lack of feasible impact pathways.
Land North of Hady Hill Farm pLWS	Local	Out	The qualifying features for designation will not be affected by the Scheme due to type and distance (1.85km north west of the Site) and lack of feasible impact pathways.
Birkin Lane Carr LWS	Local	Out	The qualifying features for designation will not be affected by the Scheme due to type and distance (1.9km south of the Site) and lack of feasible impact pathways.
West Wood and Parker's Wood	Local	Out	The qualifying features for designation will not be affected by the Scheme due to type and distance (1.9km north east of the Site) and lack of feasible impact pathways.
Avenue Country Park DWT Reserve	Local	Out	The qualifying features for designation will not be affected by the Scheme due to type and distance (1.9km south west of the Site) and lack of feasible impact pathways.
Piccadilly Cottages Scrub LWS	Local	Out	The qualifying features for designation will not be affected by the Scheme due to type and distance (1.9km north west of the Site) and lack of feasible impact pathways.

Receptor	Importance	Scoped In/Out	Justification for Scoping Out
Habitats			
Broadleaved woodland	Local	In	N/A
Scrub	Less than Local	Out	Scrub habitat is of limited ecological importance and is entirely replaceable. The Biodiversity Net Gain Assessment will address any separate requirements of habitat loss under the Environment Act 2021. As such, this habitat is scoped out of further assessment within this document.
Improved grassland	Less than Local	Out	This habitat is of limited ecological importance and is entirely replaceable. The Biodiversity Net Gain Assessment will address any separate requirements of habitat loss under the Environment Act 2021. As such, this habitat is scoped out of further assessment.
Cultivated/ disturbed land – arable	Less than Local	Out	This habitat is of limited ecological importance and is entirely replaceable. The Biodiversity Net Gain Assessment will address any separate requirements of habitat loss under the Environment Act 2021. As such, this habitat is scoped out of further assessment.
Hedgerows	Local	In	N/A
Scattered trees	Local	In	N/A
Other habitat – urban	Less than Local	Out	This habitat is of limited ecological importance and is entirely replaceable. The Biodiversity Net Gain Assessment will address any separate requirements of habitat loss under the Environment Act 2021. As such, this habitat is scoped out of further assessment.
Protected and Notable Species			
Protected and notable plants	Local	Out	<p>The only record was of bluebell on Site, which is listed on Schedule 8 of the WCA 1981 in respect of Section 13(2) only, which protects it only against sale and not against being picked, uprooted or destroyed.</p> <p>The habitats within the Site were also unlikely to support other protected or notable plant species.</p>
INNS	N/A	Out	No records on Site from further surveys.
Invertebrates	Less than Local	Out	The invertebrate surveys within the Site did not record any other Section 41 species.

Receptor	Importance	Scoped In/Out	Justification for Scoping Out
			Any impacts are unlikely to be significant. General precautions will be carried out to mitigate any potential direct impacts on terrestrial invertebrates during construction.
Common amphibians	Local	In	N/A
Great crested newt	Local	Out	<p>There were no records of great crested newt within the Site. The closest record of great crested newt was located approximately 480m north west of the Site. The desk study identified two granted EPS licence applications for great crested newt located approximately 1.9km south west of the Site.</p> <p>The great crested newt surveys concluded that great crested newt are likely absent from the Site.</p> <p>Any impacts are unlikely to be significant. General precautions will be carried out to mitigate any potential direct impacts on amphibians during construction.</p>
Reptiles	Local	In	N/A
Birds	Local	In	N/A
Roosting bats	District	In	N/A
Commuting and foraging bats	County	In	N/A
Badger	Local	In	N/A
Otter	Less than Local	Out	There are no watercourses or water bodies present on Site.
Water vole	Less than Local	Out	There are no watercourses or water bodies present on Site.
Hedgehog	Local	In	N/A
Brown hare	Local	In	N/A

4.3 Construction and Operational Control Measures

- 4.3.1 The control measures listed in Table 4.3 will be applied during the construction and operational phases of the Scheme. National Grid is committed to implementing the identified control measures to reduce or avoid any potential impacts that may occur during the construction and operation of the Scheme. The construction control measures will be included in the CEMP and their implementation will be monitored by National Grid.

Table 4.3 Construction and operational control and monitoring measures for Ecology

Potential receptor and/or impact	Control, enhancement and monitoring measures
<p>Broadleaved woodland (Furnace Hillock)</p> <p>Construction – Permanent loss of 0.22ha of broadleaved woodland (HPI). Loss of vegetation, fragmentation, disturbance to species, pollution from surface water runoff, dust deposition, impacts upon root protection areas.</p> <p>Operational – Increased disturbance through noise</p>	<p>Opportunities for habitat retention have been iteratively incorporated into the design of the Scheme. Retained areas will be protected in line with BS 5837:2012 (British Standards Institution, 2012), as set out in the CEMP.</p> <p>Pollution prevention measures detailed in the CEMP will prevent any potential pollution events which could lead to negative effects upon the woodland habitats. These include:</p> <ul style="list-style-type: none"> • carrying out activities involving potential pollutants, such as concrete or fuel, in dedicated areas which are designed so that spills, leaks, drips and contaminated runoff can be captured and properly disposed of; and • enclose dusty processes or use containment measures to prevent dust from spreading to other areas or to install dust collectors or dust extractors to capture and filter airborne dust. <p>There is an existing fence around the woodland. The woodland will continue to remain fenced off in the long-term and clearly segregated so site staff/personnel/public will be excluded, thereby avoiding increases of use/higher levels of localised disturbance.</p> <p>Creation and retention of hedgerow, woodland and scrub will provide a buffer between the new substation infrastructure and surrounding Site area. This will protect biodiversity through noise reduction and provide aesthetic improvements, such as visual screening. Suitable native tree species local to the area will be planted on-site as woodland replacement (re-provisioning) as part of the BNG and landscape strategy.</p> <p>No other potential operational effects in relation to this ecological feature are anticipated.</p>
<p>Hedgerows – Permanent loss of 680m of hedgerow. Loss of vegetation, fragmentation, pollution from surface water runoff, dust deposition, impacts upon root protection areas.</p>	<p>Opportunities for habitat retention have been iteratively incorporated into the design of the Scheme. Potential retained areas will be protected in</p>

Potential receptor and/or impact	Control, enhancement and monitoring measures
	<p>line with BS 5837:2012 (British Standards Institution, 2012), as set out in the CEMP.</p> <p>Pollution prevention measures detailed in the CEMP will prevent any potential pollution events which could lead to negative effects upon the hedgerow habitats. These include:</p> <ul style="list-style-type: none"> • carrying out activities involving potential pollutants, such as concrete or fuel, in dedicated areas which are designed so that spills, leaks, drips and contaminated runoff can be captured and properly disposed of; and • enclose dusty processes or use containment measures to prevent dust from spreading to other areas or to install dust collectors or dust extractors to capture and filter airborne dust. <p>Suitable native tree and hedge species local to the area will be planted as on-site hedgerow replacement (re-provisioning) as part of the BNG and landscape strategy.</p> <p>No adverse impacts are expected in the operational phase.</p>
<p>Scattered trees – Permanent loss of 70m of scattered trees in the form of lines of trees. Loss of vegetation, fragmentation, pollution from surface water runoff, dust deposition, impacts upon root protection areas.</p>	<p>Opportunities for habitat retention have been iteratively incorporated into the design of the Scheme. Potential retained areas will be protected in line with BS 5837:2012, as set out in the CEMP.</p> <p>Pollution prevention measures as detailed in the CEMP will be put in place to prevent any potential pollution events which could lead to negative effects upon the habitats.</p> <p>These could include:</p> <ul style="list-style-type: none"> • carrying out activities involving potential pollutants, such as concrete or fuel, in dedicated areas which are designed so that spills, leaks, drips and contaminated runoff can be captured and properly disposed of; and • enclose dusty processes or use containment measures to prevent dust from spreading to other areas or to install dust collectors or dust extractors to capture and filter airborne dust.

Potential receptor and/or impact	Control, enhancement and monitoring measures
	<p>Suitable native tree species local to the area will be planted as on-site scattered tree replacement (re-provisioning) as part of the BNG and landscape strategy.</p> <p>No adverse impacts are expected in the operational phase.</p>
<p>Common amphibians</p> <p>Construction – Killing and injuring, loss of habitat and fragmentation</p> <p>Operational – Killing and injuring through increased traffic</p>	<p>Works should be undertaken under a method statement and ecological watching brief provided by the site Ecologist/Ecological Clerk of Works (ECoW).</p> <p>Opportunities for habitat retention have been iteratively incorporated into the design of the Scheme.</p> <p>Works will be undertaken in line with a precautionary working method statement (PWMS) and a suitably qualified ECoW will supervise works such as vegetation clearance and rubble pile removal. Removal and dismantling of potential hibernacula will be avoided during hibernation season (November – March, inclusive)</p> <p>A two-stage vegetation clearance in a single direction approach will be undertaken as best practice for ecological receptors.</p> <ul style="list-style-type: none"> • The vegetation clearance will be conducted as a two-stage process with the first stage comprising a cut to a minimum height of 150mm with the arising raked off and removed from the works area. • The area shall then be left for 24 hours; upon return the ecologist shall review the conditions present on-site and remove any features present that could be utilised by amphibians. • Once the ecologist is satisfied, the second strim shall commence in which the remaining vegetation is taken down to ground level/bare earth. • All arising and cut material are to be removed from site. <p>In the event of great crested newt being incidentally encountered during the works, works will be suspended and advice sought from a suitably qualified ecologist with any great crested newt found not being handled.</p>

Potential receptor and/or impact	Control, enhancement and monitoring measures
	<p>Any excavations required for construction works will be covered at night or a soil ramp or wooden plank installed to ensure that any animals can escape.</p> <p>Habitat areas of value for amphibians will be created in the longer-term including the addition of three drainage ponds with wetland vegetation. Areas suitable for commuting and foraging like scrub and areas suitable for hibernation will also be provided. Suitable native on-site habitat replacement (re-provisioning) will be provided.</p> <p>There will be a mandatory speed limit in place to limit speeding on the access roads and within the substation. Suitable site speed limits will be determined by on-site personnel, often 10-20mph, to ensure safety for vehicles, personnel and wildlife.</p> <p>Creation and retention of hedgerow, woodland and scrub will provide a buffer between the new substation infrastructure and surrounding Site area. This will protect biodiversity through noise reduction and provide aesthetic improvements, such as visual screening</p>
<p>Reptiles</p> <p>Construction – Killing and injuring, loss of habitat and fragmentation</p> <p>Operational – Killing and injuring through increased traffic, disturbance through noise</p>	<p>Works should be undertaken under a method statement and ecological watching brief provided by the site Ecologist/ECoW.</p> <p>Opportunities for habitat retention will be explored throughout the detailed design of the Scheme.</p> <p>Avoid removal and dismantling potential hibernacula during hibernation season (November – March, inclusive)</p> <p>Measures to reduce construction/operational impacts for common amphibians will be covered in the PWMS and are similar to measures for amphibians.</p>
<p>Breeding birds</p> <p>Construction – Killing and injuring, destruction of active nests, loss of habitat, disturbance</p>	<p>Works should be undertaken under a method statement and ecological watching brief provided by the site Ecologist/ECoW.</p> <p>Opportunities for habitat retention will be explored throughout the detailed design of the Scheme. Suitable native on-site habitat replacement (re-provisioning) would be completed as part of the BNG and landscape</p>

Potential receptor and/or impact	Control, enhancement and monitoring measures
<p>Operational – Increased disturbance through personnel, traffic, lighting and noise</p>	<p>strategy. The provision of bird boxes, of various sizes and structures, will provide sheltering and nesting opportunities for a range of species.</p> <p>Removal of vegetation shall be timed outside of the bird nesting season where possible (i.e. March and August, inclusive).</p> <p>If clearance is undertaken within bird nesting season, vegetation to be cleared would be checked by a suitably qualified ecologist 48 hours prior to removal, reducing to 24 hours when in the peak of the nest season.</p> <p>If nesting birds are found to be present, the ecologist will implement a suitable buffer zone. Works in this area would be avoided until the chicks have fledged and regular monitoring by an ecologist would be undertaken to confirm that the young have fledged.</p> <p>The woodland area shall remain fenced off in the long-term and clearly segregated so site staff/personnel will be excluded and thereby avoiding increases of use/higher levels of localised disturbance.</p> <p>The landscape design and BNG will be of such that habitat areas will be created of value in the longer-term for birds. Creation and retention of hedgerow, woodland and scrub will provide a buffer between the substation and surrounding area and will protect biodiversity through noise reduction and provide aesthetic improvements, such as visual screening, which could be caused by increased traffic, personnel and the low emitting hum from the substation itself.</p> <p>The Lighting Strategy will ensure landscape features including hedgerow/boundary features and valuable habitats such as Furnace Hillock woodland remain unlit throughout the operational phase of the Scheme.</p>
<p>Badger</p> <p>Construction – Disturbance/damage of setts in the event of new setts being identified as part of pre-construction inspections, fragmentation of habitats, disturbance, loss of foraging and commuting routes</p>	<p>Works should be undertaken under a method statement and ecological watching brief provided by the site Ecologist/ECow.</p> <p>No setts were recorded during the Site surveys. Badgers are highly mobile species and there is a risk of setts being established before the start of the proposed works.</p>

Potential receptor and/or impact	Control, enhancement and monitoring measures
<p>Operational – Killing and injuring through increased traffic, increased disturbance through personnel, traffic, lighting and noise</p>	<p>A pre-construction badger survey should be undertaken in suitable habitats located within 30m of the proposed works. If badger setts are found, further monitoring of the badger setts should be undertaken. If any construction activities are required within 30m of any sett, it may be necessary to obtain a development licence from Natural England and/or carry out the works under a method statement and ecological supervision, with licensable activities only permitted between July and November, inclusive.</p> <p>If (main) sett closure is required under a Natural England badger licence, compensatory artificial sett creation and subsequent monitoring may be required.</p> <p>Any excavations required for construction works should be covered at night or a soil ramp or wooden plank installed to ensure that any animals can escape.</p> <p>Suitable native tree and hedge species local to the area will be planted as on-site hedgerow replacement (re-provisioning) as part of the BNG and landscape strategy, as well as enhancement of the existing hedgerows and woodland to ensure connectivity across the Site and to the wider landscape.</p> <p>The landscape design and BNG will be of such that habitat areas will be created of value in the longer-term for badger with more connectivity to the wider landscape with provision of habitats suitable for commuting and foraging like scrub, hedgerows.</p> <p>Creation and retention of hedgerow, woodland and scrub will provide a buffer between the substation and surrounding area and will protect biodiversity through noise reduction and provide aesthetic improvements, such as visual screening.</p> <p>There will be a mandatory speed limit in place to limit speeding on the access roads and substation.</p> <p>The Lighting Strategy will ensure landscape features including hedgerow/boundary features and valuable habitats such as Furnace</p>

Potential receptor and/or impact	Control, enhancement and monitoring measures
	Hillock woodland remain unlit throughout the operational phase of the Scheme.
<p>Hedgehog</p> <p>Construction – Permanent impacts to commuting/foraging habitat and hibernaculum on Site</p> <p>Operational – Killing and injuring through increased traffic, increased disturbance through personnel, traffic, lighting and noise</p>	<p>Works should be undertaken under a method statement and ecological watching brief provided by the site Ecologist/ECoW.</p> <p>Opportunities for habitat retention will be explored throughout the detailed design of the Scheme. The creation of habitat piles/log piles in appropriately positioned locations across the Site is recommended. These will be agreed on-site with the ECoW.</p> <p>It is also recommended that suitable potential hibernation sites for hedgehogs are removed/dismantled prior to animals going into hibernation (November to March, inclusive).</p> <p>Any excavations required for construction works should be covered at night or a soil ramp or wooden plank installed to ensure that any animals can escape.</p> <p>Measures to reduce construction/operational impacts for hedgehogs will be covered in the PWMS and are similar to measures for badgers.</p>
<p>Brown hare</p> <p>Construction – Permanent impacts to commuting/foraging habitat and resting areas on Site</p> <p>Operational – Killing and injuring through increased traffic, increased disturbance through personnel, traffic, lighting and noise</p>	<p>Works should be undertaken under a method statement and ecological watching brief provided by the site Ecologist/ECoW.</p> <p>Opportunities for habitat retention will be explored throughout the detailed design of the Scheme.</p> <p>Any excavations required for construction works should be covered at night or a soil ramp or wooden plank installed to ensure that any animals can escape.</p> <p>Measures to reduce construction/operational impacts for brown hare will be covered in the PWMS and are similar to measures for badgers.</p>

4.4 Potential Construction and Operational Impacts

- 4.4.1 There is potential for construction and operation to impact a number of protected species and designated sites if appropriate measures are not taken to avoid, mitigate or compensate for these impacts. The following appraisal has been undertaken with the inclusion of the standard control measures outlined in Table 4.3.

Habitats

- 4.4.2 The broadleaved woodland (Furnace Hillock), hedgerows and trees on Site are at risk of direct and indirect impacts. As a result of the construction and operation of the Scheme, 0.22ha of woodland, 680m of hedgerow and 70m scattered trees, in the form of lines of trees, will be permanently removed. However, after the successful implementation of the mitigation measures, discussed in Table 4.3 above, no residual effects are anticipated during the construction and operational phases of the Scheme.

Common Amphibians

- 4.4.3 The Site offers limited suitability to common and widespread species of amphibians, however there will be at risk of direct and indirect effects as a result of the construction and operation of the Scheme. The control measures identified in Table 4.3 above will sufficiently mitigate the risk of killing and/or injuring common amphibians and therefore no impacts upon the local amphibian population are anticipated during the construction and operational phases of the Scheme.

Reptiles

- 4.4.4 The Site offers limited suitability for common and widespread reptiles, however there will be a risk of direct and indirect effects as a result of the construction and operation of the Scheme. The control measures identified in Table 4.3 above will sufficiently mitigate the risk of killing and/or injuring reptiles and therefore no impacts upon the local reptile population are anticipated during the construction and operational phases of the Scheme.

Breeding Birds

- 4.4.5 The Site offers suitability for common and widespread species to use the Site for breeding, roosting, foraging and commuting, and there will be a risk of direct and indirect effects as a result of the construction and operation of the Scheme. The control measures detailed in Table 4.3 above will ensure that no impacts are sustained upon birds during the construction and operational phases of the Scheme.

Bats (Commuting/Foraging and Roosting)

- 4.4.6 The Site provides roosting, foraging and commuting habitats for common and widespread bat species, and there will be a risk of direct and indirect effects as a result of the construction and operation of the Scheme. The control measures detailed in Table 4.3 above relating to these habitats will ensure that no impacts are sustained upon bats during the construction and operational phases of the Scheme.

Badger

- 4.4.7 There are currently no badger setts confirmed present on Site; however, the Site does provide suitability for commuting, foraging and for sett creation. The control measures detailed in Table 4.3 above will ensure that no impacts are sustained upon badgers during the construction and operational phases of the Scheme.

Hedgehog and Brown Hare

- 4.4.8 Hedgehog have not been recorded on Site; however, habitat on Site is suitable for resting, foraging and commuting and therefore will be at risk of direct and indirect effects as a result of the construction and operation of the Scheme.
- 4.4.9 Brown hare have been recorded on Site, and there will be a risk of direct and indirect effects as a result of the construction and operation of the Scheme.
- 4.4.10 The control measures detailed in Table 4.3 above will ensure that no impacts are sustained upon hedgehog and brown hare during the construction and operational phases of the Scheme.

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5. Landscape and Visual

5.1 Introduction

- 5.1.1 This chapter details the Landscape and Visual baseline conditions and the environmental appraisal of the potential Landscape and Visual impacts associated with the construction and operation of the above elements of the Scheme. Where potential environmental impacts are identified, relevant control measures are prescribed to reduce or avoid these impacts.
- 5.1.2 This chapter should be read in conjunction with Appendix A Chesterfield New 400kV Substation Glossary and Abbreviations, Appendix B Chesterfield New 400kV Substation Methodology, Appendix E Chesterfield New 400kV Substation Drawings and Appendix H Chesterfield New 400kV Substation Landscaping Proposals and Visualisations.

5.2 Baseline Conditions

Landscape Designations

- 5.2.1 There are no landscape-related designated sites within the study area as shown on Appendix E Chesterfield New 400kV Substation Drawings, Figure 5.1. However, the Duckmanton Railway Cutting SSSI falls within the study area. There are also a number of Grade II listed buildings within the study area. These are shown on Appendix E Chesterfield New 400kV Substation Drawings, Figure 5.2.

Published Landscape Character

National Landscape Character

- 5.2.2 The study area lies wholly within National Character Area (NCA) 38: Nottinghamshire, Derbyshire and Yorkshire Coalfield (Natural England, 2014). The study area and its environs are therefore likely to exhibit characteristics of this NCA.
- 5.2.3 Key characteristics of NCA 38 are:
- *‘A low-lying landscape of rolling ridges with rounded sandstone escarpments and large rivers running through broad valleys, underlain by Pennine Coal Measures;*
 - *Local variations in landscape character reflecting variations in underlying geology;*
 - *Several major rivers flow through the rural and urban areas of the NCA, generally from west to east in broad valleys;*
 - *A mixed pattern of built-up areas, industrial land, pockets of dereliction and farmed open country;*
 - *Small, fragmented remnants of pre-industrial landscapes and more recent creation of semi-natural vegetation, including woodlands, river valley habitats and subsidence flashes, with field boundaries of clipped hedges or fences;*

- *Many areas affected by urban fringe pressures creating fragmented landscapes, some with a dilapidated character, separated by substantial stretches of intact agricultural land in both arable and pastoral use;*
- *A strong cultural identity arising from a history of coal mining, steel making and other heavy industry which resulted from the close relationship between underlying geology and resource availability, notably waterpower, iron ore and coal;*
- *Features of industrial heritage such as mills, goits, tips, old railway lines, canals and bridges are evident, along with former mining villages;*
- *Many large country houses and estates established by wealthy industrialists in the 18th and 19th centuries and ancient monuments create focal points and important recreational opportunities within the landscape, such as Bretton Hall, Wentworth, Woodhouse, Temple Newsam, Nostell Priory, Bolsover Castle and the ruins of Codnor Castle;*
- *Extensive urbanisation, such as in the major cities of Leeds and Sheffield, with terraced and back-to-back housing and grand 19th-century municipal buildings and churches at their centres, now surrounded by extensive housing and industrial development;*
- *Widespread influence of transport routes, including canals, roads and railways, with ribbon developments emphasising the urban influence in the landscape;*
- *An extensive network of multi-user trails on former railway lines and canal towpaths, such as the Trans Pennine Trail and the Ebor Way; and*
- *Continuing development pressure including land renewal and regeneration projects, especially along river corridors and around towns.'*

Regional Landscape Character

5.2.4 At the regional scale, the landscape character of the Site and study area is encompassed by the following Landscape Character Types (LCTs) as described in The Landscape Character of Derbyshire (Derbyshire County Council, 2013):

- Coalfield Village Farmlands;
- Estate Farmlands; and
- Riverside Meadows.

5.2.5 The Site falls within the 'Coalfield Village Farmland' LCT. This is defined as a broad industrial landscape characterised by villages, dairy farming and small woodlands.

5.2.6 Key characteristics of 'Coalfield Village Farmland' are:

- *'Gently undulating landform;*
- *Dairy farming with pasture and localised arable cropping;*
- *Relict ancient semi-natural woodland, copses and linear tree belts;*
- *Dense watercourse trees and scattered hedgerow trees;*
- *Towns and villages on ridge lines surrounded by remnant medieval strip fields;*
- *Network of small irregular lanes between larger urban roads; and*

- *Small villages with sandstone buildings expanded by red brick terrace housing and ribbon development.'*

5.2.7 The eastern extent of the study area falls in the Estate Farmlands LCT, the key characteristics of which are:

- *'Broad, gently undulating landform;*
- *Mixed farming dominated by arable cropping;*
- *Localised woodland blocks and occasional trees;*
- *Hedgerows enclose medium size, semi-regular fields;*
- *Small villages, hamlets and scattered farmsteads constructed from local Coal Measures Sandstone, some expanded with red brick former mining terraces; and*
- *Open landscape with long distance views.'*

5.2.8 The small area of the western extent of the study area falls in the Riverside Meadows LCT, the key characteristics of which are:

- *'Narrow rivers meander along flood plains of variable width;*
- *Remnant riverside vegetation, wetland and unimproved grassland;*
- *Dairy farming dominated by pasture;*
- *Dense tree cover along river channels;*
- *Scattered tree cover along boundaries;*
- *Strong association with transport routes due to the presence of canals, railway lines and roads.'*

Visual Amenity Baseline

5.2.9 Currently, the Site predominantly comprises the existing 275kV National Grid Chesterfield Substation, with agricultural parcels to the south; a number of existing pylons are also present within the Scheme boundary. The Site is bounded by Calow Lane to the north and Hallflash Lane to the east. The land parcels that immediately surround the areas are predominantly agricultural in nature. The A617 is present to the south west of the Site, beyond which are the southern areas of Chesterfield. Predominantly to the west of the Scheme boundary is developed land, and land to the north, south and east is more rural in nature.

5.2.10 A provisional classification of the sensitivity of the visual receptors at this location is provided in Table 5.1. This sensitivity varies according to the interest that receptors' take in their visual environment (and hence their susceptibility to the type of change the development is likely to bring about) and value that receptors attach to the existing view.

5.2.11 The locations of Representative Viewpoints (RVs), from where viewpoint photography has been taken during field work, are shown in Appendix E Chesterfield New 400kV Substation Drawings, Figure 5.6.

5.2.12 A description of the current amenity of the visual receptors at each of these RVs is included in Table 5.1 below.

Table 5.1 Visual receptors at each RV

RV No/Receptor Details	RV Description and Photo (all photography captured using a Canon EOS 5d Mark II with 50mm prime lens, and individual photographs stitched together using 'Photoshop' software)	Sensitivity of Visual Receptors represented by this RV
<p>RV1: Users of PRoW NE5/19/1, on the eastern outskirts of Chesterfield.</p> <p>Easterly direction</p> <p>200m from Site</p> <p>Source of Photograph: Arcadis</p> <p>Date of Photograph: 05/12/23</p>	 <p>View from PRoW NE5/19/1 to the west of the Site that follows Calow Brook in a south easterly direction. The viewpoint is taken on a footbridge over the brook and is situated adjacent to a farm property.</p> <p>The landscape is steeply undulating, falling to the south towards Calow Brook. The Site is situated on higher ground to the north east. The brook and flooded agricultural fields form the main landscape feature in the foreground, with a belt of woodland delineating the field boundary in the mid ground. Existing pylons and overhead lines are visible towards the middle of the view</p>	High
<p>RV2: Residential users of Laurel Farm and users of PRoW NE5/16/2.</p> <p>Easterly direction</p> <p>50m from Site</p>	 <p>View from PRoW NE5/16/2. adjacent to Laurel Farm which lies to the west of the Scheme boundary.</p> <p>The landscape is generally open with small woodland blocks and field boundary hedgerows forming some containment within the local landscape. Farm buildings and agricultural fields form the main landscape</p>	Medium

RV No/Receptor Details	RV Description and Photo (all photography captured using a Canon EOS 5d Mark II with 50mm prime lens, and individual photographs stitched together using 'Photoshop' software)	Sensitivity of Visual Receptors represented by this RV
Source of Photograph: Arcadis Date of Photograph: 05/12/23	feature in the view, with the existing substation, pylons and overhead lines forming the main detracting feature in the skyline as they stretch across the landscape.	
RV3: Users of PRoW NE5/7/1 south of Calow. Southerly direction 700m from Site	<div> </div> <p>View from PRoW on southern outskirts of the village of Calow which lies to the north of the Scheme boundary.</p> <p>The topography within the view is varied, with the viewpoint positioned on higher ground of approximately 140m AOD (approximately 15-20m above the Site), providing far-reaching views over the landscape. A considerable degree of containment is provided by woodland blocks and field boundary hedgerows. Small villages on the eastern outskirts of Chesterfield along with scattered agricultural properties add a noticeable presence of development to the view. Existing pylons can be seen, albeit distant and partially obscured.</p> <p>The Site is not visible due to the intervening landform and vegetation.</p>	High

RV No/Receptor Details	RV Description and Photo (all photography captured using a Canon EOS 5d Mark II with 50mm prime lens, and individual photographs stitched together using 'Photoshop' software)	Sensitivity of Visual Receptors represented by this RV
<p>RV4: Users of PRoW NE5/14/2 to the north east of the Site.</p> <p>South westerly direction</p> <p>800m from Site</p> <p>Source of Photograph: Arcadis</p> <p>Date of Photograph: 17/06/23</p>	 <p>View from junction of secondary roads and PRoW NE5/14/2 on the outskirts of the village of Bolehill which lies to the north east of the Scheme boundary.</p> <p>The viewpoint is located on higher ground at approximately 150m AOD (approximately 25-30m above the Site). The view comprises a minor road, lined by established hedgerows, with scattered properties, small woodland blocks and field boundary hedgerows combining to obscure longer views towards the Site.</p> <p>The Site is not visible due to the intervening buildings, landform and vegetation.</p>	Medium
<p>RV5: Users of Hassocky Lane and PRoW NE18/11/2 near Woodnook Farm.</p> <p>North westerly direction</p> <p>1km from Site</p>	 <p>View from junction of secondary roads and PRoW NE18/11/2 close to Woodnook Farm, which lies to the south east of the Scheme boundary.</p> <p>The landscape is gently undulating with the viewpoint positioned on higher ground at approximately 145m AOD (approximately 20-25m above the Site). The landscape is generally open in nature, comprising open</p>	High

RV No/Receptor Details	RV Description and Photo (all photography captured using a Canon EOS 5d Mark II with 50mm prime lens, and individual photographs stitched together using 'Photoshop' software)	Sensitivity of Visual Receptors represented by this RV
Source of Photograph: Arcadis Date of Photograph: 05/12/23	<p>grassland pasture in the foreground, with established hedgerow boundaries and scattered residential properties visible in the mid ground.</p> <p>The Site is visible in the distance, however views are partly obscured by intervening vegetation.</p>	
RV6: Users of PRoW NE19/2/1 near junction of A617 and B6425. North westerly direction 1.7km from Site Source of Photograph: Arcadis Date of Photograph: 05/12/23	 <p>View from junction of secondary roads and PRoW 19/2/1 close to Woodnook Farm, approximately 1700m to the south east of the Scheme boundary.</p> <p>The landscape is generally open, with roadside vegetation adjacent to the A617 visible towards the left of the view. A farm track is visible in the centre of the view, along with scattered trees and hedgerows. Existing pylons and overhead lines are a noticeable detracting feature as they cross the landscape towards the Site.</p> <p>The Site is not visible due to the intervening topography, vegetation and distance from the Site.</p>	Medium

RV No/Receptor Details	RV Description and Photo (all photography captured using a Canon EOS 5d Mark II with 50mm prime lens, and individual photographs stitched together using 'Photoshop' software)	Sensitivity of Visual Receptors represented by this RV
<p>RV7: Users of B6425 bridge over the A617</p> <p>Northerly direction</p> <p>1.4km from Site</p> <p>Source of Photograph: Arcadis</p> <p>Date of Photograph: 06/12/23</p>	 <p>View from the B6425 road bridge over the A617 between Corbriggs and Temple Normanton. The A617 is visible towards the left of the view, with the B6425 visible towards the right. Dense roadside vegetation is visible in the foreground beyond the bridge parapet adjacent to the road, largely obscuring views of the Site in the far distance.</p>	Medium
<p>RV8: Users of PRoW NE9/18/1</p> <p>Northerly direction</p> <p>600m from Site</p> <p>Source of Photograph: Arcadis</p> <p>Date of Photograph: 06/12/23</p>	 <p>View from PRoW NE9/18/1 close to the Manor House Holiday Home which lies to the south of the Site.</p> <p>The landscape is undulating with the viewpoint positioned on higher ground at approximately 100m AOD. The landscape is generally open, comprising a mixture of arable fields and grassland pasture, with woodland belts and field boundary hedgerows. Electrical transmission infrastructure is clearly visible towards the right of the image.</p>	High

RV No/Receptor Details	RV Description and Photo (all photography captured using a Canon EOS 5d Mark II with 50mm prime lens, and individual photographs stitched together using 'Photoshop' software)	Sensitivity of Visual Receptors represented by this RV
<p>RV9: Users of permissive route within Grassmoor Country Park.</p> <p>Northerly direction</p> <p>1.95km from Site</p> <p>Source of Photograph: Arcadis</p> <p>Date of Photograph: 06/12/23</p>	 <p>View from a permissive route within Grassmoor Country Park which lies on a slight plateau approximately 1.9km to the south of the Site</p> <p>The landform is gently undulating, with the viewpoint positioned on a plateau at approximately 112mAOD. The landscape in the foreground comprises an open grassland field, however the field is enclosed on all sides by established woodland, except for a small gap towards the centre of the view, through which distant glimpses of the Site may be possible.</p>	High
<p>RV 10: Users of PRoW NE5/26/1 near residential properties of Calow Green</p> <p>Easterly direction</p> <p>150m from Site</p> <p>Source of Photograph: Arcadis</p>	 <p>View from PRoW5/26/1 adjacent to residential properties at Calow Green, which lies close to the eastern Scheme boundary.</p> <p>The landscape is undulating, with the viewpoint located on high ground at approximately 120m AOD. The landscape is generally open, comprising agricultural fields and scattered farm buildings, with woodland blocks and field boundary hedgerows. The existing substation, pylons and overhead lines add a noticeable detracting feature to the view as they cross the landscape. The Site is visible in the middle ground of the view, albeit partly obscured by intervening vegetation.</p>	High

RV No/Receptor Details	RV Description and Photo (all photography captured using a Canon EOS 5d Mark II with 50mm prime lens, and individual photographs stitched together using 'Photoshop' software)	Sensitivity of Visual Receptors represented by this RV
Date of Photograph: 06/12/23		
RV11: Users of PRow NE5/17/1 near to Hall Flash Farm Source of Photograph: Arcadis	 <p>View from PRow NE5/17/1 close to Hall Flash Farm</p> <p>The landform falls away from the Site boundary, such that the PRow and, to an even greater degree, Hall Flash Farm lie significantly lower than the Site topographically. There is an established dense evergreen hedgerow in the foreground that delineates the Site boundary. The hedgerow stands approximately 2.5m high, completely obscuring views into the Site, which lies immediately beyond. Existing pylons and associated wirescape are visible over the hedgerow.</p>	High

5.3 Construction Control Measures

- 5.3.1 The control measures listed in Table 5.2 will be applied during the construction phase of the Scheme. National Grid is committed to implementing the identified control measures to reduce or avoid any potential impacts that may occur during the construction of the Scheme. The control measures will be included in the CEMP and their implementation will be monitored by National Grid.

Table 5.2 Construction Control and Monitoring Measures for Landscape and Visual

Potential receptor and/or impact	Control, enhancement and monitoring measures
Landscape and Visual Amenity	Production of a CEMP which will instil good practice construction working activities.
Landscape and Visual Amenity	<p>Planning, positioning and directing construction lighting to reduce glare, light spill and skyglow, through such measures as outlined in Guidance Note 1 for the reduction of obtrusive light (Institution of Lighting Professionals, 2021):</p> <ul style="list-style-type: none"> • using directional lighting to minimise glare beyond the construction working area or compound; • using only appropriately designed luminaires for the task at hand; and • limiting the quantity and illumination of the lighting to the minimum necessary.
Landscape and Visual Amenity	<p>Complying with the lighting levels, uniformity and other parameters of current and relevant lighting standards (to avoid higher than recommended lighting levels):</p> <ul style="list-style-type: none"> • using visual screening, such as on-site spoil, hoardings, between more sensitive visual receptors and construction light sources; • minimising light break-out above the horizontal (using 'low cut-off' and 'full cut-off' lighting systems), and using louvres, cowls and shields to prevent undesirable light break-out; and • reducing lighting levels outside working hours to suitable levels for safety and security.
Landscape and Visual Amenity	<p>Using automated devices to switch lights on and off according to activity/ambient light levels, and consider, if appropriate, using infrared floodlighting and CCTV systems for security.</p> <p>Specifying a sufficient quantity of lighting units to avoid the need for a smaller quantity of tall, wide beam lighting units to illuminate large areas.</p>
Landscape and Visual Amenity	Applying BS 5837:2012 to avoid harm to all retained existing trees, scrub and hedgerow vegetation and their root systems during construction.

Potential receptor and/or impact	Control, enhancement and monitoring measures
Landscape and Visual Amenity	Reinstating land disturbed to make way for construction compounds and the underground cable route to its existing land use following completion of the construction phase.
Landscape and Visual Amenity	Providing continuous access to local tracks and PRowS throughout the construction phase as far as is reasonably practicable.

5.4 Potential Construction Impacts

Landscape Appraisal

- 5.4.1 The construction of the Scheme infrastructure will introduce incongruent elements to the existing landscape setting to varying degrees at different stages of the construction of the Scheme.

National Landscape Character (NCA 38)

- 5.4.2 Given the relatively small scale of the Scheme in relation to the scale of the NCA, it is not anticipated that there will be any effects that are likely to materially alter the character of the wider NCA.

Regional Landscape Character (Coalfield Village Farmland LCT)

- 5.4.3 Whilst the Site and its immediate environs are largely defined by the presence of the existing substation and associated electrical transmission infrastructure, the predominantly rural nature of the wider LCT is such that it is considered to be of medium sensitivity to development of this nature.
- 5.4.4 Effects upon notable characteristics such as pasture and arable fields, boundary vegetation and scrub vegetation will be noticeably affected at the local level, however effects upon the wider LCT will be limited.
- 5.4.5 During the construction phase there are likely to be noticeable effects upon the character of the landscape during the construction phase, with the influence of construction phase activity, including noise, dust and a reduction in tranquillity extending into the wider LCT, resulting in a minor adverse level of effect.

Local Landscape Character

- 5.4.6 At the local (Site) scale, the character of the landscape is already heavily influenced by the presence of the existing substation and highly visible electrical transmission infrastructure, however the surrounding landscape is largely rural in nature.
- 5.4.7 During the construction phase, activity is likely to contribute to a considerable increase in the presence of noise and activity in an otherwise relatively tranquil setting, leading to a temporary moderate adverse effect.

Visual Amenity Appraisal

- 5.4.8 People notice movement and active change more than they notice fixed objects. The changing nature of the Scheme as it is being built and the presence of construction compounds and large on-site machinery, often with hazard lights, will be highly noticeable. Also, the general noise and activity associated with construction sites may attract attention and cause viewers to notice and observe more than they will otherwise. These effects, however, will be temporary and short term in nature.
- 5.4.9 These impacts will be reduced with the implementation of the proposed considerate construction practices (such as appropriately sited construction compounds, suitable control of construction lighting away from surrounding countryside, limiting material stockpile heights and implementing tree protection measures).
- 5.4.10 Many of these construction phase effects will fall away once the Scheme becomes operational, reducing further once proposed mitigation planting reaches maturity.

Residential receptors

- 5.4.11 There are a number of residential receptors in close proximity to the Scheme, all of which are considered to be high sensitivity receptors due to their relatively rural location.
- 5.4.12 For the purposes of the appraisal they are either considered individually or grouped together where effects are likely to be of a similar magnitude:
- Wrays Hill Farm and Laurel Farm are located close to the western boundary, and both properties are likely to experience easterly and south easterly views towards the Site.
 - During the construction phase, the scale of construction activity will result in a major adverse level of effect, albeit temporary in nature.
 - Hall Flash Farm is located close to the south eastern Site boundary, however it has no windows in its western façade, which faces towards the Site. Whilst there are still likely to be views from other elevations within the property and to a lesser degree from its gardens, direct westerly views are likely to be limited in nature.
 - During the construction phase, the scale of construction activity will result in a major to moderate adverse level of effect, albeit temporary in nature.
 - Southwood Chase is located approximately 100m to the west of the Site. Whilst the property is in close proximity to the Site, it sits within a depression, some 4-5m lower than the landform immediately to its north, with established vegetation to the east and north east. The combination of landform and vegetation is such that views will be largely obscured.
 - During the construction phase, glimpses of construction activity may be possible from north-facing upper storey windows, however these views are likely to be very limited. It is anticipated that there will be no greater than a moderate to minor level of effect, albeit temporary in nature.
- 5.4.13 Whilst there are a number of additional residential receptors that are likely to experience views of the Scheme to varying degrees (including those on Calow Lane and within urban areas including Spital, Hasland, Brimington Common and Calow), these views are likely to be sufficiently obscured by existing intervening vegetation and subsequently by proposed mitigation planting, such that effects will be no greater than moderate adverse during the construction phase.

Recreational receptors

- 5.4.14 There are a number of local authority PRoWs within the study area that are likely to experience views of the Scheme to varying degrees, all of which are considered to be of medium sensitivity. For the purposes of the appraisal, these are grouped together in accordance with the degree to which they are likely to be affected:
- PRoWs NE5/25/1, NE5/16/1, NE5/26/1, NE5/17/4, NE5/17/1, NE5/17/2 and NE5/17/3, either pass through the Site, or run immediately adjacent to it. For these receptors, views will be unavoidable and the Scheme will form a highly noticeable element, altering the overall balance and composition of the visual experience.
 - During the construction phase, the scale of construction activity will result in a major to moderate adverse level of effect, albeit temporary in nature.
 - PRoWs NE9/22/1, NE5/16/2, NE9/18/1, NE5/26/1, NE9/19/1, NE9/19/2, NE5/19/1 and NE9/21/1, are located slightly further away from the Site. Whilst the Scheme will still be visible from these receptors, vegetated field boundaries to the south, south west and east will restrict views considerably (as represented by Viewpoint 07 and Viewpoint 08)
 - During the construction phase, the scale of construction activity will result in a moderate to minor adverse level of effect, albeit temporary in nature.
- 5.4.15 Whilst there are a number of additional PRoWs, highways and access tracks that are likely to experience views of the Scheme, these views are likely to be sufficiently obscured by existing intervening vegetation and subsequently by proposed mitigation planting, such that effects will be no greater than moderate to minor adverse during the construction phase.

5.5 Operational Control Measures

- 5.5.1 The measures listed in Table 5.3 will be implemented during the operational phase of the Scheme and the appraisal has been undertaken assuming these measures are in place.
- 5.5.2 To avoid or prevent potential impacts occurring, or to reduce their significance upon landscape character and visual amenity receptors during the operational phase, the following mitigation measures will be carried out, as set out in the Landscape Mitigation Plan in Appendix H Chesterfield New 400kV Substation Landscaping Proposals and Visualisations.

Table 5.3 Operational control and monitoring measures for Landscape and Visual

Potential receptor and/or impact	Control, enhancement and monitoring measures
Embedded design measures	An iterative design process with other members of the design and environmental team to ensure that likely impacts have been identified and wherever possible avoided or minimised.
Landscape and Visual Amenity	Existing valued visual and landscape components such as the Site's southern and south western field boundaries and eastern boundary vegetation (providing screening to users of Hallflash Lane and Hall Flash Farm) and trees will be retained and enhanced, with minimal tree loss required to facilitate the proposals.
Landscape and Visual Amenity	Excavation to be undertaken with care to minimise potential impacts upon existing vegetation and maintain existing screening.
Landscape and Visual Amenity	Incursion into Root Protection Areas and tree loss will be minimised through the siting of main infrastructure components away from Root Protection Areas and allowing for an ecological buffer of grassland or mixed scrub in between.
Landscape and Visual Amenity	Planting including: <ul style="list-style-type: none"> the creation of areas of grassland; new mixed scrub planting along the northern and the western boundaries of the Scheme to help reduce the impact of the Scheme on the visual amenity of users of PRow NE5/25/1 and the re-routed PRow NE5/16/1; new hedgerow with intermittent tree planting to help reduce the impact of the Scheme on the visual amenity of users of the re-routed PRow NE5/16/1; and new areas of species rich grassland along the underground cable route and temporary infrastructure, with taller perennial wildflower species included in species mix to contribute to visual mitigation.

5.6 Potential Operational Impacts

Landscape Appraisal

- 5.6.1 The Scheme infrastructure will introduce incongruent elements to the existing landscape setting to varying degrees at different stages of the operation of the Scheme.
- 5.6.2 The appraisal therefore considers likely landscape effects at Year 1 of the operational phase and at Year 15, once proposed mitigation planting has reached maturity (residual effects).

National Landscape Character (NCA 38)

- 5.6.3 Given the relatively small scale of the Scheme in relation to the scale of the NCA, it is not anticipated that there will be any effects that are likely to materially alter the character of the wider NCA.

Regional Landscape Character (Coalfield Village Farmland LCT)

- 5.6.4 Whilst the Site and its immediate environs are largely defined by the presence of the existing substation and associated electrical transmission infrastructure, the predominantly rural nature of the wider LCT is such that it is considered to be of medium sensitivity to development of this nature.
- 5.6.5 Effects upon notable characteristics such as pasture and arable fields, boundary vegetation and scrub vegetation will be noticeably affected at the local level, however effects upon the wider LCT will be limited.
- 5.6.6 Taking into consideration the mitigation measures proposed and the presence of the existing substation immediately adjacent, it is considered that the landscape is able to absorb localised changes without the overall character of the surrounding LCT being significantly altered. This appraisal therefore concludes that there is likely to be a negligible adverse level of effect upon this LCT.

Local Landscape Character

- 5.6.7 At the local (Site) scale, the character of the landscape is already heavily influenced by the presence of the existing substation and highly visible electrical transmission infrastructure, however the surrounding landscape is largely rural in nature.
- 5.6.8 Once operational, the noise and activity associated with the construction phase will no longer influence the character of the setting. The land use of a proportion of the Site will have changed from farmland to an industrial use. However, given the close proximity of the existing substation and associated electrical transmission infrastructure, it is anticipated that this will lead to a moderate to minor adverse level of effect at Year 1, reducing to minor adverse at Year 15.

Visual Amenity Appraisal

- 5.6.9 The appraisal considers likely visual effects at Year 1 of the operational phase and at Year 15, once proposed mitigation planting has reached maturity (residual effects).

Residential receptors

- 5.6.10 There are a number of residential receptors in close proximity to the Scheme, all of which are considered to be high sensitivity receptors due to their relatively rural location.
- 5.6.11 For the purposes of the appraisal they are either considered individually or grouped together where effects are likely to be of a similar magnitude:
- Wrays Hill Farm and Laurel Farm are located close to the western boundary, and both properties are likely to experience easterly and south easterly views towards the Site.
 - Year 1: Proposed mitigation planting will not yet have reached maturity, therefore there will still be largely unobstructed views of the Scheme, resulting in a major to moderate adverse level of effect.
 - Year 15: Proposed mitigation planting will have reached a level of maturity where it can perform its intended screening function, reducing the level of effect to moderate to minor adverse.
 - Hall Flash Farm is located close to the south eastern Site boundary, however it has no windows in its western façade, which faces towards the Site. Whilst there are still likely to be views from other elevations within the property and to a lesser degree from its gardens, direct westerly views are likely to be limited in nature.
 - Year 1: Proposed mitigation planting will not yet have reached maturity, therefore there will be some views of the Scheme, resulting in a moderate to minor adverse level of effect.
 - Year 15: Proposed mitigation planting will have reached a level of maturity where it can perform its intended screening function, reducing the level of effect to minor adverse.
 - Southwood Chase is located approximately 100m to the west of the Site. Whilst the property is in close proximity to the Site, it sits within a depression, some 4-5m lower than the landform immediately to its north, with established vegetation to the east and north east. The combination of landform and vegetation is such that views will be largely obscured.
 - Year 1: Proposed mitigation planting will not yet have reached maturity, therefore there may still be glimpses of the Scheme, however it will be largely obscured by existing landform and vegetation, resulting in a minor adverse level of effect.
 - Year 15: Proposed mitigation planting will have reached a level of maturity where it can perform its intended screening function, screening the Scheme such that views are likely to be barely perceptible in the context of the presence of existing electrical transmission infrastructure, thus reducing the level of effect to neutral.
- 5.6.12 Whilst there are a number of additional residential receptors that are likely to experience views of the Scheme to varying degrees (including those on Calow Lane and within urban areas including Spital, Hasland, Brimington Common and Calow), these views are likely to be sufficiently obscured by existing intervening vegetation and subsequently by proposed mitigation planting, reducing over time such that residual effects will be no greater than minor to negligible adverse.

Recreational receptors

- 5.6.13 There are a number of local authority PRoWs within the study area that are likely to experience views of the Scheme to varying degrees, all of which are considered to be of medium sensitivity. For the purposes of the appraisal, these are grouped together in accordance with the degree to which they are likely to be affected:
- PRoWs NE5/25/1, NE5/17/2, NE5/16/1, NE5/17/4 and NE5/17/1 either pass through the Site, or run immediately adjacent to it. For these receptors, views will be unavoidable and the Scheme will form a highly noticeable element, altering the overall balance and composition of the visual experience.
 - Year 1: Proposed mitigation planting will not yet have reached maturity, therefore there will be noticeable views of the Scheme, resulting in a moderate adverse level of effect.
 - Year 15: Proposed mitigation planting will have reached a level of maturity where it can perform its intended screening function, reducing the level of effect to minor adverse.
 - PRoWs NE9/22/1, NE5/16/2 and NE9/18/1 are located slightly further away from the Site. Whilst the Scheme will still be visible from these receptors, vegetated field boundaries to the south, south west and east will restrict views considerably (as represented by Viewpoint 07 and Viewpoint 08).
 - Year 1: Proposed mitigation planting will not yet have reached maturity, resulting in a minor adverse level of effect.
 - Year 15: Proposed mitigation planting will have reached a level of maturity where it can perform its intended screening function, reducing the level of effect to negligible adverse.
- 5.6.14 Whilst there are a number of additional PRoWs, highways and access tracks that are likely to experience views of the Scheme, these views are likely to be sufficiently obscured by existing intervening vegetation and subsequently by proposed mitigation planting, reducing over time such that residual effects will be no greater than negligible adverse.

5.7 Bibliography

- British Standards Institution (2012). BS 5837:2012 Trees in relation to design, demolition and construction. Recommendations.
- Derbyshire County Council (2013). The Landscape Character of Derbyshire.
- Institution of Lighting Professionals (2021). Guidance Note 01/21: The Reduction of Obtrusive Light.
- Natural England (2014). NCA Profile: 38. Nottinghamshire, Derbyshire and Yorkshire Coalfield.

6. Cultural Heritage and Archaeology

6.1 Introduction

- 6.1.1 This chapter details the Cultural Heritage and Archaeology baseline conditions and the environmental appraisal of the potential Cultural Heritage and Archaeology impacts associated with the construction and operation of the above elements of the Scheme. Where potential environmental impacts are identified, relevant control measures are prescribed to reduce or avoid these impacts.
- 6.1.2 This chapter should be read in conjunction with Appendix A Chesterfield New 400kV Substation Glossary and Abbreviations, Appendix B Chesterfield New 400kV Substation Methodology, Appendix E Chesterfield New 400kV Substation Drawings, Appendix I Chesterfield New 400kV Substation Gazetteer of Heritage Assets; and Appendix J Chesterfield New 400kV Substation Cultural Heritage Desk-based Assessment.

6.2 Baseline Conditions

Designated Heritage Assets

- 6.2.1 There are no listed buildings (LBs) within the Site and one listed building (LB4) within the 1km study area.
- 6.2.2 The Church of St Peter (LB4) is a Grade II listed building located on the A632 Chesterfield Road within the parish of Calow. It lies approximately 950m north of the Site. The church was constructed in 1869 by S. Rollinson, with the steeple added later in 1887. The architectural design of the church is that of Early English style, which contributes aesthetic value. The church's architecture is different to that of the surrounding residential buildings, making it a unique feature of the road. The church is situated within the grounds of a church yard with mature trees present. The setting of the asset is informed by the churchyard and road which contribute to its significance as a local community church. The significance of the asset is derived from the building's historical and aesthetic value, as well as its communal value as a place of worship. The Church of St Peter is of high value.

Non-designated Heritage Assets

- 6.2.3 There are no non-designated heritage assets within the Site and 10 (1, 3, 4, 5, 6, 7, 8, 10, 11, 12) within the 1km study area. These assets date to the post-medieval period and later. Three additional assets not provided by the Historic Environment Record, but digitised by Arcadis, have been added to the baseline. Assets 13 and 14 were identified through historic mapping and asset 15 was identified from the results of the geophysical survey of the Site.
- 6.2.4 There is little known prehistoric evidence for the area around Calow or even Chesterfield, with the earliest mentions relating to the Roman period; the city of Chesterfield has its roots in the Roman fort that once occupied the land of the modern city. In the early medieval period, Calow is mentioned in the Domesday book

as 'Calehale', meaning a bare corner of land; the village was recorded as having 17 inhabitants at this time. A manor is also mentioned to exist at Calow, belonging to the King. The settlement of Chesterfield did not seem to have existed prior to the Norman conquest but was an established market town in the medieval period, having received a charter from King John in 1204. Chesterfield's main industries were wool and leather. The town hosted a yearly fair that people throughout Derbyshire travelled to sell their wares. Calow was a small agricultural hamlet at this time.

- 6.2.5 Chesterfield and its surrounding environs were an important industrial region in post-medieval times, exploiting local clay, coal, and iron resources. Three post-medieval assets within the 1km study area relate to the area's industrial past. These include the former routes of two Victorian railway lines (7, 8) located approximately 230m north and 440m south west of the Site respectively, and the site of a Georgian to Victorian Iron Foundry (6) recorded approximately 40m west of the Site. These assets are of low heritage value on account of their evidential and historical value.
- 6.2.6 Other post-medieval assets within the 1km search area include:
- Two non-extant Victorian Primitive Methodist chapels (10, 12) located approximately 510m east and 930m west of the Site respectively, both of low heritage value.
 - Route of Georgian toll road (3) (present day B6039 Mansfield Road) located approximately 820m south west of the Site, of low heritage value.
 - An extant Victorian Church School (Congregational Chapel, Sunday School, United Reformed Church and Cemetery) (11) located approximately 980m north of the Site. The asset is of medium significance and is of historical and communal value, serving as a community building to the growing settlement of Calow during the Victorian period.
 - Findspot of five lead tokens (1), located approximately 680m north of the Site, of negligible value.
- 6.2.7 A post-medieval asset, not recorded by the Historic Environment Record, but present on historic Ordnance Survey (OS) mapping, printed in 1863, has been digitised by Arcadis. This asset indicates that there were several coal pits (14) within the Site, with some along the southern border of the band of woodland on the eastern side of the Site, and some of the pits along the eastern edge of this same band of woodland. This asset is of negligible value on account of its historic and evidential significance.
- 6.2.8 There are no modern assets recorded by the Historic Environment Record. However, mining activity (for coal and ironstone) was present within the Site during the 20th century (13). Evidence for past mining activity has been collated from the Consultants Coal Mining Report (ref. 51003373983002) (The Coal Authority, 2023), Mining Remediation Authority (formerly Coal Authority) Map Viewer (Mining Remediation Authority, 2025), Historic Land Characterisation data, British Geological Survey (BGS) borehole data, and historic OS maps.
- 6.2.9 Past mining activity within the Site consisted of underground working for coal at Bonds Main Colliery and Hall Flash Farm, as well as Ironstone at Calow Old Furnace. Past shallow coal mine workings took place at Hall Flash Farm and Calow Old Furnace. There are records of this activity having taken place in 1911, 1913, and 1927; activity was limited to the southern part of the Site.

- 6.2.10 The Site is also partially located within an area of opencast coal workings mapped by the Mining Remediation Authority. It should be noted that the mapped data only depicts the outline of opencast coal prospecting areas from the 1940s to the mid-1990s and does not necessarily reflect the extent of excavation in the past.
- 6.2.11 Historic OS mapping was reviewed for evidence of 20th century mining activity:
- Several old shafts for coal and ironstone are depicted within the 1km study area from the turn of the 20th century until 1955.
 - An old coal level is depicted approximately 120m east of the Site on maps dating from 1921 to 1955.
 - Calow Colliery is shown approximately 400m east of the Site from the turn of the 20th century until 1976. It is referenced as disused by 1980.
 - Opencast workings are referenced in the southernmost part of the Site between 1967 and 1968, but the mapping does not show specific locations of the works such as outlines of pits or disturbed areas of land. The extent of opencast workings is unclear.
- 6.2.12 Available borehole data from the BGS confirms several boreholes within the Site. One of these boreholes (SK46NW241) located west of Hall Flash Farm records a backfilled opencast coal mine to a depth of 33.30m. However, boreholes to the north (towards the existing substation) show no evidence of opencast backfilling and indicate potential deposits of archaeological material below the Made Ground.
- 6.2.13 The results of the geophysical survey revealed parallel positively enhanced linear trends aligned north to south, through the eastern to south eastern extent of the Site. Whilst the origin of these trends is uncertain through the geophysical survey imagery alone, it is highly likely that these linear features can be attributed to the coal mining activity within the Site, and as such have been grouped under asset 13. It is possible that these linear features are the remains of a track or tramway associated with raw material extraction.
- 6.2.14 Based on all the above, it is evident that mining activity took place within the southern part of the Site in the early 20th century. Furthermore, opencast coal workings were carried out within the Site in the mid-20th century; although the true extent of extraction is not known from historic mapping, the geophysical survey and borehole results suggest it was limited to the southern extent of the Site. Where opencast excavation took place, it is likely that earlier buried archaeological remains would have been removed. However, as the extent of these workings is unknown, there is still potential for unrecorded buried remains which predate the modern period to exist within the Site, likely in the north. There is also potential for archaeological remains associated with early 20th century mining activity within the southern part of the Site, although these are unlikely to be of great significance. Programmed ground investigation works may provide new evidence as to the extent of opencast mining activity within the Site. Both features that make up asset 13, the open mining area and possible track/tram way, are of negligible value on account of their historic and evidential significance.
- 6.2.15 An undated section of road (4) is recorded approximately 190m west of the Site. The section of road surface was uncovered during coal extraction in 1956. It was approximately 3m wide and 4m long and lay around 300cm below ground level (bgl). The road surface was composed of limestone blocks. The road disappeared underneath a hawthorn bush in the direction of Calow Church. It is not known if the road surface was destroyed or covered over. The road is of low value on account of its historical and evidential value.

- 6.2.16 An undated Pinfold (5) is recorded approximately 990m north east of the Site. In 1977 the drystone walls were 10 courses high, with rectangular coping stones approximately 15 inches wide and up to 3ft long. The entrance was flanked by two gate posts with diamond recesses. Parts of the east side had been removed to make way for a road to a house. The asset is of low value on account of its historical value.
- 6.2.17 The asset comprising a circular and rectilinear enclosure (15) was identified from the results of the geophysical survey. The date of this asset is unknown; however, it is likely prehistoric in origin. The asset is located outside of the Site, approximately 70m to the north, on the opposite side of Calow Lane to the Site. The asset is of low value on account of its historical and evidential value.

6.3 Construction Control Measures

- 6.3.1 The control measures listed in Table 6.1 will be applied during the construction phase of the Scheme. National Grid is committed to implementing the identified control measures to reduce or avoid any potential impacts that may occur during the construction of the Scheme. The control measures will be included in the CEMP and their implementation will be monitored by National Grid.

Table 6.1 Construction control and monitoring measures for Cultural Heritage and Archaeology

Potential receptor and/or impact	Control, enhancement and monitoring measures
Listed building (LB4): Church of St Peter. Setting of church does not extend to the Site, therefore no impact to setting from construction activities.	N/A
Non-designated asset 4: Undated section of road. The recorded extent of this heritage asset lies outside of the Scheme boundary. However, there is potential for buried archaeological remains associated with this receptor to extend within the Site.	Geophysical survey has been undertaken. The results do not confirm the asset to be present with the Site. Further assessment or mitigation may be required by NEDDC. However, current evidence does not indicate the need for further investigation relating this asset.
Non-designated asset 6: Former iron foundry site (post-medieval). There is potential for associated buried archaeological remains relating to past industrial activity to extend within the Site.	Geophysical survey has been undertaken. Results suggest that coal mining activity in the Site will likely have removed all earlier activity. Further assessment or mitigation may be required by the LPA. However, current evidence does not indicate the need for further investigation relating this asset.
Potential for currently unrecorded buried archaeological remains to be present within the Site. These remains could be impacted by construction activities.	Geophysical survey has been undertaken. The results identified coal mining activity including a possible tramway associated with it. Whilst pockets of survival within the Site are possible, the industrial nature of the coal mining suggests no earlier heritage assets would survive. Further assessment or mitigation may be required by the LPA. However, current evidence does not indicate the need for further investigation relating this asset.

Potential receptor and/or impact	Control, enhancement and monitoring measures
Non-designated asset 13: 20th Century Coal Mine activity and possible tramway. There is potential for associated buried archaeological remains relating to past industrial activity to be impacted as they are within the Site.	No additional measures are necessary as it is not expected that there will be a significant impact on the asset during construction due to its negligible value.
Non-designated asset 14: Post Medieval Coal Pits. There is potential for associated buried archaeological remains relating to past industrial activity to be impacted as they are within the Site.	No additional measures are necessary as it is not expected that there will be a significant impact on the asset during construction due to its negligible value.

6.4 Potential Construction Impacts

- 6.4.1 An assessment of potential construction impacts on cultural heritage assets was carried out. Due to the low significance of cultural heritage assets within the Site (as referenced in the baseline and shown in Appendix E Chesterfield New 400kV Substation Drawings, Figure 6.1), no significant impacts to assets resulting from construction of the Scheme were identified. Furthermore, no significant impacts on the setting of any heritage assets were predicted as a result of the Scheme, due to the temporary nature of construction activities and that noticeable changes are not within or visible from the setting of cultural heritage assets.
- 6.4.2 There is potential for construction impacts to currently unrecorded buried archaeological remains (if present within the Site) from the Scheme. Geophysical survey results suggest that if such remains are present, they survive in pockets in the north of the Site. Further assessment or mitigation may be required by NEDDC. However, current evidence does not indicate the need for further investigation relating the proposals for the Site.

6.5 Operational Control Measures

- 6.5.1 No operational control measures have been identified for heritage assets within the Site or study area.

6.6 Potential Operational Impacts

- 6.6.1 No potential operational impacts have been identified for heritage assets within the Site or study area.

6.7 Bibliography

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- The Coal Authority (2023). Consultants Coal Mining Report. Ref. 51003373983002.

7. Air Quality

7.1 Introduction

- 7.1.1 This chapter details the Air Quality baseline conditions and the environmental appraisal of the potential Air Quality impacts associated with the construction and operation of the above elements of the Scheme. Where potential environmental impacts are identified, relevant control measures are prescribed to reduce or avoid these impacts.
- 7.1.2 This chapter should be read in conjunction with Appendix A Chesterfield New 400kV Substation Glossary and Abbreviations, Appendix B Chesterfield New 400kV Substation Methodology, Appendix E Chesterfield New 400kV Substation Drawings and Appendix K Chesterfield New 400kV Substation Construction Dust Assessment and Methodology.

7.2 Baseline Conditions

- 7.2.1 As required by the Environment Act (1995, amended 2021), NEDDC and Chesterfield Borough Council (CBC) have undertaken a review and assessment of air quality within their areas of jurisdiction. This process has indicated that within CBC's authority there is one declared Air Quality Management Area (AQMA), whilst there are no declared AQMAs in NEDDC's authority area.
- 7.2.2 This declared AQMA, "Chesterfield No1", is located in Brimington, Chesterfield. The AQMA was declared in August 2015 for exceedances to the annual mean of nitrogen dioxide (NO₂). The AQMA covers eight residential properties in Brimington and is located 3.6km north of the Scheme.
- 7.2.3 As the Scheme is not located within or near the AQMA, there is no potential for the Scheme to further worsen an existing area of poor air quality. It is still important however to assess the baseline conditions of the area for the Scheme.
- 7.2.4 Air quality monitoring data within the vicinity of the Scheme has been reviewed to quantify the baseline concentrations of air pollutants.

Air Quality Monitoring Data

- 7.2.5 NEDDC and CBC currently monitor air quality across their respective authorities using a combination of fixed automatic monitoring stations and non-automatic monitoring sites. None of the automatic monitoring sites are located within 3km of the Scheme and so cannot be used to inform the existing baseline conditions in the local area.
- 7.2.6 NEDDC and CBC undertake passive monitoring of NO₂ across their respective authority areas using diffusion tubes. NEDDC has a network of 18 diffusion tubes and CBC has a network of 41 diffusion tubes. To assess the existing baseline NO₂ concentrations in the local area, the diffusion tube data for monitoring sites within 3km of the Scheme have been summarised in Table 7.1 below. Exceedances of the annual Air Quality Strategy (AQS) objective for NO₂, an annual mean concentration greater than 40µg/m³, are highlighted in bold. Data for 2024 is not yet available for NEDDC.

Table 7.1 NEDDC and CBC non-automatic air quality monitoring NO₂ concentrations near the Scheme

Diffusion Tube ID	X	Y	Site Type	Annual Mean NO ₂ Concentration (µg/m ³)				
				2020	2021	2022	2023	2024
2 (CBC)	438710	370950	Roadside	22.7	22.9	25.5	24.8	28.7
5 (CBC)	438293	370863	Roadside	20.0	19.7	21.4	19.2	20.1
8 (CBC)	438395	369776	Roadside	23.0	23.9	23.4	25.3	23.9
9 (CBC)	438385	369574	Roadside	21.3	23.1	21.7	22.7	25.4
13 (CBC)	439780	369440	Roadside	18.1	17.2	17.2	17.1	19.0
14 (CBC)	438357	369410	Roadside	26.5	26.2	25.5	26.5	30.8
23 (CBC)	439830	369320	Roadside	20.4	19.7	19.8	18.1	19.7
25 (CBC)	439490	369608	Roadside	26.9	27.3	27.4	26.7	17.8
27 (CBC)	439490	369590	Roadside	24.9	25.6	24.9	22.3	29.3
30 (CBC)	438417	371357	Roadside	22.6	21.3	20.6	18.1	25.3
33 (CBC)	438976	370356	Roadside	31.5	29.8	28.0	23.9	33.8
36 (CBC)	439710	369420	Roadside	22.8	23.3	20.1	17.8	23.4
24 (NEDDC)	440708	366629	Roadside	12.9	16.2	15.6	13.9	-
20, 72, 73 (NEDDC)	440869	370912	Roadside	18.4	23.4	22.4	21.8	-
74 (NEDDC)	443555	371305	Urban Background	11.3	13.4	13.3	12.1	-

- 7.2.7 Reviewing the diffusion tube monitoring data within 3km of the Scheme shows that in 2024, the most recent year of data available, there were no exceedances of the AQS objective for NO₂. Historically, there have been no recent exceedances in the surrounding area.
- 7.2.8 The highest monitored NO₂ concentration for 2024 within 3km of the Scheme was 33.8µg/m³ at diffusion tube 33 (in CBC's monitoring network), which is well below the AQS objective of 40µg/m³. This is also the highest annual mean concentration of NO₂ over the past five years, a 9.9µg/m³ increase from the previous year.
- 7.2.9 As part of their automatic monitoring networks, CBC monitor particulate matter (PM₁₀ and PM_{2.5}) concentrations at a couple of locations across their authority area. NEDDC do not monitor particulate matter concentrations across their network. None of the automatic monitoring stations in CBC's monitoring network are within 3km of the Scheme, however the closest to the Scheme is an Automatic Urban and Rural Network site which is run by the Department for Environment, Food and Rural Affairs (Defra). The automatic monitoring site is the Chesterfield Roadside monitoring site, which is located 4.5km west of the Scheme. In 2024, the Chesterfield Roadside automatic monitoring site monitored an annual mean PM₁₀ concentration of

12.0µg/m³ and an annual mean PM_{2.5} concentration of 7.4µg/m³. These annual mean values for PM₁₀ and PM_{2.5} are well below the AQS objectives for both the pollutants.

- 7.2.10 The Chesterfield Roadside monitoring site is however not entirely representative for the Scheme, as the monitoring site is a roadside monitoring site on the A619 while the Scheme is located in a more rural setting, over 400m away from A617 and any other major road. Despite this however, the Chesterfield Roadside monitoring site remains the most representative monitoring site available in the CBC's monitoring network. It can be determined that the baseline conditions for PM₁₀ and PM_{2.5} at the Site are well below the AQS objectives for both pollutants.
- 7.2.11 Although air quality monitoring data is available for 2020 and 2021, it is expected to have been heavily influenced by the COVID-19 pandemic where traffic flows decreased in response to restrictions including lockdowns and encouragement of home working. As such 2020 and 2021 air quality monitoring data is likely to be representative of air quality under specific conditions and constraints which are not representative of a 'normal' baseline.

Background Pollutant Concentrations

- 7.2.12 Modelled predictions of background pollutant concentrations are periodically produced by Defra to assist local authorities in their review and assessment of air quality. These are produced for every 1km Ordnance Survey grid square in the UK. The Scheme is located at grid square 439500, 369500. Data for these grid squares was downloaded from the Defra website (Defra, 2025) for the purposes of the assessment. Table 7.2 shows the background pollutant concentrations for the base year 2025. All concentrations are well below their respective objectives (which are detailed in Appendix B Chesterfield New 400kV Substation Methodology).

Table 7.2 Defra background pollutant concentrations

Pollutant	Concentration (µg/m ³)
NO ₂	8.1
PM ₁₀	11.0
PM _{2.5}	6.6

Statutory Ecological Sites

- 7.2.13 There are two statutory ecological sites located within 3km of the Scheme. The first site is Duckmanton Railway Cutting, a SSSI located 1.0km north east from the Site. The second is the West Wood ancient woodland, located 1.9km north of the Scheme boundary.
- 7.2.14 Further information on these ecological sites can be found in Chapter 4 Ecology.

7.3 Construction Control Measures

- 7.3.1 The control measures listed in Table 7.3 will be applied during the construction phase of the Scheme. National Grid is committed to implementing the identified control measures to reduce or avoid any potential impacts that may occur during the construction of the Scheme. The control measures will be included in the CEMP and their implementation will be monitored by National Grid.

- 7.3.2 These measures were calculated by undertaking a construction phase dust risk assessment in accordance with the Institute of Air Quality Management (IAQM) (2024) construction dust guidance. This assessment utilises construction information, number and distances of receptors (those within 250m of the Scheme boundary, and/or those within 50m of the haul routes up to a distance of 250m from the site entrances), and existing dust concentrations in order to calculate unmitigated dust risk for construction, earthworks, and trackout. The dust risk (small/medium/large) is then used to define which control and management measures should be adopted to avoid residual effects.
- 7.3.3 The assessment is summarised in Section 7.4, and the measures commensurate with the calculated risk are listed in Table 7.3.

Table 7.3 Construction control and monitoring measures for Air Quality

Potential receptor and/or impact	Control, enhancement and monitoring measures
Dust emissions from the excavation of materials, general construction activities and the movement of HGVs on sensitive residential and human receptors.	<p>A Dust Management Plan (DMP) will be produced by the Contractor which will include, but not be limited to, the following measures:</p> <ul style="list-style-type: none"> • Site management – record all dust and air quality complaints, make the complaints log available to the local authority when asked, record any exceptional incidents and hold regular liaison meetings with other high risk construction sites within 250m of the Scheme boundary. • Preparing and maintaining the Site – erect barriers, enclose site operations, keep equipment damped down, avoid site runoff, remove materials with a potential to produce dust. • Operating vehicle/machinery and sustainable travel – ensure Non-Road Mobile Machinery complies with best practice standards, i.e. no idling, speed limits, implement travel plan, avoid diesel generators. • Operations – only use cutting/grinding equipment in conjunction with dust suppression, use enclosed chutes, minimise drop heights, ensure adequate water supply on-site. • Waste management – recycle and re-use waste materials, avoid bonfires and burning of waste. • Measures specific to earthworks – re-vegetate earthworks and exposed areas,

Potential receptor and/or impact	Control, enhancement and monitoring measures
	<p>use Hessian, mulches or tackifiers where re-vegetation is not possible.</p> <ul style="list-style-type: none"> Measures specific to construction – avoid scabbling, ensure sand and aggregates are stored in bunded areas and are kept damp where possible, ensure bulk cement and other fine powders are delivered in enclosed tankers and stored in silos, ensure bags are sealed after use. Measures specific to trackout – use a water equipped road sweeper on access/local roads, avoid dry sweeping of large areas, ensure vehicles are covered, record inspections of haul routes and actions, install hard surface haul routes which are regularly damped down, implement wheel washing systems, apply dust suppressants to locations where large volume of vehicles enter/leave the Site and locate site access gates at least 10m from receptors.

7.4 Potential Construction Impacts

Construction Dust

- 7.4.1 This appraisal considers the potential dust effects of the Scheme during construction on local air quality. During the construction phase of the Scheme, there is a potential for dust to be emitted into the air through construction activities (demolition, earthworks, and construction) and from plant and road vehicles moving over temporary roads and open ground, and where mud is carried from construction vehicles onto the highway (known as ‘trackout’). Airborne dust has the potential to cause a nuisance to local human receptors due to dust soiling, and it can affect local ecological sites that are sensitive to dust impacts.
- 7.4.2 A construction dust risk assessment has been carried out due to the presence of sensitive human receptors within 250m of the Scheme boundary. The assessment was carried out in accordance with the IAQM Guidance on the assessment of dust from demolition and construction (IAQM, 2024). The assessment’s purpose is to define the level of unmitigated construction dust risk as a means of defining proportionate control measures. The dust risk assessment is considered to be conservative as the screening distances are from the edge of the Scheme boundary, with the assumption that dust emissions could take place across the entirety of the Site.
- 7.4.3 Table 7.4 below shows the potential unmitigated risks from the construction of the Scheme for dust soiling and human health impacts. There is a medium risk of dust soiling from earthworks and construction activities, as well as trackout activities to receptors within 50m of the proposed construction vehicle route. There is a low risk to human health from all construction activities.

- 7.4.4 There will be no demolition activities as part of this application during the construction of the Scheme, therefore the risks associated with demolition activities have been screened out.
- 7.4.5 The level of activity specific mitigation for each of the four construction activities is chosen using a precautionary approach in those instances where the risk level is not uniform between dust soiling and human health. For the Scheme, dust emissions from trackout represent a medium risk for dust soiling, but low risk to human health. Therefore, mitigation measures specific to trackout commensurate with a medium risk (rather than low risk) are to be utilised.

Table 7.4 Unmitigated risk of dust impacts from construction activities associated with the Scheme

Potential Impact	Control, Enhancement and Monitoring Measures			
	Demolition	Earthworks	Construction	Trackout
Dust soiling	Screened out	Medium	Medium	Medium
Human health	Screened out	Low	Low	Low
Level of activity – specific mitigation measures	Screened out	Medium	Medium	Medium

- 7.4.6 The mitigation measures identified in Table 7.3 will help to reduce the potential impacts from the construction activities and will result in all dust generating activities being negligible during the construction phase.

Construction Traffic

- 7.4.7 The construction traffic flows associated with the Scheme were screened against the traffic change thresholds in the IAQM (2017) Development Control guidance for human receptors and National Highways (2024) Design Manual for Roads and Bridges LA 105 for ecological receptors (sites with a relevant ecological designation such as SSSI, SAC, SPA, Ramsar and ancient woodland).
- 7.4.8 The IAQM guidance presents two sets of flows change criteria: one for use in areas close to/within AQMAs, and a less stringent set for use in other locations away from AQMAs. As the Scheme is not located close to or within an AQMA, the less stringent criteria were applied.
- 7.4.9 This screening criteria is a change of Light Duty Vehicle (LDV) flows of more than 500 Annual Average Daily Traffic (AADT) and/or a change of Heavy Duty Vehicle (HDV) flows of more than 100 AADT. During the entire construction phase for the Scheme, traffic flows are forecast to not exceed the IAQM screening criteria for both LDVs and HDVs. From 2026 to 2031, the largest change in traffic flows for LDVs occur in 2028 with an increase in flow of 94 AADT, and the largest change in traffic flows for HDVs occur in 2027 with an increase in flow of 14 AADT. These changes in flows are both well below the IAQM screening criteria. Therefore, an assessment of the effect of these traffic flows on human receptors was screened out.

- 7.4.10 The flows did not meet the change criteria in National Highways (2024) Design Manual for Roads and Bridges LA 105 (>1,000 AADT, and/or >200 HDVs), and as such the effect of construction vehicle exhaust emissions on ecological receptors was screened out.

7.5 Operational Control Measures

- 7.5.1 There are no operational control measures required.

7.6 Potential Operational Impacts

- 7.6.1 During normal operation of the Scheme, the only traffic generated would be associated with infrequent repair and routine maintenance and inspection activities and a small number of operational staff (assumption of 10 vehicles per year). This number of vehicle movements is well below the screening thresholds detailed in Section 7.4, therefore an operational phase air quality assessment is scoped out.

7.7 Bibliography

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8. Water Resources and Flood Risk

8.1 Introduction

Overview

- 8.1.1 This chapter details the Water Resources and Flood Risk baseline conditions, and the environmental appraisal of the potential Water Resources and Flood Risk impacts associated with the construction and operation of the above elements of the Scheme. Where potential environmental impacts are identified, relevant control measures are prescribed to reduce or avoid these impacts.
- 8.1.2 This chapter should be read in conjunction with Appendix A Chesterfield New 400kV Substation Glossary and Abbreviations; Appendix B Chesterfield New 400kV Substation Methodology; Appendix E Chesterfield New 400kV Substation Drawings; Appendix L Flood Risk Assessment and Appendix M Surface Water Drainage Strategy.

8.2 Baseline Conditions

Water Bodies

- 8.2.1 The nearest watercourse, an unnamed tributary of the Calow Brook, flows south along the western boundary of the Site, and the Site drains to this watercourse in accordance with the relatively steeply sloping topography. The unnamed tributary, an ordinary watercourse, joins the Calow Brook approximately 270m south of the Site. The Calow Brook, another ordinary watercourse, flows north west becoming the Spital Brook approximately 480m west of the Site at the Calow Lane bridge.
- 8.2.2 There is a drainage ditch approximately 60m south east of the southern most extent of the Site. It runs approximately 110m along a field boundary, but does not appear to have hydraulic connectivity to the unnamed tributary of the Calow Brook. There are no ponds or water bodies within the Site or wider study area.
- 8.2.3 An overview of the watercourses in the study area is shown in Figure 8.1, Study Area.

Water Quality

- 8.2.4 The study area drains to one Water Framework Directive (WFD) surface water body catchment, namely the Spital/Calow/Muster Book Water Body (Environment Agency, 2023). Table 8.1 below details the current status and lists the Reasons for Not Achieving Good (RNAG) overall status for this water body.

Table 8.1 WFD surface water bodies within the study area

Name	ID	Ecological Status	Chemical Status	Overall Status	RNAG
Spital/Calow/Muster Book Water Body	GB104027057640	Poor	No assessment required (Fail in 2019)	Poor	Contaminated land, physical modification (urbanisation), poor soil management, sewage discharge and others unknown but pending investigation.

8.2.5 There is one groundwater body which underlies the Site, data for which is summarised below in Table 8.2.

Table 8.2 WFD groundwater bodies

Name	ID	Quantitative Status	Chemical Status	Overall Status	RNAG
Don & Rother Millstone grit & Coal Measures	GB40402G992300	Good	Poor	Poor	Pollution from abandoned mine, natural mineralisation and one unknown but pending investigation.

Water Resources

- 8.2.6 The British Geological Survey (BGS) Geology Viewer (BGS, 2025) shows that the Site is underlain predominantly by bedrock of the Pennine Lower Coal Measures Formation, which is formed of mudstone, siltstone and sandstone. This is interspersed with sandstone bedrock of the Silkstone Rock formation. There are no superficial deposits underlying the Site, however the Calow Brook is underlain by alluvium superficial deposits of gravel, sand, silt and clay. The Site has a history of past mining activity, consisting of underground working for coal; further details are provided in Chapter 9 Land and Ground Conditions.
- 8.2.7 The Site is underlain by a Secondary A aquifer, which is comprises permeable bedrock layers that can support local water supplies and form important sources of base flow to rivers. There are no groundwater source protection zones within the study area.
- 8.2.8 Data obtained for a recent local study (National Grid, 2024) shows that there are no abstractions from surface or groundwater resources within the vicinity of the study area. Abstraction and discharge data for the study area has been requested from the Environment Agency. There are no consented abstractions within 2km of the Site. There are 10 discharge consents within 2km of the Site, the closest being the Chesterfield Substation discharge consent on the south eastern corner of the Site boundary.

Flood Risk

- 8.2.9 The Site lies entirely within Flood Zone 1 (Environment Agency, 2025a), as illustrated in Appendix E Chesterfield New 400kV Substation Drawings, Figure 8.2. This is land defined as having a low probability of flooding from rivers and the sea, with an annual chance of flooding of less than 0.1% (1 in 1000). In the wider study area, the floodplain of the Calow Brook is located to the west of the Site (land categorised as Flood Zone 3, defined as having an annual chance of flooding greater than 1% (1 in 100)).
- 8.2.10 The Site is generally at a very low risk of flooding from surface water (Environment Agency, 2025b) (defined as land with a less than 0.1% annual chance of flooding), with some small, isolated areas having a low to high risk within the existing substation (land with an annual chance of flooding between 1% and 3.33% and greater than 3.33% chance respectively).
- 8.2.11 Further details of the flood risk from all sources are included within Appendix L FRA, which concludes a generally negligible to low risk of flooding to the Site for most sources, and a moderate risk from groundwater sources. Mitigation measures are suggested for flooding from groundwater sources, as detailed in Section 8.3.

8.3 Construction Control Measures

- 8.3.1 The control measures listed in Table 8.3 will be applied during the construction phase of the Scheme. National Grid is committed to implementing the identified control measures to reduce or avoid any potential impacts that may occur during the construction of the Scheme. The control measures will be included in the CEMP and their implementation will be monitored by National Grid.

Table 8.3 Construction control and monitoring measures for Water Resources and Flood Risk

Potential receptor and/or impact	Control, enhancement and monitoring measures
Watercourses (Calow Brook, Spittal Brook and unnamed tributaries) – degradation of surface water quality	<p>The Contractor will prepare detailed method statements and implement appropriate controls to protect water environment and manage surface water runoff from the construction footprint. Controls are to include best practice pollution prevention measures for activities such as earthworks, excavation and dewatering, storage of fuels, chemicals and oils, vehicle washing, and emergency contingency actions.</p> <p>Construction machinery will be refuelled within bunded areas with sealed drainage systems, away from water bodies. Wastewater generated from the construction compound will be disposed of via appropriate means, for example to foul sewer or pumped out and removed from Site by tanker. Where practicable, sustainable drainage features within the work area will be used to prevent pollution, for example from silted runoff.</p> <p>An emergency spillage response plan will set out clear protocols to be implemented to prevent pollutants infiltrating into the soils beneath the Site and reaching surface water receptors. Appropriate equipment (e.g. absorption mats and booms) will also be made easily accessible on Site to deal with accidental spillages, and the plan will include full communication procedures with the Environment Agency in the event of</p>

Potential receptor and/or impact	Control, enhancement and monitoring measures
	<p>an accidental surface water pollution incident. All site personnel will receive toolbox training on these procedures.</p> <p>Materials will be stored in accordance with best practice, within designated construction compounds, avoiding storage in close proximity to any watercourse or drain, to prevent pollution risk of the surface water environment.</p> <p>Any dewatering of excavations will comply with relevant permits (where applicable), and discharges to be made to ground, following suitable treatment where necessary.</p> <p>The above controls safeguarding water quality would also protect the integrity of any existing surface water abstractions and discharges.</p>
Surface and groundwater resources – consumptive water use	<p>Measures will be implemented to promote general water use efficiency during construction and particularly to reduce the use of potable water, for example recirculating wheel washers and water efficient welfare facilities.</p>
Watercourses (Unnamed tributary of the Calow Brook) – impacts on hydromorphology (physical form, flow and sediment transport regimes)	<p>Soil will be stored away from watercourses.</p> <p>Any permitted construction related discharges to nearby watercourses will be attenuated and, where necessary, treated (e.g. settlement, filtration) prior to release to minimise the risk of scour and sedimentation.</p>
Proposed development – increase in flood risk	<p>Prior to construction, site-specific ground investigations will be undertaken to identify the groundwater depth and seasonal variations. The condition of any historic mining features (e.g. soughs and shafts) will also be confirmed. With this information a hydrogeological risk assessment will be conducted covering the potential for mine water rebound and the interaction between the development structures and groundwater flow.</p> <p>During construction, a groundwater monitoring programme will be put in place to track levels in real time.</p> <p>In addition, a contingency plan will be developed that covers controlled dewatering in the event of water ingress and emergency response in the occurrence of uncharted mines.</p>
Floodplains and land drainage – increase in flood risk or impeded drainage	<p>Construction compounds will have suitable surface water drainage provision utilising sustainable drainage techniques to attenuate runoff, preventing increased flood risk on the Site and to neighbouring land.</p> <p>Existing land drainage routes/key flow paths will be retained.</p> <p>As part of pre-construction works, a record of existing land drainage will be compiled and, subject to landowner/occupier agreement, new drains will be established to help prevent damage to soil structure, maintain work areas in a dry condition and to enable current drainage systems to continue to operate through the construction phase.</p>

Potential receptor and/or impact	Control, enhancement and monitoring measures
Degradation of groundwater body (Don & Rother Millstone grit & Coal Measures water body) quality	<p>Any topsoil and/or excavated material will be reinstated to ensure no detriment to the existing land drainage regime.</p> <p>An emergency spillage response plan will document measures to be implemented to prevent pollutants infiltrating into the soils beneath the Site and reaching the groundwater receptors. Appropriate equipment (e.g. absorption mats) will also be made easily accessible on the Site to deal with accidental spillages and the plan will provide a full list of protocols and communication channels with the Environment Agency in the event of an accidental groundwater pollution incident.</p> <p>Materials will be stored in accordance with best practice in construction compounds, to prevent pollution of the groundwater environment.</p>

8.4 Potential Construction Impacts

- 8.4.1 Surface water runoff generated during construction could transport debris, silt or pollutants from the Site into nearby drains or surface watercourse, potentially degrading water quality. This risk will be managed through the pollution prevention and drainage measures set out in the CEMP, ensuring that contaminated water is not discharged to surface water receptors. In the event of a spillage or pollution incident, a response plan will be in place prior to construction that will define protocols to prevent detriment to the water environment.
- 8.4.2 The hydromorphology of watercourses, including Calow Brook, Spittal Brook and unnamed tributaries, could be affected by excess silt entering channels. The sediment build-up of additional silt in channel, or scour of the channel profile caused from uncontrolled discharges, could alter the channel hydromorphology. This risk will be mitigated by storing soil away from the water features and implementing sediment control measures to prevent its entry into watercourses.
- 8.4.3 Temporary changes to land permeability during construction, such as from temporary hardstanding or stockpiling, could increase flood risk on Site or impede local drainage. This will be mitigated by providing sustainable surface water drainage for construction compounds and reinstating the pre-existing land drainage regime once works are complete.
- 8.4.4 With regard to the water resource/supply attributes of surface water bodies, a non-depletive approach is proposed. Efficient water use practices would be implemented, with minimal or no impact on the water supply attributes of local water bodies. With regard to the water supply attributes of the underlying groundwater body, no consumptive groundwater use is proposed and there will be no change to the current recharge regime.
- 8.4.5 Due to the historical mines, there is the potential for an increase in flood risk to the Scheme. This impact can be managed via preconstruction measures to investigate water levels or potential mining infrastructure within the Site. Alongside this, during construction a monitoring programme and contingency plans can be implemented to reduce the risks. More details are given in the FRA.

- 8.4.6 Considering the control, enhancement and monitoring measures in Table 8.3 above, the Scheme is considered to have a low to negligible impact overall on water environment receptors during construction.

8.5 Operational Control Measures

- 8.5.1 The measures listed in Table 8.4 will be implemented during the operational phase of the Scheme and the appraisal has been undertaken assuming these measures are in place.

Table 8.4 Operational control and monitoring measures for Water Resources and Flood Risk

Potential receptor and/or impact	Control, enhancement and monitoring measures
Floodplains and land drainage – increase in flood risk or impeded drainage	<p>Any new permanent development that results in an increase in impermeable land cover will be drained in accordance with the planning policy requirements and any local Sustainable Drainage Systems (SuDS) guidance of the Lead Local Flood Authority, Derbyshire County Council (2017).</p> <p>As detailed in the FRA, attenuation basins will be located on Site to manage surface water runoff. The SuDS will be designed to incorporate allowances for future climate change.</p> <p>The Scheme will be situated in Flood Zone 1 and, as such, at a low risk of flooding from rivers and the sea, avoiding the impacts on flood risk from these sources.</p>
Watercourses (Callow Brook, Spittal Brook and unnamed tributaries) – degradation of surface water quality	The proposed SuDS will treat operational surface water runoff and protect the water quality attributes of water environmental receptors.
Proposed development – increase in flood risk	Permanent works have very limited potential to interact with groundwater. Since no buildings will be underground, the risk to groundwater flooding on-site is low and passive drainage systems will be incorporated into the design.

8.6 Potential Operational Impacts

- 8.6.1 Given the increase in impermeable land cover during operation compared to the existing land use, there is a potential for impacts to the land drainage regime. Any increases to surface water flood risk or impacts on water quality in or around the Site will be mitigated, as noted above, through the implementation of suitable drainage systems at the Site.

- 8.6.2 Given the location of the Site, there is the potential for groundwater flooding, however the mitigation and monitoring measures proposed will reduce the risk to the Site.
- 8.6.3 There are not expected to be any other potential impacts during operation, as the embedded design avoids encroachment into functional floodplain areas.
- 8.6.4 With the embedded design and mitigation measures set out in the FRA and summarised in Table 8.4 above, the Scheme is considered to have a low impact overall on the water environment receptors during operation. However, it is noted that the capacity of drainage systems serving the Scheme have the potential to be exceeded during extreme rainstorms. As detailed in the FRA, this residual impact will be mitigated through maintenance and preserving the existing flow paths (accommodated by the proposed drainage design), and therefore there will be no net increase in flood risk to or arising from the Scheme.

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9. Land and Ground Conditions

9.1 Introduction

- 9.1.1 This chapter details the Land and Ground Conditions baseline conditions, and the environmental appraisal of the potential Land and Ground Conditions impacts associated with the construction and operation of the above elements of the Scheme as set out in Chapters 1 and 2 of this report. Where potential environmental impacts are identified, relevant control measures are prescribed to reduce or avoid these impacts.
- 9.1.2 This chapter should be read in conjunction with Appendix A Chesterfield New 400kV Substation Glossary and Abbreviations; Appendix B Chesterfield New 400kV Substation Methodology; Appendix E Chesterfield New 400kV Substation Drawings; and Appendix N Chesterfield New 400kV Substation Ground Conditions and Contaminated Land Desk Study Report.
- 9.1.3 This chapter is supported by the following figures shown in Appendix E Chesterfield New 400kV Substation Drawings:
- Figure 9.1 Study Area;
 - Figure 9.2 Superficial Geology; and
 - Figure 9.3 Bedrock Geology

9.2 Baseline Conditions

Site and Study Area Description

- 9.2.1 A walkover was undertaken on 24 April 2024, and the following observations were made of the Site and the general study area. The Site is of mixed use, with agricultural fields in the centre and southern half and the existing Chesterfield Substation present in the north, covered in asphalt hardstanding with associated infrastructure. Pylons are present running from the substation to the north and south. There are two PRow footpaths that run through the Site, south of the substation, from west to east. There are various site access gates around the substation with two pedestrian access gates on the eastern boundary off Hallflash Lane and seven access gates for cattle and vehicles distributed around the Site boundary. A small, wooded area, named Furnace Hillock (a woodland) is present on the western boundary within the Site. A small mound of rubble and construction waste is present in the south west field entrance.
- 9.2.2 The area surrounding the Site (the study area), is predominantly semi-rural, comprising a mixture of agricultural fields and residential land use. Directly west of site there are undeveloped fields with the A617 approximately 400m from Site heading north west into Chesterfield. Directly north is Calow Lane with agricultural fields beyond. Directly to the east of the Site is Hall Flash Farm on Hallflash Lane with a small watercourse running parallel with further agricultural fields beyond. More agricultural fields are also present to the south. The surface water feature Calow Brook is present approximately 200m west flowing to the south.

Geology

- 9.2.3 **Made Ground:** Infilled ground is mapped in one area on the northern edge of the study area boundary and is likely to be associated with historical railways cuttings (Groundsure, 2024). Further away, approximately 400m to the south, areas of infilled ground are mapped likely associated with past opencast workings.
- 9.2.4 Superficial Geology: Superficial deposits are not mapped underlying the majority of the Site (BGS, 2024), except for strips of alluvium, described as clay, silt, sand and gravel, in the south and west, within the study area, as presented on Appendix E Chesterfield New 400kV Substation Drawings, Figure 9.2 and in Appendix N Chesterfield New 400kV Substation Ground Conditions and Contaminated Land Desk Study Report. The alluvium is mapped in the approximate vicinity of Calow Brook and an unnamed tributary (both off-site).
- 9.2.5 Bedrock Geology: The majority of the Site is underlain by the Pennine Lower Coal Measures which are described as *“interbedded grey mudstone, siltstone and pale grey sandstone, commonly with mudstones containing marine fossils in the lower part, and more numerous and thicker coal seams in the upper part”* (BGS, 2024). In the south of the Site the Pennine Middle Coal Measures are mapped, also comprising mudstone, siltstone and sandstone. The bedrock geology is displayed in Appendix E Chesterfield New 400kV Substation Drawings, Figure 9.3, and presented in Appendix N Chesterfield New 400kV Substation Ground Conditions and Contaminated Land Desk Study Report.
- 9.2.6 The Pennine Middle Coal Measures host frequent coal seams (BGS, 2024). According to BGS mapping, there are nine records of coal seams within the Site with further details presented in Paragraph 9.2.23. Other linear features recorded within the Site are a fault (inferred) in the south and a fossil horizon also in the south. An inferred fault is also indicated approximately 100m west of the Scheme boundary (BGS, 2024).
- 9.2.7 Geological sites (regional or local) or other sensitive designations with respect to geology are recorded within the study area (Groundsure, 2024). There are no records to indicate that the Site is located within a Regionally Important Geological and Geomorphological Site.
- 9.2.8 There are six available BGS borehole records within the Site. One record is depicted on Calow Road and is dated 1963 for oil exploration purposes. This is an oil exploration well dated 1963, which is located in the centre of the Site, north of Calow Road. The borehole recorded bedrock from the surface described as coal measures, described as dark grey silty shale to approximately 4m below ground level (bgl), underlain by siltstone to approximately 8.5m bgl, and in turn by soft grey shale to approximately 15m where a thin coal bed was encountered. A mix of mudstone, shale and siltstone were recorded to 253m bgl where Millstone Grit was encountered as a mix of shale and sandstone to the base of the hole at approximately 339m deep.
- 9.2.9 The remaining five records relate to a ground investigation undertaken in 1993 detailed in report ref: CEC/MTS/SM962. Two boreholes approximately 40m west of the substation recorded Made Ground to a maximum depth of 0.5m bgl overlying clay down to approximately 2m, and siltstone/mudstone bedrock was recorded below to a maximum depth of 5m. Two boreholes in the centre of the Site, approximately 120m south of the substation encountered Made Ground down to 1.70m to 2.10m bgl overlying silt/clay. Bedrock of the coal measures, comprising siltstone, sandstone, mudstone and coal, was encountered at 3.00m bgl to 8m bgl. The most southern

borehole, BGS reference KS46NW241, approximately 230m south of the substation recorded Made Ground down to 23.30m bgl which is recorded as “backfilled opencast coal mine”. The Made Ground recorded from 1.10m to 23.30m bgl was generally described as very silty clayey angular fine to medium gravel of sandstone, siltstone, mudstone, rare coal and ironstone nodule.

Hydrogeology

- 9.2.10 The Defra MAGIC maps database (Defra, 2024) indicates that the underlying bedrock lithology are classified as Secondary A aquifers. The alluvium deposits to the south and west, within the study area are also classified as Secondary A aquifers. Secondary A aquifers are defined as *‘permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers’* (Groundsure, 2024). These are generally aquifers formerly classified as minor aquifers.
- 9.2.11 Where the >23m backfill of granular material in the historical opencast coal workings is present in the south, no specific groundwater data is present from the borehole log owing to the use of water flush as a drilling medium. As the material is described as granular it is assumed groundwater will be present, however the depth of the water table is unknown without further ground investigation.
- 9.2.12 The groundwater vulnerability for superficial deposits is low and for bedrock geology is medium. This results in the Site having an overall medium vulnerability classification (Defra, 2024). The Groundsure report (2024) also shows that the Site is not within a source protection zone.

Hydrology

- 9.2.13 There are five surface water features within the study area, of which one is located on the eastern Site boundary. All surface water features are tributaries to Calow Brook which flows to the south (Groundsure, 2024).

Unexploded Ordnance

- 9.2.14 The Unexploded Ordnance risk maps (Zetica, 2024) indicate the Site is located within an area of low risk, *‘indicated as having 15 bombs per 1000 acres or less’*. The Preliminary Desk Study Assessment for the Site concluded that *‘a detailed desk study, whilst always prudent, is not considered essential in this instance’*.

Radon

- 9.2.15 According to the UK Radon Risk Map (UK Health Security Agency, 2024), the northern half of the Site is in an area where 10% to 30% of properties are estimated to be above the radon action level. This appears to be associated with the sandstone bedrock geology (Groundsure, 2024). In the southern half, and a small area in the north, radon is estimated to affect between 1% and 3% of properties. As such, new development or structures which will be occupied within the Site will require radon protection measures, as advised in the guidance in BRE Report BR 211 (BRE, 2015) and UK building regulations.

Historical Review

- 9.2.16 The following summarises the historical development within the Site based on specific historical OS maps (Groundsure, 2024) relating to the Scheme.
- 9.2.17 From the earliest map (1876), the maps show the Site was undeveloped agricultural fields with Calow Lane running through along the northern boundary from west to east and a drain in the north extending from beyond the northern boundary towards Calow Lane. The 1897 map shows the Lancashire, Derbyshire and East Coast Railway line ran along the northern edge of the study area which was later (by 1921) renamed the Chesterfield and Lincoln Railway, with a tank also shown on the northern boundary of the study area. By 1967 the railway was dismantled and unspecified “works” were constructed in the east of the Site, off Calow Lane, and Laurel House in the west, also off Calow Lane. Opencast workings are shown on the 1967 map in the south of the Site but not after 1974. During this time the “works” expanded to the current layout of Chesterfield Substation with overhead lines running through the Site to the north and to the south. No other significant changes were noted from around 1976 to present day.
- 9.2.18 The earliest maps, dated 1876, show Cock Alley hamlet located north east of the Site and farmland/fields within the study area. A sewage works was constructed directly east of the Site by 1921, and by 1967 the Chesterfield and Lincoln Railway had been dismantled. In 1967 another record of opencast mining was depicted approximately 200m south of the Site, no longer depicted by 1987. From 1987 until present, no significant changes other than minor residential/commercial development is shown within the study area.

Environmental Information

- 9.2.19 **Landfills and waste:** Authorised landfills are not recorded within the study area, however a historical landfill is recorded to the north of the Site (along the northern boundary of the study area) associated with Calow Railway cutting. The Groundsure Report indicates this former landfill site is classified as potentially contaminated land under Part 2a of the Environmental Protection Act 1990.
- 9.2.20 **Current industrial land use:** The Groundsure report indicates 10 industrial land uses are recorded on-site and are related to electricity infrastructure, i.e. pylons across the Site, and the existing substation in the centre. Within the study area, there are a further nine industrial land uses recorded outside of the Site, including pylons associated with the substation, a telecommunications mast and a tank located approximately 82m west.
- 9.2.21 **Pollution incidents:** The Groundsure report indicates that there are two pollution incidents recorded within the Environment Agency database within the study area. The closest incident was recorded approximately 225m south west, as a spill of oil or fuel from 2002 resulting in “minor” impact to land. This is unlikely to have affected the Site given the distance and scale (e.g. minor impact). There are also two records of licensed discharges to controlled water within the study area, with the closest record being 1m to the north relating to trade discharges from Chesterfield Substation into a tributary of Calow Brook.
- 9.2.22 **Environmental designations:** No SSSIs are located in the study area, however the Duckmanton Railway Cutting SSSI is located approximately 1km north east (Groundsure, 2024). This results in the area within the Site being designated within a SSSI Impact Risk Zone, which is a zone around a SSSI which reflects particular

sensitives to certain development proposals (e.g. airports). The only other environmentally sensitive site designation, indicated by the Groundsure report, within the Site is a record of a nitrate vulnerable zone on-site relating to the River Rother. Nitrate vulnerable zones are areas at risk from agricultural nitrate pollution, usually comprising areas of land which drain into nitrate polluted waters.

Mining, Quarries and Minerals

- 9.2.23 Two Coal Authority (2023a; 2023b) Consultants Coal Mining Reports have been provided for parts of the Site and study area. Report ref. 51003373983002 dated 22 August 2023 covers land within the Site, however the boundary is not exact, and report ref. 51003394907001 dated 13 December 2023 covers land to the north, west and east of the Site. Distances have been approximated, and the search focuses on the Site. A preliminary mining hazard zonation drawing (Ref. PDD-203717-LAY-228), which also covers the Site, was reviewed and is presented in Appendix N Chesterfield New 400kV Substation Ground Conditions and Contaminated Land Desk Study Report. However, stability and coal mining risks were outside of the scope of the desk study, except for land contamination risk. A full review of past underground mining records is presented in the desk study and a summary of the Coal Authority Consultants Coal Mining Reports and drawing Ref. PDD-203717-LAY-228 is presented below:
- There are six records of past underground mining beneath the Site (four coal and two ironstone).
 - Three mine entries are recorded within the Site.
 - There are three mine entries recorded outside of the Site, and within 200m.
 - There are probable unrecorded shallow workings.
 - Multiple unlicensed opencast mines are indicated to span the majority of the Site.
 - No mine gas incidents recorded within the study area.
 - No mine water treatment schemes are recorded within the study area.
 - There are approximately 24 coal seams within the Site.
 - The shallowest coal seam below the Site is Blackshale at 6m bgl.
- 9.2.24 Review of the Coal Authority Interactive Map Viewer (The Coal Authority, 2024c) indicates that surface mining is depicted extensively across the Site, south of Calow Lane, which is also in a “development high risk area”. Four records of surface or underground mineral workings are recorded within the study area with the nearest being the ceased Furnace Hollock sandstone quarry, located 80m west. The Groundsure report also indicates that there are 12 records of surface ground workings on-site, with a further 51 within the 250m study area. The on-site records comprise sewage treatments works, opencast workings, cuttings and an unspecified heap (Groundsure, 2024). It is also indicated that three records of underground workings within the study area, which are old coal levels 30m, 32m and 35m north of the Site from 1921, 1938 and 1950, respectively.
- 9.2.25 Policy SP17 of the Derbyshire and Derby Minerals Local Plan (2022-2038) (Pre-submission Draft Plan, January 2023) states that *“locally and national important mineral resources, permitted reserves, permitted mineral operations and allocated mineral sites will be safeguarded from sterilisation by non-mineral development*

through the designation of mineral safeguarding areas.... The Minerals Local Plan indicates the Site is within a “Surface Coal Safeguarding Area”. Therefore, as the Site falls within a consultation area, the LPA, NEDDC will be required to consult with the Mineral Planning Association. As records of opencast mining indicate the surface coal reserves have already been worked in the area, and there will be a relatively small footprint of the substation, it is not thought that the Scheme would lead to significant mineral sterilisation. Nonetheless, consultation with NEDDC will be required in relation to the development within the “Surface Coal Safeguarding Area”.

Key Receptors and Value (Sensitivity)

- 9.2.26 Table 9.1 below provides a summary of the values assigned to receptors. These have been assigned using the criteria presented in the methodology section in Appendix B Chesterfield New 400kV Substation Methodology.

Table 9.1 Summary of the value of receptors

Receptor Type	Receptors	Value (Sensitivity)
Geology	Potential superficial deposits of alluvium and some residual soils likely.	Negligible
	Pennine Lower Coal Measures Bedrock – (mudstone, siltstone, sandstone, coal)	Negligible
	Pennine Middle Coal Measures Bedrock – (mudstone, siltstone, sandstone, coal)	Negligible
Human health	Construction workers	Very High
	Existing off-site neighbours (commercial/residential properties)	Medium
	Users of development	Medium
Hydrogeology	Bedrock – Pennine Lower Coal Measures (Secondary A aquifer)	Medium
	Bedrock – Pennine Middle Coal Measures (Secondary A aquifer)	Medium
	Superficial deposits – significant volume not likely to underly the Site. Designated as Secondary A aquifer in the study area	Medium
Surface water	Calow Brook and tributaries (off-site)	High
Buildings/structures and services	Proposed substation development	Medium

Future Baseline

- 9.2.27 The existing baseline conditions with respect to ground conditions and hydrogeology are unlikely to change significantly within the time prior to the construction. Gross contamination is not expected below the Site, however this is subject to completion of site-specific ground investigation works to confirm if remediation is needed. Significant changes to ground conditions are not anticipated.

9.3 Construction Control Measures

- 9.3.1 The control measures described in this section will be applied during the construction phase of the Scheme. National Grid is committed to implementing the identified control measures to reduce or avoid any potential impacts that may occur during the construction of the Scheme. The control measures will be included in the CEMP and their implementation will be monitored by National Grid.

Table 9.2 Construction control and monitoring measures for Land and Ground Conditions

Potential receptor and/or impact	Control, enhancement and monitoring measures
Human health – construction workers	Adoption of an appropriate CEMP and Construction Phase (Health and Safety) Plan.
Human health – nearby residents (commercial/residential properties)	Adoption of an appropriate CEMP and Construction Phase (Health and Safety) Plan.
Geology (contamination)	Adoption of an appropriate CEMP.
Geology (ground stability)	Geotechnical ground investigation and appropriate design. Adoption of an appropriate CEMP and Construction Phase (Health and Safety) Plan.
Hydrogeology (Secondary A “local supplies” aquifers)	Detailed land contamination ground investigation with design and implementation of appropriate remedial measures (if required). Adoption of an appropriate CEMP.
Surface water	Detailed land contamination ground investigation with design and implementation of appropriate remedial measures (if required). Adoption of an appropriate CEMP.

- 9.3.2 This section presents the design and mitigation measures anticipated prior to a site-specific ground investigation and production of an updated conceptual site model.

- 9.3.3 Primary mitigation will be incorporated into the design process to comply with the requirements of national and local planning policy, including the following:
- Site specific detailed land contamination ground investigation will be undertaken, including ground gas and groundwater monitoring, interpretive reporting and risk assessment to ascertain the degree of risk from ground contamination and gas. The data, assessments and reports will also provide details on the any quantities of contaminated waste and inform suitable materials management and the waste strategy.

- Preparation of an options appraisal and remediation strategy, if required based on the findings of the risk assessment that will be agreed with the regulators.
- Preparation of a piling or foundations risk assessment for the Site in accordance with Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention (CL:AIRE, 2025). This is to provide a summary of the available environmental information, identify and discuss the potential land quality issues which may impact upon the piling design, and provide appropriate recommendations and mitigation methods to minimise impacts associated with piling (if considered necessary).
- Appropriate design of buried concrete (BRE (2005) Special Digest 1) and water supply pipe works in accordance with UKWIR (2010) guidance.
- Appropriate gas protection measures and/or upgrading to vapour resistance membrane within structures in accordance with CIRIA (2007) C665 and BS 8485:2015+A1:2019 (British Standards Institution, 2019) (if considered necessary).
- Detailed geotechnical ground investigation to determine ground engineering parameters and inform a geotechnical assessment of ground conditions for the design of foundations, pavements, services and the need for potential slope stability analysis (not anticipated) and potential stabilisation measures.
- Implementation of any design measures recommended from a site-specific mining risk assessment, if required.

9.3.4 During the construction works, the following will be incorporated:

- During removal of vegetation, stripping of topsoil, excavation, earthworks and construction a watching brief protocol will be adopted as detailed in a CEMP, with site workers remaining vigilant such that visual or olfactory signs of contamination will be noted and that contaminated soil will be kept separate from other materials. Suspected contaminated material will be analysed to determine if it is suitable for re-use on the Site (in accordance with agreed strategies) or requires disposal off-site to an appropriate soil recycling or disposal facility.
- In line with best practice and as detailed in a CEMP, prior to any construction compound area being prepared, a baseline survey will be undertaken to determine the current land quality across the compound area. This will identify localised contamination present above risk-based suitable-for-use criteria. If required, such areas will be remediated prior to, or as part of, the soil stripping/enabling works. Alternatively, other measures will be applied such as using an appropriate cover system/barrier to reduce the risk of exposure to site workers and to prevent pathways to sensitive receptors. This may include impermeable bunding and sheeting to prevent the spread of existing contamination and potential leaching.
- Within any construction site compounds, specific areas will be designated for the storage of chemicals, waste oils and fuel and refuelling activities. These areas will be bunded and placed on hardstanding to prevent downward migration of contaminants. Any transfer of fuel or other potentially contaminated liquids will only take place within a designated fuel transfer area. Drip trays will be provided to reduce the risk of impact of spillages. These areas will be designed with appropriate drainage to ensure any spillages can be isolated.

- An Emergency Response/Spill Response Plan will be produced by the Contractor. Appropriate equipment (e.g. spill kits, absorption mats) will be made easily accessible on-site and personnel will be trained in using them. Clear protocols and communication channels will be provided to ensure that any spillages are dealt with immediately and adequately. This will prevent large areas of soil/geology potentially becoming contaminated and, in turn, protect surface water quality.
- A repeat baseline survey will be undertaken once the construction has finished and the compound dismantled to demonstrate the area has been returned to its previous state. If contamination has occurred during the lifetime of the compounds, remediation will be undertaken to return the land to its previous land quality state as detailed in a CEMP.
- During construction, excavated soils will be appropriately stored to ensure that if dust is generated in dry weather periods, it is not directed towards existing properties. Other best practice measures such as damping down areas, vehicle wheel washing, and covering stockpiles and lorries containing soils will be utilised to reduce the impacts from dust.
- To avoid the spread of contaminants, contaminated soils (identified during the ground investigation) within areas to be excavated will be removed prior to the main works as detailed in a remedial method statement. Materials will be further assessed, and if necessary treated, for reuse within the Site, e.g. for use in areas of open space. Material that cannot be reused will be disposed of at an appropriate waste facility.
- If contaminated materials are approved suitable for use within less sensitive parts of the Site, information will be included in the H&S file about their location and quality so that future works (i.e. in operational phase) know of their existence and can take the necessary precautions if they must work in that area.
- If groundwater is found to be contaminated, groundwater that may arise during the construction phase will be treated/disposed of appropriately and with the necessary agreements in place. During the dewatering activities, consideration will be given to soil contamination in the locality to ensure that contaminants do not become mobilised and enter the water environment.
- To reduce the risk to surface water, excavated materials will be appropriately stored to ensure that water runoff from stockpiles does not enter the water environment via drains and nearby watercourses. If necessary, stockpiles will be covered. Pollution prevention best practice protocols will be adopted to ensure contamination does not enter surface water.
- A Site Waste Management Plan (SWMP) and a Materials Management Plan (that will form part of a CEMP and will be developed by the Contractor) would be prepared following the protocols within the CL:AIRE Definition of Waste: Development Industry Code of Practice (CL:AIRE, 2011) to ensure that excavated materials are re-used appropriately and sustainably in line with the waste hierarchy. Materials designated for re-use but classified as hazardous should be re-used in accordance with the Environmental Permitting Regulations and may require remediation or sorting/segregation.
- During the construction phase, construction/site workers could be exposed via accidental ingestion, inhalation or dermal contact with soil and any contamination present. To mitigate risks from contaminated soils/materials, all persons engaged in site construction works will be made aware of the findings of the intrusive investigations and the hazards associated with handling potentially contaminated materials via a CEMP, Construction Phase (Health and Safety) Plan and toolbox talks.

- Suitable Personal Protective Equipment (PPE) including Respiratory Protective Equipment (RPE) (if necessary) will be available to all site workers as detailed in the H&S Plan. Appropriate site hygiene protocols will be adopted during the construction phase.
- Where hazardous chemicals are used in the construction works, risk assessments will be made and detailed in a CEMP.

9.4 Potential Construction Impacts

- 9.4.1 Construction workers will be present during the construction of the Scheme. They will be exposed to soil and shallow groundwater (potentially contaminated) during earthworks including excavation, topsoil stripping, stockpiling, transportation and backfilling. Exposure could be through accidental ingestion, inhalation of dust and dermal exposure. Nearby residents could also potentially be exposed to dust blown from earthwork activities. Construction workers are considered to be of very high sensitivity and existing off-site neighbours (commercial and residential properties) of medium sensitivity. Assuming the adoption of appropriate mitigation measures as detailed in Section 9.3, including adoption of an appropriate CEMP and Construction Phase (Health and Safety) Plan, the magnitude of impact is considered to be negligible. The level of effect is assessed as an overall slight adverse to neutral effect.
- 9.4.2 During construction activities there is the potential for accidental spillages of oils, chemicals, cement and fuels from the movement of construction traffic and the storage of chemicals. This could impact the underlying ground, with the potential for contamination to migrate into the water environment. Geology across the Site is considered to have a negligible value. If the design and mitigation measures detailed in Section 9.3 are implemented, the magnitude of impact is considered to be negligible with an overall neutral level of effect. Groundwater underlying the Site is considered to have a medium value with regards the superficial and bedrock aquifers. With the implementation of the design and mitigation measures detailed in Section 9.3, the magnitude of impact is considered to be negligible with an overall slight adverse level of effect. Surface water is considered to be of high value, and assuming the appropriate environmental design measures and mitigation are adopted, the magnitude of impact is considered to be negligible. The level of effect is assessed as slight adverse overall.
- 9.4.3 Geology across the Site is considered to have a negligible value with the magnitude of impact considered to be negligible. During any earthworks or foundation construction there is the risk of initiating ground failure. There are known historical opencast mine workings with infilled ground in the south of the Site. Additionally, there are inferred faults and coal seams on the BGS mapping running through the south. Therefore, a geotechnical ground investigation is necessary to inform risk, including a mining risk assessment, so appropriate mitigation can be designed if necessary. Any structure is considered to be of medium value, and assuming the appropriate design measures and mitigation are adopted, the magnitude of impact is considered to be negligible. The level of effect is assessed to be neutral overall.

9.5 Operational Control Measures

- 9.5.1 During the operational phase of the substation, activities are considered unlikely to result in significant changes to the Land and Ground Conditions. Good operational practices will be followed to mitigate potential localised spills of fuels and polluting chemicals that may impact on soils, surface water and groundwater.
- 9.5.2 The measures listed in Table 9.3 will be implemented during the operational phase of the Scheme and the appraisal has been undertaken assuming these measures are in place.

Table 9.3 Operational control and monitoring measures for Land and Ground Conditions

Potential receptor and/or impact	Control, enhancement and monitoring measures
Geology (ground stability)	Geotechnical ground investigation and appropriate design.
Hydrogeology (Secondary A “local supplies” aquifers)	Detailed land contamination ground investigation with design and implementation of appropriate remedial measures (if required).
Surface water	Detailed land contamination ground investigation with design and implementation of appropriate remedial measures (if required). Adoption of an appropriate Drainage Strategy.
New buildings/infrastructure	Detailed land contamination ground investigation with further ground gas monitoring and assessment with design and implementation of appropriate design gas protection measures.
Human health (future site users and workers)	Detailed land contamination ground investigation with further ground gas monitoring and assessment with design and implementation of appropriate design gas protection measures.

9.6 Potential Operational Impacts

- 9.6.1 Where SuDS are proposed to manage surface water drainage, this may infiltrate through the ground and join the underlying groundwater across the Site which could potentially mobilise contamination and reduce water quality. Groundwater underlying the Site is considered to have a medium value with regards the superficial and bedrock. With the implementation of the design and mitigation measures detailed in Section 9.5, including land contamination investigation and remedial works (if required), the magnitude of impact is considered to be negligible with an overall slight adverse level of effect.

- 9.6.2 Users (e.g. maintenance workers or visitors) could be affected by ground gases within the buildings, especially in confined spaces, via accumulation of hazardous gases with risk of asphyxiation and inhalation. Buildings could be affected by accumulation of high concentrations of explosive gases. There is no available ground gas monitoring data for the Site, but sources (Made Ground and historical mine workings) have been identified in the study area. Therefore, a ground investigation is needed to assess this risk so appropriate mitigation can be designed, if required. Site users are considered to be of medium value, and assuming the appropriate design measures and mitigation are adopted, the magnitude of impact is considered to be negligible. Therefore, the level of effect is assessed to be neutral overall.
- 9.6.3 Geology across the Site is considered have a negligible value. The superficial deposits are not anticipated to directly underlie the Site. The Site is located in a mineral safeguarding zone in relation to the coal in the Lower and Middle Pennine Coal Measures (bedrock), however there is evidence that the shallow coal deposits have already been extracted in the south of the Site and no coal seams are mapped to underlie where the footprint of the substation is located. Given the footprint of the Scheme, it is considered there will be limited mineral resource loss and the impact is considered to be minor adverse. The level of effect is considered to be slight adverse.
- 9.6.4 Permanent structures may be affected by ground stability issues. There are known historical opencast mine workings with infilled ground in the south of the Site. Additionally, there are inferred faults and coal seams on the BGS mapping running through the south. Therefore, a geotechnical ground investigation is necessary to inform risk, including a mining risk assessment, so appropriate mitigation can be designed if necessary. Any structure is considered to be of medium value, and assuming the appropriate design measures and mitigation are adopted, the magnitude of impact is considered to be negligible. The level of effect is assessed to be neutral overall.

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10. Noise and Vibration

10.1 Introduction

- 10.1.1 This chapter details the Noise and Vibration baseline conditions and the environmental appraisal of the potential Noise and Vibration impacts associated with the operation of the above elements of the Scheme. Where potential environmental impacts are identified, relevant control measures are prescribed to reduce or avoid these impacts.
- 10.1.2 The residual impacts of construction noise and vibration have been scoped out of this EAR on the basis that this will be mitigated through the implementation of a CEMP and due to the temporary nature of the construction impact.
- 10.1.3 This chapter should be read in conjunction with Appendix A Chesterfield New 400kV Substation Glossary and Abbreviations; Appendix B Chesterfield New 400kV Substation Methodology; Appendix C Chesterfield New 400kV Substation Proposed Site Layout; Appendix E Chesterfield New 400kV Substation Drawings; and Appendix O Noise Impact Assessment.

10.2 Baseline Conditions

Existing Operational Noise Sources

- 10.2.1 The most significant sources of noise on high voltage substations are typically items of equipment generally termed 'reactive plant'. Reactive plant, such as SGTs and shunt reactors, are predominantly responsible for the tonal 'hum' associated with substations. There are currently four 240MVA 275kV/132kV SGTs and one 60MVA shunt reactor at the existing National Grid Chesterfield Substation.
- 10.2.2 The existing National Grid Chesterfield Substation also comprises circuit breakers, disconnectors/isolators, and current/voltage transformers often termed 'switchgears'. Switchgear noise is generated by the operation of circuit breakers and isolators. Switchgears operate very infrequently, typically only a few times a year for outages and maintenance, and in emergencies to protect the substation and electricity network infrastructure from lightning strikes or faults. Noise from switchgear is impulsive in character (i.e., of very short duration). Switchgear generally operates with a dull 'thud' while isolators would operate with a 'click'.
- 10.2.3 No significant effects on noise sensitive receptors are anticipated from the existing substation equipment due to the low noise level, infrequency of operation, and the fact that the equipment is located within a building that provides acoustic attenuation.

Overhead lines and energised/passive equipment

- 10.2.4 One 275kV National Grid overhead line passes around the substation to the west, through non-operational National Grid land, and another overhead line connects to the substation to the north and south.

- 10.2.5 The existing energised Air Insulated Switchgear includes the short circuit connections from the nearby 4ZV overhead line to the north and 4ZV overhead line to the south, and the terminal overhead line span into the substation. Insulators, and GIBs, will under certain conditions ‘crackle’ or ‘fizz’ due to the occurrence of a phenomenon called corona discharge.
- 10.2.6 Corona discharge occurs when the voltage gradient (or electrical stress) on the surface of energised components and fittings exceeds the corona inception level, which is a function of the insulating properties of the surrounding air. Energised components are designed to operate below this level, however in certain conditions such as damp or wet weather and following long dry spells when surface contamination may build up, the corona inception level may be exceeded, meaning corona discharge may occur. Corona discharge may be audible when close to the substation, but it is not continuous and not considered a significant level of noise.

Acoustic Survey Observations

- 10.2.7 During installation and collection of the noise monitoring equipment, the acoustic environment was dominated by traffic noise from the A617. Distant transformer/ humming sound from the existing National Grid Chesterfield Substation was also noted across both monitoring locations. Additionally, distant animal cries, rustling trees, and bird song were also audible at both locations, identified in Appendix O Noise Impact Assessment.

Noise Sensitive Receptors

- 10.2.8 Residential properties surrounding the Site are considered to be the most exposed receptors that could be affected by the Scheme. These are:
- Nether House Farm – Residential property located to the north east of the Site;
 - 1 Calow Green – Residential property located at Calow Green to the east of the Site;
 - Hall Flash Farm – Residential property to the south east of the Site;
 - Southwood Chase – Hospitality property to the west of the Site; and
 - Laurel House – Residential property to the north west of the Site.
- 10.2.9 The receptors above are considered the most sensitive due to their proximity to the Scheme.
- 10.2.10 Further details on the location of the noise sensitive receptors can be found in Appendix O Noise Impact Assessment.

10.3 Construction Control Measures

- 10.3.1 The construction phase of the Scheme may potentially introduce additional sources of noise and vibration, such as construction work and operation of construction traffic, plant and equipment. National Grid is committed to implementing control measures to reduce or avoid any potential impacts that may occur during the construction of the Scheme. Appendix B of the OCEMP contains outline proposals to manage noise and vibration during construction and will be updated for the detailed CEMP.

10.3.2 Examples of these measures are summarised below:

- Commitments for active control of construction noise and vibration, including issues such as specific and detailed complaint procedures, community liaison, compliance survey requirements and a risk based mitigation scheme to control noise and vibration on an ongoing basis.
- Mitigation strategies formulated on the basis of 'Best Practicable Means'.
- Undertaking construction during the proposed working hours detailed in Section 4.3 of the OCEMP.
- Recommendations and good practice as detailed in BS 5228:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites Part 1: Noise and Part 2: Vibration.
- Measures as set out in BS 5228 Code of practice for noise and vibration control on construction and open sites including:
 - careful planning of methodology, programming of the works at less sensitive times and selection of plant to minimise adverse impacts;
 - selection of plant that conforms with relevant national or international standards, directives and recommendations on noise and vibration emissions;
 - location of construction plant as far as is reasonably practicable away from adjacent occupied buildings, or as close as possible to noise barriers or Site hoardings where these are located between the plant and buildings;
 - selection and location of generators so as to minimise adverse impacts on the local community;
 - fitting static and semi-static plant/equipment with suitable enclosures where practicable;
 - instruction of personnel on best practicable means to reduce noise and vibration, as part of induction training and prior to specific work activities;
 - shut down of plant and vehicles when not in use, i.e., no idling;
 - audible warning systems and alarms designed to minimise noise;
 - broadband reverse alarms fitted to all vehicles;
 - notification of local residents in advance of works commencing; and
 - use of localised mobile screening where reasonably practicable to reduce noise levels from handheld tools such as concrete saws.
- Implementation of appropriate construction traffic routeing to minimise noise impacts on sensitive receptors. Details of the routeing of construction vehicles and visitors to the Site will be agreed with NEDDC.
- All construction traffic entering and leaving the Site will be closely controlled. Vehicles making deliveries or removing material will travel via designated routes. Measures will be taken to review and reduce, where possible, the numbers of construction vehicles accessing the Site during peak hours, by adopting measures such as 'just-in-time' deliveries.

10.4 Operational Control Measures

- 10.4.1 The control measures listed in Table 10.1 will be implemented during the operational phase of the Scheme and the appraisal has been undertaken assuming these measures are in place.

Table 10.1 Operational control and monitoring measures for Noise and Vibration

Potential receptor and/or impact	Control, enhancement and monitoring measures
Noise Sensitive Receptors	Acoustic enclosures for the SGTs. The effect of installing acoustic enclosures offers a 20dB(A) reduction at 100Hz (potentially greater at 200Hz) to the SGTs.

10.5 Potential Operational Impacts

- 10.5.1 Based on the acoustic modelling undertaken, the noise impacts of the Scheme are anticipated to be negligible to all receptors. Therefore, the identified acoustic mitigation is considered suitable to mitigate potential noise impacts from the Scheme.

10.6 Bibliography

- British Standards Institution (2014a). BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites Part 1: Noise.
- British Standards Institution (2014b). BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites Part 2: Vibration.

11. Traffic and Transport

11.1 Introduction

- 11.1.1 This chapter details the Traffic and Transport baseline conditions, and the environmental appraisal of the potential Traffic and Transport impacts associated with the construction and operation of the above elements of the Scheme. Where potential environmental impacts are identified, relevant control measures are prescribed to reduce or avoid these impacts.
- 11.1.2 This chapter should be read in conjunction with Appendix A Chesterfield New 400kV Substation Glossary and Abbreviations; Appendix B Chesterfield New 400kV Substation Methodology; Appendix C Chesterfield New 400kV Substation Proposed Site Layout; Appendix E Chesterfield New 400kV Substation Drawings; Appendix P Chesterfield New 400kV Substation Outline Construction Traffic Management Plan.

11.2 Baseline Conditions

Local Highway Network

- 11.2.1 The extent of highway network considered within this appraisal was informed by the proposed construction route identified for material and equipment delivery to the Site and by roads which will be used by construction staff traffic. The construction route consists of the Calow Lane, the A632, B6425 Hassocky Lane/Moor Lane/Deepsick Lane, and A617 (non-Strategic Road Network (SRN) section). Beyond these roads, the construction traffic will be distributed onto the M1 which forms part of the SRN. Traffic will then disperse further along numerous SRN routes with the effect of the additional traffic diluted. The proposed construction route is shown in Appendix E Chesterfield New 400kV Substation Drawings, Figure 11.1 Traffic and Transport Assessment – Proposed Construction Routes.

Calow Lane

- 11.2.2 The assessed section of Calow Lane is a single carriageway, with one lane in each direction although lane markings are not present throughout the route. It is subject to the national speed limit between the proposed Site access and junction with Calow Green, reducing to 30mph between the junction with Calow Green and Back Lane, and then increasing to 40mph for the remainder of the route connecting to the A632. There are varying widths along Calow Lane, with sections being considerably narrow for two-way traffic movements measuring approximately 3.7 to 4m. On sections, this narrowing is due to parking along this route which reduces the carriageway significantly to approximately 3.7m. It should be noted that along these pinch points, two-way movements would be limited, therefore mitigation measures will need to be implemented to ensure this is a safe route for all users.
- 11.2.3 Most of Calow Lane is fronted by agricultural land. However, narrow footways are present along the northbound side of the carriageway to the north of the junction with Calow Green. This footway is not consistently present along the route. During the site visit it was noted that PRow could be accessed along this route, and there were some low overhead lines, and change in gradients. Calow Lane has a vehicle weight restriction for 7.5T except for access.

A632 Chesterfield Road

- 11.2.4 The assessed section of the A632 Chesterfield Road between Calow Lane and the B6425 Deepsick Lane is generally single carriageway, with one lane in each direction, although in an eastbound direction it increases to two lanes separating the ahead and right-turn movements. Carriageway width varies from 7.5m to 10.7m, with the widest section being due to the additional traffic lanes at the signalised junction with the B6425 Deepsick Lane. It is subject to a 40mph speed limit with a narrow footway along the southern side of the carriageway, and it is fronted by agricultural land. The route is well lit, and there is no walking or cycling provision.

B6425 Deepsick Lane/Moor Lane/Hassocky Lane

- 11.2.5 The B6425 Deepsick Lane/Moor Lane/Hassocky Lane is single carriageway with one lane in each direction, catering for the northbound and southbound traffic movements. It is subject to a speed limit of 50mph with a width of 6m to 7.2m and has a 40mph speed limit north of its junction with the A617. During the site visit, numerous HGVs were observed to be using this route. The route has notable bends in the carriageway alignment and changes to gradient. There are no footways or cycleways present along the extent of the B6425.

A617

- 11.2.6 The A617 is a dual carriageway with two lanes in each direction, catering for eastbound and westbound traffic movements providing a connection to the SRN via the M1. The road is subject to the national speed limit, and there are no footways or cycleways present. There are three sensitive receptors along the route within a distance of 150m (Temple Normanton Junior Academy, Williamthorpe Nature Reserve, and All Saints Church), however they are not directly accessible via the A617 and are separated from the carriageway by high vegetation. The A617 is predominantly fronted by agricultural land, although there are some residential properties in close proximity as Temple Normanton village is located to the south of the A617.

Public Transport

- 11.2.7 Public transport in the vicinity of the Site is limited. However, there are a number of bus services along the construction route, which includes the following:
- Service no. 48 Clay Cross – Brampton on Calow Lane;
 - Service no. 1 Langwith – Newbold on the A632; and
 - Service no. 1A Hillstown – Newbold on the A632.
- 11.2.8 The closest bus stops to the Site served by these bus services are located on Calow Lane, approximately 88m walking distance, west of the Site access. There are two bus stops at this location (one travelling eastbound, and the other westbound), however it was noted that there are no footways present at this location. The bus service available is no. 48 available Monday to Saturday providing a service on Calow Lane three times a day.
- 11.2.9 No bus stops are located on the B6425 Deepsick/Moor Lane/Hassocky Lane or the A617 sections of the construction route.

Cycling, Walking and Equestrian Provision

- 11.2.10 Key elements of the existing walking and cycling infrastructure along the proposed construction route are as follows:
- Footways present on Calow Lane, north of the junction with Calow Green coinciding with the settlements. These footways are considerably narrow and are present along the northbound side of the carriageway where residential property fronts the carriageway, to the north of the junction with Calow Green. This footway is not consistently present along the route, and there is a warning sign of equestrians and no footways approximately 100m east of the junction with Dark Lane.
 - A southern footway is provided on the A632 Chesterfield Road between Calow Lane and the B6425 Deepsick Lane.
 - No footway or designated cycle infrastructure along the B6425 Deepsick Lane/Moor Lane/Hassocky Lane and A617 section of the route.
- 11.2.11 A review of the PRoWs which are to be diverted and potentially temporarily or permanently closed depending on the works required, has been undertaken. Three PRoWs, all of which are footpaths, have been identified and are highlighted below:
- PRoW NE5/25/1 – this footpath runs east to west through the middle of the Site. This footpath is to be permanently slightly realigned between the existing substation and the new 400kV substation;
 - PRoW NE5/16/1 – this footpath runs east to west through the southern section of the Site. During the construction and operational phases, it is proposed that this footpath be diverted further to the south within the Site and potentially temporarily closed during construction; and
 - PRoW NE5/17/2 – this footpath runs north to south along Hallflash Lane. During construction, it is proposed that a short section of this footpath be potentially temporarily closed for a very short period to facilitate drainage works. No further changes are required to this PRoW.
- 11.2.12 The wider PRoW network connects north (Calow Lane area) to south towards Milehill in the south west and Hassocky Lane Solar Farm in the south east. PRoW that connect to the proposed construction route, and do not require any changes, are as follows:
- NE5/14/1, NE5/14/2 and NE5/14/3 (footpath) – runs north to south connecting to the north of Calow Lane (west of Back Lane) and A632 Top Road.
 - NE5/28/1 (footpath) – runs north west to south east connecting Calow Lane to the B6425 Deepsick Lane.
 - NE5/17/3, NE5/17/2 and NE5/17/1 (footpath) – runs north to south along Hallflash Lane connecting to Calow Lane
 - NE5/20/1 (footpath) – runs north east to south west connecting the B6425 Moor Lane to Back Lane.
 - NE18/10/1, NE18/10/2, NE18/10/3, NE18/10/4, NE18/10/5 and NE18/10/6 (bridleway) – runs east to west connecting to the B6425 Hassocky Lane and extending towards Sutton Scarsdale.

- NE18/11/2 (footpath) – connects to the B6425 Hassocky Lane and PRoW NE18/10/1.
- NE19/1/1 (footpath) – runs parallel along the eastern side of the B6425 Hassocky Lane.
- NE 19/2/1 (footpath) – runs in the north west to south east connecting the B6425 Hassocky Lane with PRoW NE9/19/2.

11.2.13 These PRoW and those located within the Site are shown in Appendix E Chesterfield New 400kV Substation Drawings, Figure 11.1 Traffic and Transport Assessment – Proposed Construction Routes.

11.2.14 No National Cycle Routes are located in the vicinity of the Site or along/across the construction route.

Traffic Flows

11.2.15 Annual Average Daily Traffic (AADT) flow data has been obtained from the Department for Transport (DfT) website and Automatic Traffic Counts (ATC) from commissioned surveys. The traffic count locations are shown on a plan in Appendix B Chesterfield New 400kV Substation Methodology.

11.2.16 In the interests of providing a more robust assessment, which takes account of the traffic flows during the assessed construction phase (7am-7pm), the AADT data was used to calculate traffic flows within this period for a typical weekday. This has been based on a standard daily profile over 24-hour period, from the road traffic statistics Table TRA0307 (DfT, 2024). The data indicates that as a proportion, the period 7am-7pm, equates to 80.9% of daily weekday traffic.

11.2.17 Additional traffic flows data were obtained via commissioning traffic surveys. These were undertaken for a one-week period, for 24 hours between 2 July and 8 July 2024 to avoid the school summer holidays. This data was collected via ATC on Calow Lane, B63425 Hassocky Lane and A617

11.2.18 Background traffic growth is anticipated to occur between 2019 (for which existing traffic flows are available) and 2027 (when peak HGV movements are predicted to occur). To account for this growth an appropriate growth factor derived from Trip End Model Presentation Program (TEMPPro) has been applied to the traffic flow data.

11.2.19 The resultant predicted 2027 future baseline Annual Average Weekday Traffic (AAWT) 12-hour (7am-7pm) on road links along the construction routes are shown in Table 11.1.

Table 11.1 Future baseline traffic AAWT flows, 12hrs (7am-7pm), both directions

DfT/Automatic Traffic Counter (ATC) Ref.	Road	Description	Two-way 12hr (7am-7pm) flows	
			HGVs	Total Vehicles
ATC 1	Calow Lane	West of Chesterfield Substation site access	79	3,086
ATC 2	Calow Lane	East of Chesterfield Substation site access	73	3,167
ATC 3	Calow Lane	To the south of junction with Back Lane	64	2,887
88066	A632	East of Calow Lane	225	14,539
ATC 4	B6425 Hassocky Lane	North of the A617	208	8,096
ATC 5	A617	West of Shire Lane overbridge	1,619	27,461

11.2.20 As can be seen from Table 11.1, average weekday 12-hour (7am-7pm) HGV two-way flows on the roads that form the construction route are between 64 HGVs (on the Calow Lane to the south of the junction with Back Lane) and 1,619 HGVs (on A617). Average weekday 12-hour (7am-7pm) total vehicle flows are between 2,887 on Calow Lane to the south of the junction with Back Lane and 27,461 vehicles on the A617.

Sensitive Receptors

11.2.21 Table 11.2 provides a summary of key potential sensitive receptors and their sensitivity within 150m of the construction route, all of which are located along the A617 section of the route. These are all shown in Appendix E Chesterfield New 400kV Substation Drawings, Figure 11.1 Traffic and Transport Assessment – Proposed Construction Routes. However, it should be noted that no direct access to the A617 is provided and as such there are no pedestrian or cycle facilities to encourage use by these user groups along this section of the construction route.

Table 11.2 Key environmental receptors and sensitivity along the construction route

Receptor type	Name	Distance from construction route (m)	Sensitivity of Receptor
Primary school	Temple Normanton Junior Academy	Within 50m	High
Open space	Williamthorpe Nature Reserve	Within 150m	Low
Church	All Saints Church	Within 150m	Low

Collision Data

- 11.2.22 The latest three-year personal injury collision data (2021-2023) was obtained from Crashmap.co.uk (Crashmap, 2025) for the roads forming the construction route and for the Site access junction.
- 11.2.23 Table 11.3 provides a summary of all collisions by severity for each road link and junctions on the construction route. A location plan showing all collisions along the proposed construction route is presented in Appendix E Chesterfield New 400kV Substation Drawings, Figure 11.1 Traffic and Transport Assessment – Proposed Construction Routes.

Table 11.3 Summary of total collisions by severity on road links and junctions

Location	Severity			
	Slight	Serious	Fatal	Total
Calow Lane (between Site access and junction with Calow Green)	3	0	0	3
Calow Lane (between junction with Calow Green and A632)	0	1	0	1
A632	1	0	0	1
B6425 Hassocky Lane	1	1	0	2
A617	8	0	0	8
Heath Interchange/Slip Roads	28	1	0	29
Total	41	3	0	44

11.2.24 The analysis of the collision data identified the following:

- A total of 44 collisions were recorded along the construction route between 2021 and 2023, 93% were of slight severity, and the remaining 7% were classified as serious. No fatal collision was recorded along the construction route.
- Along the section of Calow Lane to the east of Calow Green, a total of three collisions were recorded, all of which were slight in severity. Two of these collisions were located near the Calow Lane/Calow Green junction.
- A total of three serious collisions were recorded along the construction route. One of these collisions occurred on Calow Lane, north of the junction with Calow Green. One occurred on the B6425 north of the junction with Calow Green. The final serious collision recorded occurred at the Heath Interchange.
- No collisions involving pedestrians or cyclists were recorded along the full length of the proposed construction route.
- There was a total of three collisions which involved a motorcyclist casualty, two of which are classified as slight in severity, and the remaining collision classified as serious. One of these collisions occurred on the B6425 Moor Lane, and the remainder occurred on the A617 and at the Heath Interchange.
- There are a relatively high number of collisions that occurred at the Heath Interchange. Of the 29 collisions one was recorded as serious, and the remaining classified as slight in severity.

11.2.25 On the assessed section of the construction route forming the Local Road Network no collision clusters have been identified. However, it should be noted that on the SRN, on the A617 eastbound approach to the Heath Interchange, a collision cluster of seven slight collisions has been identified. All collisions were classified as slight in severity.

Traffic Generation

11.2.26 Table 11.4 Below table shows the estimated maximum daily traffic movements associated with construction activities, which includes HGVs and also the car/LGV movements associated with construction staff travelling to and from the Site.

Table 11.4 Peak daily indicative maximum construction vehicle movements

Vehicle Type	Total Vehicles	Total Movements
HGVs	29	58
Cars/LGVs	94	188
Total	123	246

11.2.27 As can be seen from Table 11.4, it is anticipated that there will be a maximum total of 123 vehicles, which equates to 246 movements (two-way) per road assessed. This equates to 58 HGVs (two-way movements) and 188 cars/LGVs lights (two-way movements). Therefore, there will be approximately six HGV movements and 19 Car/LGV movements an hour along the construction route.

- 11.2.28 Based on the indicative Construction Traffic Estimates (document ref: PDD-203717-TAB-003 Rev P01), construction will commence in September 2026 and end in August 2031. Peak construction traffic is anticipated to occur in 2027.

11.3 Construction Control Measures

- 11.3.1 The control measures listed in Table 11.5 will be applied during the construction phase of the Scheme. National Grid is committed to implementing the identified control measures to reduce or avoid any potential impacts that may occur during the construction of the Scheme. The control measures are included in the OCTMP which is referred to in the OCEMP and their implementation will be monitored by National Grid.

Table 11.5 Construction control and monitoring measures for Traffic and Transport

Potential receptor and/or impact	Control, enhancement and monitoring measures
Site access and security	<p>Site access control:</p> <ul style="list-style-type: none"> A Traffic Marshal will be appointed to control access to and from the Site where required and ensure drivers have been through the Site induction process. Appropriate security fencing will be established around the Site including compounds, works areas and areas used for the storage of plant and machinery and hazardous substances. These will be subject to regular inspection. Where necessary, CCTV will be installed within construction areas. Remote cameras will be installed at compounds for security purposes when items of value are left, with permanent CCTV being installed at the primary compounds. Access to working areas will be restricted to approved personnel only, with the Site Supervisor to monitor and manage traffic and site visitors.
Pedestrian severance, amenity, fear and intimidation – Personnel and visitor access and safety	<ul style="list-style-type: none"> Security gates will be used to ensure that only authorised personnel and deliveries can enter and will remain closed at all other times on access to the work area (gates within the Site may remain open). Safe pedestrian access routes between car parking locations, access points, work areas, site offices and welfare facilities will be provided. Where pedestrian and vehicle routes interact, appropriate crossing points and segregation will be provided. Personnel requiring access to the Site for reasons other than carrying out physical construction work will be treated as a site visitor. All visitors will be granted access by appointment only and must in all cases be authorised by a senior manager at the Site and be required to attend a site induction session to maintain health and safety.

Potential receptor and/or impact	Control, enhancement and monitoring measures
	<ul style="list-style-type: none"> • All visitors, except for authorised collection or delivery drivers, shall always be the responsibility of the permanent pass holder whilst on-site and must sign in at security. • Visitors must always use the pedestrian walkways and access gates provided for safe and easy access to site office. • Compounds will be segregated into PPE and non-PPE areas. Personnel will not be allowed access into PPE areas without the appropriate equipment as per construction standards.
<p>HGV environmental effects including road users, accidents and safety, residents, and air/noise quality</p>	<p>HGV booking:</p> <ul style="list-style-type: none"> • A booking system (Delivery Management System) will be used to ensure deliveries to the Site will be spread across the whole day where possible. • Dedicated members of staff will travel on the construction routes and monitor LGV and HGV traffic using the routes associated with the Scheme. Staff will be trained to conduct this monitoring process, and collect and collate data. • Delivery vehicle dwell times will be kept to a minimum; vehicle engines will also be turned off to reduce noise and air pollution. Appropriate traffic management including clear and visible construction works signage will be implemented and used when/where required; this will be submitted by the Contractor prior to commencement, as requested by NEDCC. Banksman will also be in position as and when required. <p>HGV emissions:</p> <ul style="list-style-type: none"> • All vehicles used in the construction of the Scheme will be to Euro standard V class or better.
<p>Seamless flow of movement, together with safety and security on-site</p>	<p>Traffic Marshal:</p> <ul style="list-style-type: none"> • Trained personnel (Traffic Marshal) will be in place at key locations when necessary, during the construction of the Scheme.
<p>Parking and loading</p>	<ul style="list-style-type: none"> • Appropriate loading/unloading and parking areas for construction vehicles will be designated to avoid the need for parking or waiting on the highway. • Upon arrival to the site compound, all deliveries will report to the coordinated delivery contact. This will be communicated to all suppliers and subcontractors at their site induction for all new drivers. • Whilst on-site, the delivery operation will be controlled by a trained Traffic Marshal, from the point of guiding a vehicle to its designated off-loading area to guiding the vehicle back onto the Local Road Network. Both the Traffic Marshal and drivers will

Potential receptor and/or impact	Control, enhancement and monitoring measures
	<p>follow relevant safety procedures and operate the same signalling systems.</p> <ul style="list-style-type: none"> • Adequate parking will be provided to ensure that the safety and efficient operation of the public highway is not reduced. At no time will construction personnel, including contractors and suppliers, be authorised to park outside of the Site boundary, including on the public highway, unless prior permission has been granted by either the relevant landowner or the local highway authority (LHA). • On-site parking will be managed to ensure safety of all personnel. Parking terms and regulations will be clearly displayed using signage displayed in the immediate vicinity of the parking provision.
Road safety	<ul style="list-style-type: none"> • Suitable space within the works site will be provided for all vehicles to park, unload and manoeuvre, therefore enabling all egressing vehicles to exit onto the access road in a forward-facing direction. Reversing onto any public highway will not be permitted. • A 'Near Miss' reporting system will be implemented for all highways incidents. The Contractor will ensure that all accidents and near misses are recorded within this system and that drivers are instructed to report all issues recorded through the system. Any accidents or near misses involving vehicles travelling to/from the Site will be recorded, investigated, and reported internally and to the client referring specific incidents to the LHA as deemed necessary. • The Contractor will retain records of all incidents (e.g. speeding and driver hours) and submit to the relevant authorities upon request. If emerging issues are identified, the contractor and the LHA will initiate discussions with relevant stakeholders.
Ensuring the construction routes are adequate for AIL deliveries	<p>AIL deliveries:</p> <ul style="list-style-type: none"> • Constraints along the construction route have been identified, which includes constrained widths, sharp turns, conflict with street furniture, and constrained junction geometry. Based on the outcome of the route appraisal, Swept Path Analysis at each of the 'pinch points' to inform mitigation measures that may be required. • As highlighted in the OCTMP all components have been identified as transportable using the Local Road Network. Depending on the type and size of the equipment component, the following measures for abnormal loads could be required: <ul style="list-style-type: none"> — marker boards; — escort vehicles; — police escort;

Potential receptor and/or impact	Control, enhancement and monitoring measures
	<ul style="list-style-type: none"> — appropriate notice; — speed restriction; and — additional lights. <ul style="list-style-type: none"> • Discussions with LHA/National Highways to be undertaken regarding AIL Strategy and required permissions.
<p>Road condition – ensure that the surface of the highway altered for the Scheme remains in good repair and safe for the public traffic using the highway</p>	<p>Road condition surveys:</p> <ul style="list-style-type: none"> • Each access point to the Local Road Network by any access road or track used by the Scheme will be inspected. These inspections shall take place before first use, regularly during use and following final use, to ensure that the surface of the highway altered for the Scheme remains in good repair and safe for the public traffic using the highway. Any repairs that are required to maintain the altered highway throughout the construction phase will be carried out in a timely manner. • Regular inspections will be carried out in all locations where the works corridor passes over a public highway, private road, or PRow. These will be recorded, and remedial action will be taken to remove any dirt and debris resulting from construction operations. Any damage to the surface will be scheduled for repair at the earliest opportunity. <p>Wheel washing/dry rumble:</p> <ul style="list-style-type: none"> • When leaving the construction site, all vehicles exiting the Site will be checked and cleaned if required prior to using the Local Road Network. If required, a road sweeper will be utilised to further ensure that the Local Road Network remains safe and clear of debris.
<p>Accidents and safety</p>	<p>Tipper covers:</p> <ul style="list-style-type: none"> • It is expected that all tippers importing or removing loose material will be covered if required and it is the responsibility of the Traffic Marshal to ensure vehicles do not leave site without the appropriate covers. Any vehicles arriving to site without appropriate covers will be reported immediately to ensure the supplier is informed and appropriate action taken.
<p>Ensuring vehicles comply to minimise impact on road users and the public</p>	<p>Vehicle identification:</p> <ul style="list-style-type: none"> • Staff/worker vehicles dedicated to the Scheme long-term, i.e. staff cars, Site Supervisor commercial LGVs, will also be inducted and their registrations stored on record. • If the public have any issues with the vehicles travelling to/from Site, they will be able to report this to a free phone line, which will then be investigated.

Potential receptor and/or impact	Control, enhancement and monitoring measures
	<p>Information packs (or handbook):</p> <ul style="list-style-type: none"> Information packs will be provided to all Contractors, which will form part of the contractual agreement between the Contractors and National Grid. The information pack may contain the details of the following CTMP requirements: <ul style="list-style-type: none"> site induction; HGV restrictions; construction routes; non-compliance guidance; complaints procedure; CTMP protocols and indications required for all contractors including a code of good practice; guidance on standard communication procedures between Contractors and Site; and CTMP contacts (emergency and non-emergency). Information packs and communications details will be shared with relevant local planning authorities (LPAs) and LHAs ahead of any construction works.
Sustainable travel – manage and improve the way employees travel to, from, and during work	<p>Staff Travel Plan:</p> <ul style="list-style-type: none"> Based on the construction personnel numbers, it is not considered necessary to produce a travel plan for the Scheme. Notwithstanding the above, if deemed possible and appropriate, construction teams will be transported to the Site from local accommodation or agreed pick-up points in personnel transport vans. These vans will only be parked on-site within the defined working areas, and only while construction staff are on-site during work hours. Outside of working hours there will be no parking of personnel vans on-site.
Temporary disruption to PRow access	<ul style="list-style-type: none"> Temporary Closures: Where required, PRow closures or diversions during the construction phase will be clearly communicated and advertised. Diversions routes will be equipped with appropriate signage to minimise route uncertainty and ensure clarity for users. The design of PRow routes will follow best practices to ensure safety. PRow diverted will be reinstated along its original alignment unless permanent diversions are identified.

11.4 Operational Control Measures

- 11.4.1 The measures listed in Table 11.6 will be implemented during the operational phase of the Scheme and the appraisal has been undertaken assuming these measures are in place.

Table 11.6 Operational control and monitoring measures for Traffic and Transport

Potential receptor and/or impact	Control, enhancement and monitoring measures
Permanent access disruption to recreational routes (adverse)	<p>Permanent diversion of NE5/25/1 (footpath) will be provided between the existing and the proposed substation. The indicative layout of the permanent diversion is presented in Appendix H Chesterfield New 400kV Substation Landscaping Proposals and Visualisations.</p> <p>Permanent diversion of NE5/16/1 (footpath) would be provided around the southern extent of the proposed substation. The indicative layout of the permanent diversion is presented in Appendix H Chesterfield New 400kV Substation Landscaping Proposals and Visualisations.</p>

11.5 Potential Construction Impacts

Transport Appraisal

- 11.5.1 The peak daily construction activity is anticipated to occur in 2027. To assess the worst-case scenario with regards to the volume of traffic during the construction phase, the associated traffic with both construction HGVs and construction staff cars/LGVs has been assessed.
- 11.5.2 The Transport Appraisal has assumed that all construction vehicles travelling between the SRN and proposed site will use the construction route identified on the plan in Appendix E Chesterfield New 400kV Substation Drawings, Figure 11.1 Traffic and Transport Assessment – Proposed Construction Routes.
- 11.5.3 Table 11.7 presents the predicted increase in HGV and total traffic on road links that form the proposed construction routes as a result of the Scheme.
- 11.5.4 As can be seen from Table 11.7, the predicted increase in construction HGV traffic on Calow Lane against the 2027 Future Baseline flows exceed the 30% threshold recommended in the Institute of Environmental Management and Assessment (IEMA) (2023) guidance

Table 11.7 Predicted increase from construction traffic against 2027 future baseline flows

DfT Counter/ ATC Ref.	Road	2027 Baseline 12hr Flows (7am-7pm)		Construction Traffic Movements, per Day			% Increase in 12hr Flows (7am-7pm)		Road Sensitivity
		HGVs	Total	HGVs	Cars/Vans	Total	HGV	Total	
ATC 1	Calow Lane – West of Chesterfield Substation site access	79	3,086	58	188	246	42%	7%	Not Sensitive
ATC 2	Calow Lane – East of Chesterfield Substation site access	73	3,167	58	188	246	44%	7%	Not Sensitive
ATC 3	Calow Lane – To the south of junction with Back Lane	64	2,887	58	188	246	47%	8%	Not Sensitive
88066	A632 – East of Calow Lane	225	14,539	0	0	0	0%	0%	Not Sensitive
ATC 4	B6425 Hassocky Lane – North of A617	208	8,096	58	188	246	22%	3%	Not Sensitive
ATC 5	A617 – West of Shire Lane overbridge	1,619	27,461	58	188	246	3%	1%	Not Sensitive

Committed Development

- 11.5.5 Committed developments were reviewed based on the following criteria, of which one was identified, a battery energy storage system, the details are reported in Table 11.8.
- construction or operational traffic route coincide with the Scheme's construction traffic route;
 - construction or operational traffic trips generated will occur during the peak construction period of the Scheme (2027).
- 11.5.6 presents the predicted increase in HGV and total traffic on road links that form the proposed construction routes from both the Scheme construction and the total committed development traffic flows.
- 11.5.7 As can be seen from Table 11.9, the predicted increase in construction HGV traffic on Calow Lane against the 2027 Future Baseline flows exceed the 30% threshold recommended in the IEMA (2023) guidance. As such, an appraisal of potential residual effects on existing and future road users and potential receptors has been undertaken.

Table 11.8 Short list of committed developments for transport

Reference	Name of committed development	Status	Distance from the Site	Description of the committed development	Traffic Included in Assessment
1	Planning application for a battery energy storage system (BESS): (22/01247/FL) and (24/00865/FL) Land Between Nether House Farm And Calow Green Farm Back Lane Calow	Conditionally Approved	Approx. 200m	Planning application for a battery energy storage system (BESS) together with associated infrastructure and associated S73 application to vary conditions	Construction trips to occur over seven months, however construction start date not specified. Note: two separate construction routes are reported, either associated with the transformer or the BESS scheme. Both are included as a worst-case assessment; the routes do not overlap so there is no double counting. Construction traffic is estimated to be 4 HGV movements per day and 20 construction workers on-site during the peak construction period, resulting in a worst-case scenario of 40 car/van movements per day.

Table 11.9 Predicted increase from Scheme construction traffic and committed developments against 2027 future baseline flows

DfT Counter/ ATC Ref.	Road	2027 Future Baseline 12hr flows (7am-7pm)		Scheme Construction and Committed Development Traffic movements, per day			% Increase in 12hr flows (7am-7pm)		Road Sensitivity
		HGVs	Total	HGVs	Cars/Vans	Total	HGV	Total	
ATC1	Calow Lane – West of Chesterfield Substation site access	79	3,086	58	188	3,333	42%	7%	Not Sensitive
ATC 2	Calow Lane – East of Chesterfield Substation site access	73	3,167	58	188	3,414	44%	7%	Not Sensitive
ATC 3	Calow Lane – To the south of junction with Back Lane	64	2,887	62	228	3,177	49%	9%	Not Sensitive
88066	A632 – East of Calow Lane	225	14,539	4	40	14,583	2%	0%	Not Sensitive
ATC 4	B6425 Hassocky Lane – North of A617	208	8,096	62	228	8,386	23%	3%	Not Sensitive
ATC 5	A617 – West of Shire Lane overbridge	1,619	27,461	62	228	27,751	4%	1%	Not Sensitive

Impact on PRow

- 11.5.8 Temporary or permanent PRow diversions will be provided during construction for the PRowS impacted by the Scheme:
- NE5/25/1 (footpath) – likely temporary closure of approximately three years for the construction of the proposed substation, however, east to west connectivity will be maintained along NE9/19/1 and NE5/17. This is approximately a 0.9km extension to the existing PRow.
 - NE5/16/1 (footpath) – likely temporary closure and diversion, with adequate accessibility provision provided. This is approximately a 0.7km extension to the existing PRow.
 - NE5/17/2 (footpath) – likely temporary closure to facilitate drainage works for a short period, with a diversion in place. The proposed temporary diversion is not available at the time of writing this assessment.

Residual Impacts

- 11.5.9 Calow Lane is mostly fronted by agricultural land. However, footways are present along the northbound side of the carriageway where there are residential properties fronting the carriageway. The length of Calow Lane considered for this appraisal is therefore identified as having low sensitivity.
- 11.5.10 While the projected percentage increase in HGV traffic exceeds 30% on Calow Lane, it must be seen in the context of the future traffic baseline on this section of Calow Lane, which is low. During the peak construction activity, it is anticipated that there will be a maximum of 29 HGVs from the Scheme on this section of Calow Lane, equating to 58 HGV movements on Calow Lane per day. This equates to three HGVs (six HGV movements) an hour.
- 11.5.11 When considering the projected increase in the total traffic from both the Scheme construction and committed development traffic, these are less than 30% for all sections of roads assessed.
- 11.5.12 Given the daily increase in HGVs is considered not significant, a minor impact is anticipated for users of PRow connecting to Calow Lane.
- 11.5.13 The construction phase will be temporary, and appropriate control and monitoring measures aim to reduce adverse effects from traffic associated with the Scheme. These measures will be included in the full detailed CTMP and are outlined in Section 11.3. Therefore, the potential effects along Calow Lane will be short-term and temporary in nature, therefore considered to be **negligible and not significant**.
- 11.5.14 The changes to PRow due to temporary closures and diversions during construction have been reviewed. In general, the receptor sensitivity of the PRowS is considered low due to the availability of alternative routes and has a magnitude of impact of major due to the increase in walking distance of the diversion route. However, this increase may not be considered as having an adverse effect given PRowS are considered leisure routes. A temporary significance of effect of **slight** is anticipated which is considered **not significant**.

11.6 Potential Operational Impacts

- 11.6.1 During normal operation of the Scheme, the only traffic generated would be associated with infrequent (assumption of 10 vehicles per year) repair and routine maintenance and inspection activities and a small number of operational staff. Operational traffic numbers will also be dependent on any operational issues with the Site. Therefore, movements are not anticipated to have a material effect on the transport network and receptors, and therefore, no further assessment will be required.
- 11.6.2 There are two PRowS (NE5/25/1 (footpath) and NE5/16/1 (footpath)) that will be realigned as part of the delivery of this Scheme. The overall length of the PRowS will be increased compared to the existing route alignment. However, this increase in walking distance may not be considered as having an adverse effect given the PRowS are considered leisure routes. Given that adequate accessibility provision will be provided, a **permanent slight** effect is anticipated which is considered **not significant**.
- 11.6.3 There are additional footpaths and one bridleway located within 500m of the Scheme boundary and that intersect the construction route. No disruption to access is anticipated during the operational phase. Therefore, no impact on recreational routes located beyond the Scheme boundary is anticipated during operation.

11.7 Bibliography

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12. Agriculture and Soils

12.1 Introduction

- 12.1.1 This chapter details the Agriculture and Soils baseline conditions and the environmental appraisal of the potential Agriculture and Soils impacts associated with the construction and operation of the above elements of the Scheme. Where potential environmental impacts are identified, relevant control measures are prescribed to reduce or avoid these impacts.
- 12.1.2 This chapter should be read in conjunction with Appendix A Chesterfield New 400kV Substation Glossary and Abbreviations; Appendix B Chesterfield New 400kV Substation Methodology; Appendix C Chesterfield New 400kV Substation Proposed Site Layout; Appendix E Chesterfield New 400kV Substation Drawings; Appendix Q Chesterfield New 400kV Substation Agricultural Land Classification Report; and Appendix R Chesterfield New 400kV Substation Outline Soil Management Plan.

12.2 Baseline Conditions

Land Use

- 12.2.1 Aerial imagery indicates that the land use across the Site is predominantly a mixture of arable agriculture and grassland. The existing Chesterfield Substation is also present in the northern half of the Site. This was confirmed during the site visit.

Topography and Relief

- 12.2.2 Available OS maps indicate the field south of Calow Lane moderately slopes to the south east from approximately 115m AOD down to 105m AOD.
- 12.2.3 The existing Chesterfield Substation is gently sloping down from the west with the highest point at approximately 112m AOD and the lowest point at approximately 104m AOD in the east.

Flooding

- 12.2.4 Government long-term flooding risk service information (Environment Agency, 2024) was consulted to assess the flooding risk of the Site. This states that flooding from surface water and small watercourses, rivers and the sea is low risk across the Site, which means that this area has a risk of flooding of less than 0.1% each year.

Geology

- 12.2.5 The BGS Geology Viewer (BGS, 2025) indicates the majority of the Site to be mapped as bedrock geology of the Pennine Lower Coal Measures, described as sedimentary mudstone, siltstone and sandstone bedrock formed between 129 and

318 million years ago during the Carboniferous period. Areas of the Pennine Lower Coal Measures Formation also comprise units just containing either sandstone (Deep Hard Rock and Silkstone Rock Formations) or mudstone and siltstone.

- 12.2.6 Superficial deposits of alluvium (sedimentary deposits comprising of gravel, sand, silt or clay formed between 11,800 years ago and present day during the Quaternary period) are mapped running parallel to the west of the Site. However, no superficial geology is mapped within the Scheme boundary.

Previous Agricultural Land Classification (ALC)

- 12.2.7 Provisional ALC mapping suggests the Site is predominantly mapped as Grade 4 land, with the northern extent of the Site being mapped as Grade 3. Provisional mapping, at a scale of 1:250,000, does not distinguish between Grades 3a and 3b but provides an indication of the likely land classification.
- 12.2.8 There is no published detailed ALC mapping available for the Site. The Detailed ALC Map, produced as part of this appraisal, is found in Appendix E Chesterfield New 400kV Substation Drawings, Figure 12.1.

Previous Soil Survey Data

- 12.2.9 Available national soil survey information suggests that the soils across the Site are predominantly characterised by the Neutral Restored Opencast Association, with soils across the northern extent of the Site mapped as comprising the Bardsey Association.
- 12.2.10 The Neutral Restored Opencast coal workings comprise slowly permeable seasonally waterlogged compacted fine loamy and clayey disturbed soils, which are often stoney with thin topsoils. The Bardsey Association comprises slowly permeable seasonally waterlogged loamy over clayey and fine silty soils over soft rock.

Climatological Data

- 12.2.11 The climate data required for the ALC assessment are provided for 5km intersections of the British National Grid by the Meteorological Office. Interpolated data for the Site is set out in Table 12.1. The climate data covers the centre of the Site and the areas of highest and lowest elevation.

Table 12.1 Climatological data of the Site

Parameter		Values		
British National Grid Reference	SK 410 692	SK 408 696	SK 409 702	
Altitude (m)	87	115	121	
Average annual rainfall (AAR) (mm)	736	751	755	
Accumulated temperature (AT0) (day degrees)	1345	1313	1306	

Parameter	Values		
Moisture deficit for wheat (mm)	96	93	92
Moisture deficit for potatoes (mm)	84	79	78
Field Capacity Days (FCD)	178	181	181

Agricultural Land Classification (ALC)

- 12.2.12 The ALC surveys identified the major soil type across the Site as loam over clay. These soils are generally acidic medium or heavy clay loams over clay (see Appendix Q Chesterfield New 400kV Substation Agricultural Land Classification Report).
- 12.2.13 The land across the Site is Grade 3b non-Best and Most Versatile (BMV) land (moderate quality agricultural land).
- 12.2.14 The distribution and grades of the surveyed areas across the Site are as follows:
- ALC Grade 3b (non-BMV land) accounts for 10.8ha (74.5%); and
 - non-agricultural land accounts for 3.7ha (25.5%).

Control Measures

- 12.2.15 The control measures listed in Table 12.2 will be applied during the construction and operational phases of the Scheme. National Grid is committed to implementing the identified control measures to reduce or avoid any potential impacts that may occur during the construction or operation of the Scheme. The control measures relevant for construction will be included in the CEMP and their implementation will be monitored by National Grid.

Table 12.2 Control and monitoring measures for Agriculture and Soils

Potential receptor and/or impact	Control, enhancement and monitoring measures
Agricultural land quality and soil resources	A detailed Soil Management Plan (SMP) will be prepared post-planning consent and implemented during construction and operation to protect agricultural land quality and soil resources, ensuring that good practice measures are implemented for soil stripping, stockpiling and reinstatement.

12.3 Potential Impacts

- 12.3.1 Construction and operation of the Scheme have the potential to affect agricultural land quality and soil resources, although there is no BMV land on-site. An Outline Soil Management Plan (OSMP) has been prepared and submitted alongside this EAR as part of the planning application (see Appendix R Chesterfield New 400kV Substation Outline Soil Management Plan).

- 12.3.2 A detailed Soil Management Plan (SMP) will be prepared post-planning consent and implemented during construction and operation to protect agricultural land quality and soil resources, ensuring that good practice measures are implemented for soil stripping, stockpiling and reinstatement.

12.4 Bibliography

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13. Socioeconomics and Human Health

13.1 Introduction

- 13.1.1 This chapter details the Socioeconomics and Human Health baseline conditions and the environmental appraisal of the potential Socioeconomics and Human Health impacts associated with the construction and operation of the above elements of the Scheme. Where potential environmental impacts are identified, relevant control measures are prescribed to reduce or avoid these impacts.
- 13.1.2 This chapter should be read in conjunction with Appendix A Chesterfield New 400kV Substation Glossary and Abbreviations; Appendix B Chesterfield New 400kV Substation Methodology; and Appendix E Chesterfield New 400kV Substation Drawings.

13.2 Baseline Conditions Socioeconomics

- 13.2.1 Census 2021 (Nomis, 2025) data shows that North east Derbyshire District has 102,300 residents, 58.7% of which were aged 16 to 64 (i.e. of working age), which is lower than the east Midlands (62.3%) and Great Britain (62.9%) averages.
- 13.2.2 The proportion of the working age population that was economically active between October 2023 and September 2024 in the District (73.6%) is lower than the regional (79.5%) and national (78.4%) averages. There was also a considerably lower job density (i.e., the ratio of total jobs to population aged 16 to 64) in North east Derbyshire (0.56) when compared to the regional (0.81) and national (0.87) averages in 2022. This indicates a lower availability of employment opportunities within the District.
- 13.2.3 There were estimated to be 28,000 jobs available in North east Derbyshire in 2023, of which 67.9% were full-time and 35.7% were part-time. The dominant industries in the District are “manufacturing” (17.9%), “wholesale and retail trade; repair of motor vehicles and motorcycles” (14.3%) and “human health and social work activities” (14.3%). The proportion of employees in “manufacturing” in the District is twice as high as the national (7.5%) average.
- 13.2.4 The Indices of Multiple Deprivation (IMD) (Ministry of Housing, Communities and Local Government, 2019)² show that North East Derbyshire was ranked 177 out of the 317 local authorities in England in 2019, indicating the District exhibits relatively moderate levels of deprivation when compared to the broader context of England (Department of Health and Social Care, 2025). An update to the IMD was recently published; North East Derbyshire was ranked 158, indicating the District exhibits slightly more deprivation.

² The IMD uses a combination of information relating to seven ‘domains’: income; employment; health deprivation and disability; education, skills and training; barriers to housing; crime and living environment; all of which are used to create an overall score of deprivation. Deprivation is scored between 1 and 317 (representing the 317 local authorities within England), with a score of 1 being most deprived and 317 being least deprived.

Community Facilities

- 13.2.5 There are no community facilities within the Scheme boundary. A playing field located off Heathcote Drive is located approximately 490m west of the Scheme boundary.

Business, Recreation and Tourism Assets

- 13.2.6 There are no business, recreation or tourism assets within the Scheme boundary. However, there are two receptors located within 500m from the Scheme boundary. These include:
- Southwood Chase (visitor accommodation located approximately 80m west of the Site); and
 - Manor House (visitor accommodation located approximately 480m south west of the Site).
- 13.2.7 There are three PRoWs within the Scheme boundary, PRoW NE5/25/1 (footpath), PRoW NE5/16/1 (footpath) and PRoW NE5/17 (footpath). There are an additional 10 footpaths and one bridleway located within 500m of the Scheme boundary.

Human Health

- 13.2.8 The Department of Health and Social Care (2025) data shows that the majority of health indicators are categorised as 'similar' in North east Derbyshire when compared to the England averages. Examples include life expectancy at birth (male and female); adults classified as overweight or obese; and winter mortality index.
- 13.2.9 The health indicators in North east Derbyshire that are significantly worse than England are related to estimated dementia diagnosis rate (aged 65 and older); admission episodes for alcohol-specific conditions (under age 18); and children in relative and absolute low-income families (under age 16).
- 13.2.10 North east Derbyshire has a lower rate of Year 6 prevalence of obesity (aged 10-11); under 75 mortality rate from cardiovascular disease; and estimated diabetes diagnosis rate.
- 13.2.11 Further baseline of the wider environment relevant to health related environmental change is presented in Chapter 5 Landscape and Visual, Chapter 7 Air Quality, Chapter 8 Water Resources and Flood Risk, Chapter 9 Land and Ground Conditions, Chapter 10 Noise and Vibration and Chapter 11 Traffic and Transport.

13.3 Construction Control Measures

- 13.3.1 The control measures listed in Table 13.1 will be applied during the construction phase of the Scheme. National Grid is committed to implementing the identified control measures to reduce or avoid any potential impacts that may occur during the construction of the Scheme. The control measures will be included in the CEMP and CTMP and their implementation will be monitored by National Grid.

Table 13.1 Construction control and monitoring measures for Socioeconomics and Human Health

Potential receptor and/or impact	Control, enhancement and monitoring measures
Temporary direct, indirect and induced employment opportunities from the construction works (beneficial)	Not required.
Temporary access disruption to businesses (adverse)	<p>The main construction route comprises Calow Lane, A632, B6425 and A617.</p> <p>Access to business premises will be maintained wherever practicable throughout the construction phase.</p> <p>In instances where access is restricted, alternative arrangements will be provided. These arrangements will be agreed upon with the business owner prior to the commencement of construction activities.</p>
Temporary access disruption to recreational routes (adverse)	<p>Where practicable, PRoWs and routes for walking, cycling and horse-riding (WCH) routes will remain open during the construction phase.</p> <p>During the construction of the proposed substation, it will be necessary to implement a temporary closure of NE5/25/1 (footpath) for approximately three years. East to west connectivity between Calow Lane and Hallflash Lane would be maintained for footpath users along PRoW NE9/19/1 and NE5/17.</p> <p>Temporary closure for NE5/16/1 (footpath) will also be necessary; appropriate route diversions will be implemented adjacent to the southern extent of the Scheme boundary. WCH route diversions will be agreed in advance with local authority access officers and the rambling group. Local communities will be notified of any route changes prior to the commencement of construction activities.</p> <p>Any PRoW or WCH route closures or diversions during the construction phase will be clearly communicated and advertised. Diversionary routes will be equipped with appropriate signage to minimise route uncertainty and ensure clarity for users. The design of WCH routes will follow best practices to ensure safety.</p>
Temporary changes to visual amenity to recreational routes (adverse)	<p>Adoption and implementation of CEMP and construction practices (such as appropriately sited construction compounds, suitable control of construction lighting away from surrounding countryside, limiting material stockpile heights and implementing tree protection measures).</p> <p>Relevant construction information will be provided to the public to ensure transparency and facilitate a clear understanding of the proposed works, which could assist in managing public expectations effectively.</p>

Potential receptor and/or impact	Control, enhancement and monitoring measures
Temporary changes in air quality (adverse)	A DMP will be produced and implemented by the Contractors as detailed in Section 1 to minimise dust emissions from the excavation of materials, general construction activities and the movement of construction vehicles.
Temporary changes in water quality and flood risk (adverse)	Adoption of mitigation measures, including the implementation of sustainable drainage, emergency spillage response plan, best practice in material storage, dewatering excavation in accordance with relevant permits and attenuated water discharges outlined in Section 8.3.
Temporary changes in potential exposure to contaminated dust (adverse)	Adoption of an appropriate CEMP and Construction Phase (Health and Safety) Plan outlined in Section 9.3.
Temporary changes in noise levels (adverse)	<p>A Best Practicable Means approach will be adopted to plan construction during the daytime (i.e., 7am to 5pm on Monday to Friday) and minimise the need for night-time construction works to reduce noise and vibration impacts on residents.</p> <p>Construction works outside of the times specified will be with prior agreement with NEDDC.</p>
Temporary changes in traffic (adverse)	A CTMP will be produced and implemented by the Contractor to minimise disruption from the construction traffic, including the compliance with safety measures, adherence to the designated construction route to and from the Site, implementation of emergency access protocols, minimisation of debris deposits onto public roads, implementation of appropriate road signs warning, and implementation of site induction covering travelling through the construction route.

13.4 Potential Construction Impacts

Socioeconomics

- 13.4.1 Due to the nature of the Scheme, the capital cost of the Scheme would be relatively small in scale (an indicative estimate of 160 workers on-site at peak) when compared with other large scale energy developments. The extent to which construction expenditure will be directed into the local economy cannot be determined until construction contracts have been awarded. Drawing on experience from similar energy developments, it is anticipated that the majority of the construction expenditure will be allocated to specialist contractors, who may not be based in the local area. Therefore, the potential residual impacts on the local economy and local employment are anticipated to be temporary negligible beneficial.

Community Facilities

- 13.4.2 There are no community facilities within the Scheme boundary.
- 13.4.3 The only community land (i.e., a playing field located off Heathcote Drive) located within the study area is approximately 490m west of the Scheme boundary. As this receptor is situated at a considerable distance from the Scheme boundary, no disruption to access is anticipated. Therefore, no impact on community facilities is anticipated during construction.

Business, Recreation and Tourism Assets

- 13.4.4 There are two business and tourism premises located within 500m of the Scheme boundary. These are:
- Southwood Chase (visitor accommodation), which uses a minor road off Calow Lane situated approximately 660m west from the proposed construction access; and
 - Manor House (visitor accommodation), which uses a minor road off the B6039 Mansfield Road.
- 13.4.5 Given that the construction access will be via Calow Lane at the northern section of the Site, access to the business and tourism premises is not anticipated to be affected during construction. Therefore, no impact on access to businesses and tourism premises is anticipated during construction.
- 13.4.6 There may be a potential indirect perceived impact on the visitor accommodation businesses due to the potential change in the surrounding environment, due to construction activities. However, the financial impact of the indirect perceived impact falls outside the scope of the EAR. A separate discussion with the owner of the businesses should be undertaken.
- 13.4.7 Temporary PRoW diversions will be provided during construction for the PRoWs that fall within the Scheme boundary:
- Temporary closure of NE5/25/1 (footpath) is likely to be required due to safety reasons. East to west connectivity between Calow Lane and Hallflash Lane would be maintained for footpath users along PRoWs NE9/19/1 and NE5/17. Given that adequate accessibility will be maintained, a **temporary low adverse** residual impact is anticipated.
 - Temporary closure and diversion of NE5/16/1 (footpath) adjacent to the southern extent of the Scheme boundary. Given that adequate accessibility provision will be provided, a **temporary low adverse** residual impact is anticipated.
 - Temporary closure of a short section of NE5/17/2 (footpath) is likely to be required for a short period to facilitate drainage works. The proposed temporary diversion is not available at the time of writing this assessment. Given that a diversion will be in place, a **temporary low adverse** impact is anticipated.
- 13.4.8 There are an additional 10 footpaths and one bridleway located within 500m of the Scheme boundary. As these PRoWs are situated at a distance from the Scheme boundary, and no direct impacts are predicted, no disruption to access is anticipated. Therefore, no impact on recreational routes located beyond the Scheme boundary is anticipated during construction.

Human Health

13.4.9

There are potential construction impacts on human health from the changes in the wider health determinants. These comprise the following:

- **Employment and income:** Potential employment opportunities will be limited due to the nature of the Scheme. These limited employment gains are likely to result in induced employment from the potential limited additional spending from the construction workers. This is likely to result in beneficial health outcomes, such as improved mental health and provide opportunities for social contact. Therefore, a **temporary negligible beneficial** impact is anticipated on human health associated with employment and income.
- **Physical activity:** PRoWs provide opportunities for walking for recreation. The construction of the Scheme is anticipated to result in temporary and/or permanent access disruption and diversions to some PRoWs. The diversions may increase journey length and may discourage physical activities. Chapter 5 Landscape and Visual also identified an adverse impact on visual amenity of PRoW users. Given the implementation of construction best practice, the visual amenity effects are likely to be reduced to minor adverse (not significant) and not likely to alter the overall balance of users' visual experience. Provided that relevant construction information will be provided to the public, especially PRoW users, to ensure transparency and facilitate a clear understanding of the proposed works, public expectations on views of a small section of PRoW network are expected to be effectively managed. Therefore, a **temporary negligible adverse** residual impact is anticipated on human health associated with physical activity.
- **Air quality:** Chapter 7 Air Quality identified a negligible impact on construction dust from earthworks, construction and trackout. The potential decrease in air quality may adversely affect the population with preexisting respiratory and cardiovascular disease. Given that mitigation will be in place to reduce construction dust, the potential change in air quality due to the Scheme will be within the statutory standards, resulting in a **temporary negligible adverse** residual impact on human health associated with respiratory and cardiovascular disease.
- **Water quality and flood risk:** Chapter 8 Water Resources and Flood Risk identified a low to negligible impact from potential water pollution and flood risk following the implementation of mitigation measures. Given that mitigation will be in place to reduce pollution and risk of flooding, the potential change due to the Scheme will be within the statutory standards, resulting in a **temporary negligible adverse** impact on human health associated with water quality and flood risk.
- **Land quality:** Chapter 9 Land and Ground Conditions identified a moderate adverse impact from potential exposure to contaminated dust. However, the potential impact will be reduced to negligible (not significant) following the adoption of an appropriate CEMP and Construction Phase (Health and Safety) Plan. Given that mitigation will be in place to reduce exposure to contaminated land, the potential change due to the Scheme will be within the statutory standards, resulting in a temporary negligible adverse impact on human health associated with exposure to contamination.

- Noise: Changes in noise levels from construction work and construction traffic could lead to impacts on mental wellbeing. Given that mitigation will be in place to appropriately manage and reduce construction noise levels, the potential change due to the Scheme will be within the statutory standards, resulting in a temporary negligible adverse impact on human health associated with noise levels.
- Transport mode, access and connections: Chapter 11 Traffic and Transport identified a negligible impact from the increase in road traffic. Given that mitigation (i.e., CTMP) will be in place to manage construction traffic, there will be a **temporary negligible adverse** impact on human health associated with access.

13.5 Operational Control Measures

13.5.1 The measures listed in Table 13.2 will be implemented during the operational phase of the Scheme and the appraisal has been undertaken assuming these measures are in place.

Table 13.2 Operational control and monitoring measures for Socioeconomics and Human Health

Potential receptor and/or impact	Control, enhancement and monitoring measures
Permanent access disruption to recreational routes (adverse)	Permanent diversion of NE5/25/1 (footpath) would be provided between the existing and the proposed substation. The indicative layout of the permanent diversion is presented in Appendix H Chesterfield New 400kV Substation Landscaping Proposals and Visualisations. Permanent diversion of NE5/16/1 (footpath) would be provided around the southern extent of the proposed substation. The indicative layout of the permanent diversion is presented in Appendix H Chesterfield New 400kV Substation Landscaping Proposals and Visualisations.
Permanent change in visual amenity along recreational routes (adverse)	Adoption of the proposed mixed scrub and new hedgerow with intermittent tree planting as outlined in Section 5.5.
Permanent changes in mental health due to perceived risk from EMFs (adverse)	The Scheme will be designed and operated in full compliance with established guidelines related to EMFs. Adherence to these guidelines will ensure that potential EMF impacts are effectively mitigated, maintaining compliance with health and safety standards.
Permanent changes in potential exposure to contaminated land and ground gas (adverse)	Adoption of detailed land contamination ground investigation with further ground gas monitoring and assessment, with design and implementation of appropriate gas protection measures as outlined in Section 9.5.
Permanent changes in noise levels (adverse)	Adoption of enclosing the proposed SGTs as outlined in Appendix O Noise Impact Assessment.

13.6 Potential Operational Impacts

Socioeconomics

- 13.6.1 Due to the nature of the Scheme, the proposed substation will be operated remotely and will not require any operators to be permanently on-site. Therefore, no effect is anticipated on the local economy and local employment during operation.

Community Facilities

- 13.6.2 There are no community facilities within the Scheme boundary.
- 13.6.3 The only community land located within the study area is approximately 490m west of the Scheme boundary. As this receptor is situated at a considerable distance from the Scheme boundary and due to the nature of the Scheme, being a small-scale substation, no disruption to access is anticipated. Therefore, no impact on community facilities is anticipated during operation.

Business, Recreation and Tourism Assets

- 13.6.4 There are two business and tourism premises located within 500m of the Scheme boundary. These are Southwood Chase (visitor accommodation) and Manor House (visitor accommodation). No access disruption is anticipated during operation due to the nature of the Scheme being a small-scale substation. Therefore, no impact on businesses and tourism premises is anticipated during operation.
- 13.6.5 There may be a potential indirect perceived impact on the visitor accommodation businesses due to the potential change in the surrounding environment, due to the Scheme. However, the financial impact of the indirect perceived impact falls outside the scope of the EAR. A separate discussion with the owner of the businesses should be undertaken.
- 13.6.6 Two permanent PRoW diversions will be provided for the PRoWs that fall within the Scheme boundary. These include:
- Permanent diversion of NE5/25/1 (footpath) to an area between the existing and the proposed substation. Given that adequate accessibility provision will be provided, a **permanent low adverse** residual impact is anticipated.
 - Permanent diversion of NE5/16/1 (footpath) to the southern extent of the proposed substation. Given that adequate accessibility provision will be provided, a **permanent low adverse** residual impact is anticipated.
- 13.6.7 Access to NE5/17/2 (footpath) will be reinstated during operation, so no disruption to access is anticipated. Therefore, no impact on NE5/17/2 (footpath) is anticipated during operation.
- 13.6.8 There are an additional 10 footpaths and one bridleway located within 500m of the Scheme boundary. As these PRoWs are situated at a distance from the Scheme boundary, no disruption to access is anticipated. Therefore, no impact on recreational routes located beyond the Scheme boundary is anticipated during operation.

Human Health

13.6.9 There are potential operational impacts on human health from the changes in the wider health determinants. These comprise the following:

- **Physical activity:** The Scheme is anticipated to result in permanent diversions for NE5/25/1 (footpath) and NE5/16/1 (footpath). The proposed diversions would be largely within the current alignment. Hence, changes in journey length are not anticipated to be significant. Chapter 5 Landscape and Visual identified potential adverse impacts on visual amenity for PRow users. Mixed scrub and hedgerow with intermittent tree planting is proposed along sections of the proposed diversion route to screen views of the proposed substation. This would reduce the potential changes in PRow amenity to a range of minor to moderate adverse in Year 1, and negligible to moderate adverse in Year 15 (following mitigation). However, the moderate adverse changes to visual amenity affecting two PRowS within the broader PRow network in the area are not anticipated to significantly discourage the overall pursuit of physical activity. Therefore, a **permanent low adverse** residual impact is anticipated on human health associated with physical activity.
- **Radiation and mental health:** Although there is no evidence of direct impacts to human health from EMFs, there remains a perception of risk, which itself could lead to an impact on mental health. The Scheme is located away from major settlements, in a rural area. There are scattered residential properties located around the Scheme. Given that the Scheme will be designed and operated in full compliance with established guidelines related to EMFs, potential EMF impacts will be effectively mitigated and the Scheme will be in compliance with health and safety standards. Therefore, a **permanent negligible adverse** impact on human health associated with radiation and mental health is anticipated.
- **Land quality:** Chapter 9 Land and Ground Conditions identified a moderate adverse impact from potential exposure to contaminated ground and ground gas. However, the potential impact will be reduced to neutral (not significant) following the adoption of land contamination ground investigation with further ground gas monitoring and assessment, with design and implementation of appropriate gas protection measures. Given that mitigation will be in place to reduce exposure to contaminated ground and ground gas, the potential change due to the Scheme will be within the statutory standards, resulting in a **permanent negligible adverse** impact on human health associated with exposure to contamination.
- **Noise:** Appendix O Noise Impact Assessment identified a significant adverse impact from the proposed transformers. As a result the SGTs will be enclosed within acoustic enclosures, the potential impacts are anticipated to be reduced to negligible and below the representative background level as reported in the Noise Impact Assessment. Therefore, a permanent negligible adverse impact on human health associated with noise is anticipated.

13.7 Bibliography

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14. Cumulative Impacts

14.1 Introduction

- 14.1.1 This chapter of the EAR reports the results of the appraisal of the intra-project and inter-project cumulative impacts associated with the construction and operation of the Scheme. There are two types of cumulative impacts, both of which are considered within this EAR:
- intra-project cumulative impacts: the combination of individual impacts from the Scheme on a particular receptor; and
 - inter-project cumulative impacts: the combination of impacts from several developments, in this case, and the Scheme together with other reasonably foreseeable development, which individually might have negligible or slight impacts, but when considered together could create a moderate or major cumulative impact.

14.2 Potential Cumulative Impacts

Intra-project Impacts

- 14.2.1 The outcome of the Stage 1 – Screening Assessment is presented in Table 14.1 below, which summarises whether a sensitive receptor or group of receptors experiences more than one type of residual impact. Sensitive receptors or receptor groups have been identified based on professional judgement.
- 14.2.2 The following topics were identified as having no impacts during construction or operation and have therefore been scoped out of further intra-project impact assessment:
- Ecology;
 - Noise and Vibration; and
 - Agriculture and Soils.

Table 14.1 Summary of the interaction between common receptors

Receptor								
Table Notes: M+ – moderate or above impacts NM – minor or negligible impacts	Landscape and Visual	Cultural Heritage and Archaeology* *no operational impacts	Air Quality* *no operational impacts	Water Resources and Flood Risk	Land and Ground Conditions	Traffic and Transport	Socioeconomics and Human Health	
Construction								
National Landscape Character	NM							
Regional Landscape Character (Coalfield Village Farmland LCT)	NM							
Local Landscape Character	M+							
Wrays Hill Farm	M+							
Laurel Farm	M+							
Hall Flash Farm	M+							
Southwood / Southwood Chase (visitor accommodation)	M+							NM
PRoW NE5/25/1	M+					NM		NM
PRoW NE5/16/1	M+					NM		NM
PRoW NE5/17/2	M+					NM		NM

Receptor Table Notes: M+ – moderate or above impacts NM – minor or negligible impacts	Landscape and Visual	Cultural Heritage and Archaeology* *no operational impacts	Air Quality* *no operational impacts	Water Resources and Flood Risk	Land and Ground Conditions	Traffic and Transport	Socioeconomics and Human Health
PRoW NE5/17/4	M+						
PRoW NE5/17/1	M+						
PRoW NE9/22/1	M+						
PRoW NE5/16/2	M+						
PRoW NE9/18/1	M+						
Non-designated asset 13: 20 th Century Coal Mine		NM					
Non-designated asset 14: Post Medieval Coal Pits		NM					
Construction Dust			NM				
Calow Brook				NM			
Spittal Brook				NM			
Unnamed Tributaries				NM			
Flood Risk				NM			
Construction Workers					NM		
Groundwater					NM		

Receptor Table Notes: M+ – moderate or above impacts NM – minor or negligible impacts	Landscape and Visual	Cultural Heritage and Archaeology* *no operational impacts	Air Quality* *no operational impacts	Water Resources and Flood Risk	Land and Ground Conditions	Traffic and Transport	Socioeconomics and Human Health
Geology					NM		
Calow Lane						NM	
Local Economy							NM
Community Facilities							NM
Manor House (visitor accommodation)							NM
Employment and Income (Human Health)							NM
Physical Activity (Human Health)							NM
Air Quality (Human Health)							NM
Water Quality and Flood Risk (Human Health)							NM
Land Quality (Human Health)							NM
Noise (Human Health)							NM
Transport mode, access and connection (Human Health)							NM

Receptor								
Table Notes: M+ – moderate or above impacts NM – minor or negligible impacts	Landscape and Visual	Cultural Heritage and Archaeology* *no operational impacts	Air Quality* *no operational impacts	Water Resources and Flood Risk	Land and Ground Conditions	Traffic and Transport	Socioeconomics and Human Health	
Operation								
National Landscape Character	NM							
Regional Landscape Character (Coalfield Village Farmland LCT)	NM							
Local Landscape Character (Year 1)	M+							
Local Landscape Character (Year 15)	NM							
Wrays Hill Farm (Year 1 and Year 15)	M+							
Laurel Fram (Year 1 and Year 15)	M+							
Hall Flash Farm (Year 1)	M+							
Hall Flash Farm (Year 15)	NM							
Southwood Chase (Year 1 and Year 15)	NM							
PRoW NE5/25/1 (Year 1)	M+					NM	NM	

Receptor Table Notes: M+ – moderate or above impacts NM – minor or negligible impacts	Landscape and Visual	Cultural Heritage and Archaeology* *no operational impacts	Air Quality* *no operational impacts	Water Resources and Flood Risk	Land and Ground Conditions	Traffic and Transport	Socioeconomics and Human Health
PRoW NE5/25/1 (Year 15)	NM					NM	NM
PRoW NE5/16/1 (Year 1)	M+					NM	NM
PRoW NE5/16/1 (Year 15)	NM					NM	NM
PRoW NE5/17/2 (Year 1)	M+						
PRoW NE5/17/2 (Year 15)	NM						
PRoW NE5/17/4 (Year 1)	M+						
PRoW NE5/17/4 (Year 15)	NM						
PRoW NE5/17/1 (Year 1)	M+						
PRoW NE5/17/1 (Year 15)	NM						
PRoW NE9/22/1 (Year 1 and Year 15)	NM						
PRoW NE5/16/2 (Year 1 and Year 15)	NM						
PRoW NE9/18/1 (Year 1 and Year 15)	NM						
Surface Water Flood Risk				NM			
Water Quality				NM			

Receptor Table Notes: M+ – moderate or above impacts NM – minor or negligible impacts	Landscape and Visual	Cultural Heritage and Archaeology* *no operational impacts	Air Quality* *no operational impacts	Water Resources and Flood Risk	Land and Ground Conditions	Traffic and Transport	Socioeconomics and Human Health
Groundwater Flooding				NM			
Ground Water Quality					NM		
Site Users					NM		
Geology					NM		
Permanent Structures					NM		
Physical Activity (Human Health)							NM
Radiation and Mental Health (Human Health)							NM
Land Quality (Human Health)							NM
Noise (Human Health)							NM

- 14.2.3 If there is considered to be no potential for intra-project cumulative impacts to occur, then the receptor has not been assessed further.
- 14.2.4 The following receptors have been identified in Table 14-1 as having the potential for intra-project cumulative impacts:
- Construction:
 - Southwood Chase;
 - PRoW NE5/25/1;
 - PRoW NE5/16/1; and
 - PRoW NE5/17/2.
 - Operation:
 - PRoW NE5/25/1 (Year 1 and Year 15); and
 - PRoW NE5/16/1 (Year 1 and Year 15).
- 14.2.5 Table 14.2 details the intra-project cumulative impacts on the above receptors.

Table 14.2 Assessment of intra-project cumulative impacts

Receptor	Discipline	Residual Impacts	Intra-project Cumulative Impact and Mitigation
Southwood Chase	Chapter 5 Landscape and Visual	During the construction phase, glimpses of construction activity may be possible from north-facing upper storey windows, however these views are likely to be very limited. It is anticipated that there will be no greater than a moderate to minor level of effect, albeit temporary in nature.	Following the implementation of a CEMP and adequate accessibility, no intra-project cumulative impact is anticipated.
	Chapter 13 Socioeconomics and Human Health	There is no impact on access to businesses and tourism premises anticipated during construction. There may be a potential indirect perceived impact on the visitor accommodation businesses due to the potential change in the surrounding environment, due to construction activities. However, the financial impact of the indirect perceived impact falls outside the scope of the EAR.	
PRoW NE5/25/1	Chapter 5 Landscape and Visual	For this receptor, views will be unavoidable and the Scheme will form a highly noticeable element, altering the overall balance and composition of the visual experience. During the construction phase, the scale of construction activity will result in a major to moderate adverse level of effect, albeit temporary in nature.	Users of the PRoW are likely to experience a change in visual amenity during construction along with a temporary closure of the PRoW, with adequate access maintained for users through alternative available footpaths. Following the implementation of a CEMP and adequate accessibility, no intra-project cumulative impact is anticipated.

Receptor	Discipline	Residual Impacts	Intra-project Cumulative Impact and Mitigation
	Chapter 11 Traffic and Transport	Temporary closure of the PRow is likely to be required. East to west connectivity would be maintained for footpath users along PRowS NE9/19/1 and NE5/17. Given the availability of alternative routes, a temporary slight adverse impact is anticipated.	
	Chapter 13 Socioeconomics and Human Health	Temporary closure of the PRow is likely to be required. East to west connectivity would be maintained for footpath users along PRowS NE9/19/1 and NE5/17. Given that adequate accessibility will be maintained throughout construction, a temporary low adverse residual impact is anticipated.	
PRow NE5/16/1	Chapter 5 Landscape and Visual	For this receptor, views will be unavoidable and the Scheme will form a highly noticeable element, altering the overall balance and composition of the visual experience. During the construction phase, the scale of construction activity will result in a major to moderate adverse level of effect, albeit temporary in nature.	Users of the PRow are likely to experience a change in visual amenity during construction along with a temporary closure and diversion of the PRow. Following the implementation of a CEMP and a diversion, no intra-project cumulative impact is anticipated.
	Chapter 11 Traffic and Transport	Temporary closure and diversion of the PRow will be required. Given the availability of alternative routes, a temporary slight adverse impact is anticipated.	

Receptor	Discipline	Residual Impacts	Intra-project Cumulative Impact and Mitigation
	Chapter 13 Socioeconomics and Human Health	Temporary closure and diversion of the PRoW will be required. Given that adequate accessibility will be maintained throughout construction, a temporary low adverse residual impact is anticipated.	
PRoW NE5/17/2	Chapter 5 Landscape and Visual	For this receptor, views will be unavoidable and the Scheme will form a highly noticeable element, altering the overall balance and composition of the visual experience. During the construction phase, the scale of construction activity will result in a major to moderate adverse level of effect, albeit temporary in nature.	Users of the PRoW are likely to experience a change in visual amenity during construction along with a temporary closure and diversion of the PRoW. Following the implementation of a CEMP and a diversion, no intra-project cumulative impact is anticipated.
	Chapter 11 Traffic and Transport	A temporary closure is likely to be required for a short period for this PRoW. Given that a diversion will be in place, a temporary slight adverse impact is anticipated during construction.	
	Chapter 13 Socioeconomics and Human Health	A temporary closure is likely to be required for a short period for this PRoW. Given that a diversion will be in place, a temporary low adverse impact is anticipated during construction.	
Operation			
PRoW NE5/25/1 (Year 1)	Chapter 5 Landscape and Visual	Views of the Scheme from this receptor will be unavoidable and it will form a highly noticeable element, altering the overall balance and composition of the visual experience. During Year 1,	Users of the PRoW will experience a change in visual amenity and access in the first year as proposed mitigation planting will not yet have reached maturity. However, over time, as the planting establishes and reaches maturity, it will

Receptor	Discipline	Residual Impacts	Intra-project Cumulative Impact and Mitigation
		proposed mitigation planting will not yet have reached maturity, resulting in a moderate adverse level of effect.	result in improved visual screening. Access for PRow users will be maintained throughout operation. As such, no intra-project cumulative impact is anticipated.
	Chapter 11 Traffic and Transport	Given that adequate accessibility provision will be provided, a permanent slight adverse impact is anticipated.	
	Chapter 13 Socioeconomics and Human Health	Given that adequate accessibility provision will be provided, a permanent low adverse residual impact is anticipated.	
PRow NE5/21/1 (Year 15)	Chapter 5 Landscape and Visual	Views of the Scheme from this receptor will be unavoidable and it will form a highly noticeable element, altering the overall balance and composition of the visual experience. During Year 15, proposed mitigation planting will have reached a level of maturity where it can perform its intended screening function, reducing the level of effect to minor adverse.	Users of the PRow will experience a change in visual amenity and access. However, there will be new mixed scrub planting along the northern and the western boundaries of the Scheme which will have reached a level of maturity where it can perform its intended screening function. Access for PRow users will be maintained throughout operation. Following the implementation of the landscaping mitigation, no intra-project cumulative impact is anticipated.
	Chapter 11 Traffic and Transport	Given that adequate accessibility provision will be provided, a permanent slight adverse impact is anticipated.	
	Chapter 13 Socioeconomics and Human Health	Given that adequate accessibility provision will be provided, a permanent low adverse residual impact is anticipated.	
PRow NE5/16/1 (Year 1)	Chapter 5 Landscape and Visual	Views of the Scheme from this receptor will be unavoidable and it will form a highly noticeable element, altering the overall balance and composition of the	Users of the PRow will experience a change in visual amenity and access in the first year as proposed mitigation planting will not yet have reached maturity. However, over time, as the

Receptor	Discipline	Residual Impacts	Intra-project Cumulative Impact and Mitigation
		visual experience. During Year 1, proposed mitigation planting will not yet have reached maturity, resulting in a moderate adverse level of effect.	planting establishes and reaches maturity, it will result in improved visual screening. Access for PRoW users will be maintained throughout operation. As such, no intra-project cumulative impact is anticipated.
	Chapter 11 Traffic and Transport	Given that adequate accessibility provision will be provided, a permanent slight adverse impact is anticipated.	
	Chapter 13 Socioeconomics and Human Health	Given that adequate accessibility provision will be provided, a permanent low adverse residual impact is anticipated.	
PRoW NE5/16/1 (Year 15)	Chapter 5 Landscape and Visual	Views of the Scheme from this receptor will be unavoidable and it will form a highly noticeable element, altering the overall balance and composition of the visual experience. During Year 15, proposed mitigation planting will have reached a level of maturity where it can perform its intended screening function, reducing the level of effect to minor adverse.	Users of the PRoW will experience a change in visual amenity and access. However, there will be new hedgerow with intermittent tree planting to help reduce the impact of the Scheme on the visual amenity of users of the re-routed PRoW NE5/16/1 which will have reached a level of maturity where it can perform its intended screening function. Following the implementation of this mitigation, no intra-project cumulative impact is anticipated.
	Chapter 11 Traffic and Transport	Given that adequate accessibility provision will be provided, a permanent minor adverse impact is anticipated.	
	Chapter 13 Socioeconomics and Human Health	Given that adequate accessibility provision will be provided, a permanent low adverse residual impact is anticipated.	

Proposed mitigation

- 14.2.6 Proposed mitigation for intra-project cumulative impacts is outlined in Table 14.2. Following the implementation of this mitigation, no additional mitigation for intra-project cumulative impacts is required.

Inter-project Impacts

- 14.2.7 Based on the defined approach in Appendix B Chesterfield New 400kV Substation Methodology, the following committed developments listed in Table 14.3 below have been considered within this assessment of inter-project cumulative impacts.

Table 14.3 Summary of committed developments

Reference	Name of Committed Development	Status	Distance from Site	Description of the Committed Development
1	St Peter and St Paul School, Hady Hill, Hady, Chesterfield, S41 0EF (planning ref: CHE/22/00471/FUL)	Conditional permission	1.52km north west	Construction of a multi-use games area (MUGA) with associated infrastructure, car park and internal access route.
2	Chesterfield and North Derbyshire Royal Hospital, Chesterfield Road, Calow, Derbyshire, S44 5BL (planning ref: CHE/22/00555/FUL)	Conditional permission	1.06km north west	Installation of new external prefabricated electricity substation and generator units for critical infrastructure upgrades and associated works to existing adjacent buildings.
3	Chesterfield and North Derbyshire Royal Hospital, Chesterfield Road, Calow, Derbyshire, S44 5BL (planning ref: CHE/22/00540/FUL)	Conditional permission	0.9km north west	Construction of a new mental health facility and associated landscaping, groundworks, parking, and access arrangements.
4	Chesterfield and North Derbyshire Royal Hospital, Chesterfield Road, Calow, Derbyshire, S44 5BL (planning ref: CHE/21/00438/FUL)	Conditional permission	0.78km north east	Two-storey Urgent Care and Emergency Department extension to existing hospital.
5	Land Between Calow Brook Drive and Calow Lane, Calow Brook Drive, Hasland, Chesterfield, Derbyshire (planning ref: CHE/24/00158/FUL)	Conditional permission	0.44km south west	2 no. industrial units for B2, E(g)ii and E(g)iii use, associated parking and external works.

Reference	Name of Committed Development	Status	Distance from Site	Description of the Committed Development
6	Riverside Works, Storforth Lane, Chesterfield, S40 2TU (planning ref: CHE/19/00071/FUL)	Conditional permission	1.9km south west	Erection of two industrial buildings ancillary to existing operations at Medway Closures Ltd.
7	Land Between Nether House Farm and Calow Green Farm, Back Lane, Calow (planning ref: 22/01247/FL)	Conditionally approved	0.11km east	Planning application for a battery energy storage system (BESS) together with associated infrastructure including switchyard, control room, DNO switch room, acoustic barrier, landscaping, biodiversity enhancement, internal access tracks, vehicular parking, underground diversion of section of existing 33kv overhead power line and two options for underground cable run between the BESS and switchyard (Major Development).
8	MXG Waste Transfer Station, Mansfield Road, Corbriggs, Chesterfield, S41 0JW (planning ref: 22/01238/CM)	Conditionally approved	1.09km south	Full planning application for the demolition of existing office building and workshop and development of a Wood Processing Facility with associated roads, parking and infrastructure.
9	Manor House Farm, Mansfield Road, Hasland, Chesterfield, S41 0JG (planning ref: 20/01283/FL)	Conditionally approved	0.7m south west	Proposed photovoltaic solar park and associated infrastructure (Affecting public right of way) (Major Development).
10	The Coal Yard, North Wingfield Road, Grassmoor (planning ref: 20/00634/FL)	Conditionally approved	1.64km south west	Provision of 2no Office Buildings with associated parking and landscaping forming a new innovation centre (Major Development).
11	Land From the east of Dark Lane to the west of Oaks Farm, Calow (planning ref: 20/01005/FL)	Conditionally approved	0.56km north	Outline planning application for the construction of up to 80 no. dwellings and associated works (all matters reserved except access) (Major Development).

Reference	Name of Committed Development	Status	Distance from Site	Description of the Committed Development
12	Elliot's Butchers Farm Shop, Stud Farm, Chesterfield Road, Calow, Chesterfield, S44 5UN (planning ref: 24/00047/FL)	Conditionally approved	1.08km north east	Installation of a solar array, along with associated infrastructure including electrical housing.
13	Manor House Farm, Mansfield Road, Hasland, Chesterfield, S41 0JG (planning ref: 24/00756/FL)	Conditionally approved	Overlap	Installation of underground cable (affecting a Public Right of Way)
14	Lodge Farm, Top Road, Calow, Chesterfield, S44 5TE (planning ref: 24/01034/MFL)	Conditionally approved	0.83km north east	Construction, operation and decommissioning of a Battery energy Storage System with vehicular access, internal access tracks, landscaping, boundary treatment, cabling and associated works and infrastructure (Major Development) (affecting Public Rights of Way) (affecting the setting of a Listed Building)
15	Land to the south east of Lings Farm, Birkin Lane, Temple Normanton (planning ref: 25/00709/EIA)	No EIA Required	1.92km south east	EIA screening opinion request for a proposed Solar Farm and Battery Energy Storage System (BESS) development.
16	Chesterfield to Willington (Development Consent Order Application)	Application to be submitted in 2026	Overlap	60km of new 400kV overhead electricity line between Chesterfield and Willington to allow National Grid to carry more energy between the North of England and the Midlands.

- 14.2.8 In addition to the above committed developments, there are additional Great Grid Upgrade projects to consider, including the Brinsworth to Chesterfield Project, which largely comprises the construction a new 400kV substation located off Long Lane, Brinsworth. The Chesterfield to High Marnham Project also includes the construction of a new 400kV substation located off Fledborough Road, High Marnham.
- 14.2.9 Due to the distances between the Scheme and the proposals above, the intervening topography and the nature of the Scheme, no inter-project cumulative impacts are anticipated.
- 14.2.10 Table 14.4 outlines the conclusions of the qualitative evaluation of the inter-project cumulative impacts associated with the Scheme. This assessment has been undertaken using professional judgement and the environmental information relating to the committed developments available at the time of the appraisal.
- 14.2.11 The following topics have been scoped out of further inter-project cumulative assessment as they were identified as having no impacts during construction or operation:
- Ecology;
 - Noise and Vibration; and
 - Agriculture and Soils.
- 14.2.12 The following topics have been scoped out of further inter-project cumulative assessment during the operational phase as they have no impacts during this phase:
- Cultural Heritage and Archaeology;
 - Air Quality; and Traffic and Transport.

Table 14.4 Inter-project cumulative impacts

Committed Development	Inter-project Cumulative Impacts
Construction	
1	Due to the small scale of the committed development, the nature of the land use, and the intervening topography between the Scheme and the committed development, it is deemed unlikely that there will be any inter-project cumulative impacts during construction.
2	Due to the small scale of the committed development, the nature of the land use within the existing wider hospital infrastructure, and the intervening topography between the Scheme and the committed development, it is deemed unlikely that there will be any inter-project cumulative impacts during construction.
3	<p>Landscape and Visual:</p> <p>During construction, there is the potential for the committed development to impact the surrounding landscape through an increase in construction noise, traffic and the presence of machinery and plant. Following the implementation of a CEMP, and in consideration of the distance, the surrounding land use of the hospital around the committed development, and the intervening topography between the committed development and the Scheme, no inter-project cumulative impacts are anticipated.</p> <p>Cultural Heritage and Archaeology:</p> <p>The committed development is not located within a conservation area or in close proximity to any listed buildings, and as such is not anticipated to have a substantial impact to heritage assets during construction (Ryder Architecture Limited, 2022). Following the implementation of a CEMP, and in consideration of the distance and intervening topography between the committed development and the Scheme, no inter-project cumulative impacts are anticipated.</p> <p>Air Quality:</p> <p>The committed development is not located within an AQMA. Following the implementation of a CEMP, and in consideration of the nature of the committed development and the intervening topography between the committed development and the Scheme, no inter-project cumulative impacts are anticipated.</p> <p>Water Resources and Flood Risk:</p> <p>The committed development is located within Flood Zone 1, therefore having a low risk of flooding (Ryder Architecture Limited, 2022) and an FRA (Curtins, 2021) undertaken to ensure no increase in flood risk to the wider catchment. As such, it is anticipated that there will be no inter-project cumulative impact during the construction phase.</p>

Committed Development	Inter-project Cumulative Impacts
	<p>Land and Ground Conditions:</p> <p>The committed development is not located in a groundwater source protection zone and previous studies in the area as part of other developments did not identify a likely source for the generation of potential contamination (Ryder Architecture Limited, 2022). Provided that the CEMP is appropriately implemented for each scheme, it is anticipated that there will be no inter-project cumulative impact during the construction phase.</p> <p>Traffic and Transport:</p> <p>The Transport Technical Note (Curtins, 2022) concluded that the residual traffic impact of the committed development is not severe. As such, following the implementation of a CEMP, it is anticipated that there will be no inter-project cumulative impacts for traffic and transport during construction.</p> <p>Socioeconomics and Human Health:</p> <p>The committed development is likely to generate temporary small-scale employment during the construction phase, similar to the Scheme. As such, it is anticipated that there will be no inter-project cumulative impact during the construction phase.</p>
4	<p>Landscape and Visual:</p> <p>During construction, there is the potential for the committed development to impact the surrounding landscape through an increase in construction noise, traffic and the presence of machinery and plant. Following the implementation of a CEMP, and in consideration of the distance, the surrounding land use of the hospital around the committed development, and the intervening topography between the committed development and the Scheme, no inter-project cumulative impacts are anticipated.</p> <p>Cultural Heritage and Archaeology:</p> <p>The committed development is not located within a conservation area, with the nearest listed building being 130m to the south within the wider hospital grounds. The Design and Access Statement (The Manser Practice, 2021) concluded that, due to the surrounding setting of the hospital and the scale of the committed development, there would be no additional impact to the setting of the listed building. As such, following the implementation of a CEMP, and in consideration of the distance and intervening topography between the committed development and the Scheme, no inter-project cumulative impacts are anticipated.</p> <p>Air Quality:</p> <p>The committed development is not located within an AQMA. Following the implementation of a CEMP, and in consideration of the nature of the committed development and the intervening topography between the committed development and the Scheme, no inter-project cumulative impacts are anticipated.</p>

Committed Development	Inter-project Cumulative Impacts
	<p>Water Resources and Flood Risk:</p> <p>The committed development is located within Flood Zone 1 and has a low probability of flooding (Alan John Partnership LLP, 2021). As such, following the implementation of a CEMP, it is anticipated that there will be no inter-project cumulative impact during the construction phase.</p> <p>Land and Ground Conditions:</p> <p>During construction, there is the potential for pollution to groundwater as a result of the committed development and the Scheme. Provided that the CEMP is appropriately implemented for each scheme, it is anticipated that there will be no inter-project cumulative impact during the construction phase.</p> <p>Traffic and Transport:</p> <p>Due to the smaller scale of the committed development, it is unlikely to have a significant impact on the local transport network during construction. As such, following the implementation of a CEMP, no inter-project cumulative impact during construction is anticipated.</p> <p>Socioeconomics and Human Health:</p> <p>The committed development is likely to generate temporary small-scale employment during the construction phase, similar to the Scheme. As such, it is anticipated that there will be no inter-project cumulative impact during the construction phase.</p>
5	<p>Based on the information publicly available, a thorough inter-project cumulative assessment cannot be fully undertaken. However, due to the small scale of the committed development, the nature of the land use, and the intervening topography between the Scheme and the committed development, it is deemed unlikely that there will be any inter-project cumulative impacts during construction.</p>
6	<p>Due to the small scale of the committed development, the nature of the land use, and the intervening topography between the Scheme and the committed development, it is deemed unlikely that there will be any inter-project cumulative impacts during construction.</p>
7	<p>Landscape and Visual:</p> <p>The committed development and the Scheme would both be located within the same local landscape character area. Given the proximity of the committed development and the Scheme, it is anticipated that there could be an inter-project cumulative impact on the local landscape character during construction. This would be mitigated through the implementation of a CEMP and best practice measures throughout construction.</p>

Committed Development	Inter-project Cumulative Impacts
	<p>An inter-project cumulative visual amenity impact is anticipated for residential receptors and PRowS during the construction phase of the committed development and the Scheme, however this will be temporary and limited to the construction phase.</p> <p>Cultural Heritage and Archaeology:</p> <p>The committed development has the potential to have an impact to the setting of heritage assets in the surrounding area. It is assumed that this impact can be appropriately managed through the implementation of a CEMP and industry best practice. As such, following the mitigation measures set out in this EAR and the CEMP, it is anticipated that there will be no inter-project impacts during construction.</p> <p>Air Quality:</p> <p>The committed development has the potential to adversely impact air quality in the local area during construction, however this will be temporary and localised in nature. Following the implementation of a CEMP, and in consideration of the nature of the committed development and the intervening topography between the committed development and the Scheme, no inter-project cumulative impacts are anticipated.</p> <p>Water Resources and Flood Risk:</p> <p>Should the construction programmes for the committed development and the Scheme overlap, there is the potential for pollution from construction activities to affect groundwater and surface water receptors. With the implementation of a CEMP and drainage strategies for each scheme, this is expected to cause no inter-project cumulative impact.</p> <p>Land and Ground Conditions:</p> <p>During construction, there is the potential for pollution to groundwater as a result of the committed development and the Scheme. Provided that the CEMP is appropriately implemented for each scheme, it is anticipated that there will be no inter-project cumulative impact during the construction phase.</p> <p>Traffic and Transport:</p> <p>A CTMP has been produced for the committed development that sets out measures to mitigate the impact of construction traffic (Pegasus Group, 2023). Construction traffic is predicted to use the A617, B6425 Hassocky Lane, Calow Green, and Back Lane. As such, an inter-project cumulative impact is anticipated during construction, although this will be temporary in nature.</p> <p>Socioeconomics and Human Health:</p> <p>The committed development is likely to generate temporary small-scale employment during the construction phase, similar to the Scheme. As such, it is anticipated that there will be no inter-project cumulative impact during the construction phase.</p>

Committed Development	Inter-project Cumulative Impacts
8	<p>Landscape and Visual:</p> <p>During construction, there is the potential for the committed development to impact the surrounding landscape through an increase in construction noise, traffic and the presence of machinery and plant. Following the implementation of a CEMP, and in consideration of the distance and intervening topography between the committed development and the Scheme, no inter-project cumulative impacts are anticipated.</p> <p>Cultural Heritage and Archaeology:</p> <p>The committed development has the potential to impact the setting of heritage assets during construction. Following the implementation of a CEMP, and in consideration of the distance and intervening topography between the committed development and the Scheme, no inter-project cumulative impacts are anticipated.</p> <p>Air Quality:</p> <p>The committed development has the potential to adversely impact air quality in the local area during construction, however this will be temporary and localised in nature. Following the implementation of a CEMP, and in consideration of the nature of the committed development and the intervening topography between the committed development and the Scheme, no inter-project cumulative impacts are anticipated.</p> <p>Water Resources and Flood Risk:</p> <p>Should the construction programmes for the committed development and the Scheme overlap, there is the potential for pollution from construction activities to affect groundwater and surface water receptors. With the implementation of a CEMP and drainage strategies for each scheme, this is expected to cause no inter-project cumulative impact.</p> <p>Land and Ground Conditions:</p> <p>During construction, there is the potential for pollution to groundwater as a result of the committed development and the Scheme. Provided that the CEMP is appropriately implemented for each scheme, it is anticipated that there will be no inter-project cumulative impact during the construction phase.</p> <p>Traffic and Transport:</p> <p>During construction, there is the potential for an impact on Traffic and Transport in the surrounding area as a result of the committed development. Following the implementation of a CEMP and CTMP, it is anticipated that there will be no inter-project cumulative impact during the construction phase.</p> <p>Socioeconomics and Human Health:</p> <p>The committed development is likely to generate temporary small-scale employment during the construction phase. As such, it is anticipated that there will be no inter-project cumulative impact during the construction phase.</p>

Committed Development	Inter-project Cumulative Impacts
9	<p>Landscape and Visual:</p> <p>The committed development is a large-scale scheme that would be a dominant feature in the wider landscape. As such, in consideration of the proximity of the committed development and the Scheme, it is anticipated that there will be an inter-project cumulative impact during the construction phase. This is as a result of increased construction activity, workers compounds and partially completed structures throughout construction.</p> <p>Sensitive receptors, including residential properties and PRow users, are likely to experience a visual amenity impact as a result of the committed development. As such, it is anticipated that there will be an inter-project cumulative visual amenity impact during the construction phase.</p> <p>Cultural Heritage and Archaeology:</p> <p>During the construction phase of the committed development, an impact to the visual setting of heritage assets is anticipated. This impact will be as a result of construction activities resulting in an increase in dust, traffic movement and noise; a CEMP will be produced to mitigate this impact. As such, it is anticipated that there will be an inter-project cumulative visual amenity impact during the construction phase.</p> <p>Air Quality:</p> <p>The committed development is likely to have an impact on air quality during construction as a result of dust emissions, however this will be localised and temporary in nature. As such, following the implementation of a CEMP and best practice measures, no inter-project cumulative impact on air quality is anticipated during construction.</p> <p>Water Resources and Flood Risk:</p> <p>Should the construction programmes for the committed development and the Scheme overlap, there is the potential for pollution from construction activities to affect groundwater and surface water receptors. With the implementation of a CEMP and drainage strategies for both schemes, this is expected to cause no inter-project cumulative impact.</p> <p>Land and Ground Conditions:</p> <p>During construction, there is the potential for pollution to groundwater as a result of the committed development and the Scheme. Provided that a CEMP is appropriately implemented for each scheme, it is anticipated that there will be no inter-project cumulative impact during the construction phase.</p>

Committed Development	Inter-project Cumulative Impacts
	<p>Traffic and Transport:</p> <p>Due to the proximity of the committed development and the Scheme, it is anticipated that there will be an overlap in construction traffic routes and an increase in construction vehicle movements on the local highway network, although this will be temporary in nature. As set out in the decision notice (NEDDC, 2021) a CEMP will be produced for the committed development which will include measures to minimise the impact of construction traffic. Following the implementation of CEMPs, an inter-project cumulative impact is anticipated during construction.</p> <p>Socioeconomics and Human Health:</p> <p>The committed development is likely to generate temporary small-scale employment during the construction phase, similar to the Scheme. Following the implementation of a CEMP for each of the committed development and the Scheme, it is anticipated that there will be no inter-project cumulative impacts during construction.</p>
10	<p>Due to the small scale of the committed development, the nature of the land use, and the intervening topography between the Scheme and the committed development, it is deemed unlikely that there will be any inter-project cumulative impacts during construction.</p>
11	<p>Landscape and Visual:</p> <p>During construction, there is the potential for the committed development to impact the surrounding landscape through an increase in construction noise, traffic and the presence of machinery and plant. Following the implementation of a CEMP, and in consideration of the distance and intervening topography between the committed development and the Scheme, no inter-project cumulative impacts are anticipated.</p> <p>Cultural Heritage and Archaeology:</p> <p>The committed development has the potential to impact the setting of heritage assets during construction. Following the implementation of the CEMP, it is anticipated that there will be an inter-project cumulative visual amenity impact during the construction phase.</p> <p>Air Quality:</p> <p>The committed development has the potential to adversely impact air quality in the local area during construction, however this will be temporary and localised in nature. Following the implementation of a CEMP, and in consideration of the nature of the committed development and the intervening topography between the committed development and the Scheme, no inter-project cumulative impacts are anticipated.</p>

Committed Development	Inter-project Cumulative Impacts
	<p>Water Resources and Flood Risk:</p> <p>The committed development has the potential to impact groundwater and surface water during construction. Following the implementation of a CEMP and best practice measures, no inter-project cumulative impacts are anticipated.</p> <p>Land and Ground Conditions:</p> <p>During construction, there is the potential for pollution to groundwater as a result of the committed development and the Scheme. Provided that a CEMP is appropriately implemented for each scheme, it is anticipated that there will be no inter-project cumulative impact during the construction phase.</p> <p>Traffic and Transport:</p> <p>During construction, there is the potential for an impact on Traffic and Transport in the surrounding area as a result of the committed development. Following the implementation of a CEMP, it is anticipated that there will be no inter-project cumulative impact during the construction phase.</p> <p>Socioeconomics and Human Health:</p> <p>The committed development is likely to generate temporary small-scale employment during the construction phase. As such, it is anticipated that there will be no inter-project cumulative impact during the construction phase.</p>
12	<p>Landscape and Visual:</p> <p>The committed development has the potential to impact the surrounding landscape during construction as a result of an increase in construction traffic, noise and the presence of machinery and plant. Following the implementation of a CEMP, and in consideration of the distance and intervening topography between the committed development and the Scheme, no inter-project cumulative impacts are anticipated.</p> <p>Cultural Heritage and Archaeology:</p> <p>The committed development has the potential to impact the setting of heritage assets during the construction phase. Following the implementation of a CEMP and best practice measures, no inter-project cumulative impacts are anticipated.</p> <p>Air Quality:</p> <p>Given the scale of the committed development, air quality impacts during construction are likely to be minimal, localised and temporary in nature. As such, no inter-project impacts are anticipated.</p> <p>Water Resources and Flood Risk:</p>

Committed Development	Inter-project Cumulative Impacts
	<p>The committed development has the potential to impact groundwater and surface water during construction. Following the implementation of a CEMP and best practice measures, no inter-project cumulative impacts are anticipated.</p> <p>Land and Ground Conditions:</p> <p>During construction, there is the potential for pollution to groundwater as a result of the committed development and the Scheme. Provided that a CEMP is appropriately implemented for each scheme, it is anticipated that there will be no inter-project cumulative impact during the construction phase.</p> <p>Traffic and Transport:</p> <p>Given the scale of the committed development, the impact to the local transport network during construction is anticipated to be minimal and temporary. As such, no inter-project cumulative impacts are anticipated.</p> <p>Socioeconomics and Human Health:</p> <p>Given the scale of the development, the committed development is anticipated to generate temporary small-scale employment during construction. As such, it is anticipated that there will be no inter-project cumulative impact during the construction phase.</p>
13	<p>The committed development overlaps with the Scheme in such a way that it could not be developed in its current form if the Scheme were to go ahead. For that reason, there would not be inter-project cumulative impacts.</p>
14	<p>Landscape and Visual:</p> <p>The Landscape and Visual Appraisal (Fairhurst, 2024) for the committed development sets out that there is likely to be a local and site-specific level impact on landscape during construction. The Landscape and Visual Impact Assessment concludes that these impacts are not anticipated to be significant. As such, no inter-project cumulative impact to landscape is anticipated.</p> <p>Visual receptors, including residential dwellings and PRoW users, within 1km of the committed development are anticipated to have visual impacts during the construction phase (Fairhurst, 2024). The Landscape and Visual Impact Assessment concludes that the visual impacts to receptors will not be significant (Fairhurst, 2024). As such, no inter-project cumulative impact to visual receptors is anticipated during construction.</p> <p>Cultural Heritage and Archaeology:</p> <p>The committed development is likely to impact the setting of heritage assets during construction due to changes to noise and traffic levels and the introduction of plant and machinery. Following the implementation of a CEMP, no inter-project cumulative impacts are anticipated.</p>

Committed Development	Inter-project Cumulative Impacts
	<p>Air Quality:</p> <p>The committed development has the potential to adversely impact air quality in the local area during construction, however this will be temporary and localised in nature. Following the implementation of a CEMP, and in consideration of the nature of the committed development and the intervening topography between the committed development and the Scheme, no inter-project cumulative impacts are anticipated.</p> <p>Water Resources and Flood Risk:</p> <p>Should the construction programmes for the committed development and the Scheme overlap, there is the potential for pollution from construction activities to affect groundwater and surface water receptors. With the implementation of a CEMP and drainage strategies for each scheme, this is expected to cause no inter-project cumulative impact.</p> <p>Land and Ground Conditions:</p> <p>During construction, there is the potential for pollution to groundwater as a result of the committed development and the Scheme. Provided that the CEMP is appropriately implemented for each scheme, it is anticipated that there will be no inter-project cumulative impact during the construction phase.</p> <p>Traffic and Transport:</p> <p>Construction traffic and vehicle movement from the committed development has the potential to impact the local transport network during construction, however this will be temporary in nature. Following the implementation of a CEMP, no inter-project cumulative impacts are anticipated.</p> <p>Socioeconomics and Human Health:</p> <p>The committed development is likely to generate temporary small-scale employment during the construction phase. As such, it is anticipated that there will be no inter-project cumulative impact during the construction phase.</p>
15	<p>Based on the information publicly available, a thorough inter-project cumulative assessment cannot be fully undertaken. Due to the nature of the committed development not being an EIA development (NEDDC, 2025), and the distance from the Scheme, it is anticipated that there will be no inter-project cumulative impacts during construction.</p>
16	<p>Landscape and Visual:</p> <p>The committed development is a large-scale scheme that would be a dominant feature in the wider landscape. As such, in consideration of the proximity of the committed development and the Scheme, it is anticipated that there will be an inter-project cumulative impact during the construction phase. This is as a</p>

Committed Development	Inter-project Cumulative Impacts
	<p>result of increased construction activity, workers compounds and partially completed structures throughout construction.</p> <p>Sensitive receptors, including residential properties and PRoW users, are likely to experience a visual amenity impact as a result of the committed development. As such, it is anticipated that there will be an inter-project cumulative visual amenity impact during the construction phase.</p> <p>Cultural Heritage and Archaeology:</p> <p>The committed development is likely to impact the setting of heritage assets during the construction phase as a result of changes to noise and traffic levels, as well as the introduction of plant and machinery. As such, inter-project impacts are anticipated for cultural heritage and archaeology during the construction phase.</p> <p>Air Quality:</p> <p>The committed development is likely to have an adverse impact to air quality during construction as a result of dust emissions and increased vehicle and plant movements. As a result, an inter-project cumulative impact to air quality is anticipated, although this will be temporary in nature.</p> <p>Water Resources and Flood Risk:</p> <p>Should the construction programmes for the committed development and the Scheme overlap, there is the potential for pollution from construction activities to affect groundwater and surface water receptors. With the implementation of a CEMP and drainage strategies for both schemes, this is expected to cause no inter-project cumulative impact.</p> <p>Land and Ground Conditions:</p> <p>During construction, there is the potential for pollution to groundwater as a result of the committed development and the Scheme. Provided that a CEMP is appropriately implemented for each scheme, it is anticipated that there will be no inter-project cumulative impact during the construction phase.</p> <p>Traffic and Transport:</p> <p>Due to the scale of the committed development, it is anticipated that there will be an adverse impact on the local highway network during construction as a result of increased construction vehicle movements. Given the proximity of the committed development and the Scheme, it is likely that there will be an overlap in the construction traffic routes. As such, an inter-project cumulative impact is anticipated for traffic and transport during the construction phase.</p> <p>Socioeconomics and Human Health:</p> <p>The committed development is likely to generate temporary employment during construction which would have a beneficial impact to the local economy. As such, no inter-project cumulative impact is anticipated.</p>

Committed Development	Inter-project Cumulative Impacts
Operation	
1	Due to the small scale of the committed development, the nature of the land use, and the intervening topography between the Scheme and the committed development, it is deemed unlikely that there will be any inter-project cumulative impacts during operation.
2	Due to the small scale of the committed development, the nature of the land use within the existing wider hospital infrastructure, and the intervening topography between the Scheme and the committed development, it is deemed unlikely that there will be any inter-project cumulative impacts during operation.
3	<p>Landscape and Visual:</p> <p>During operation, the committed development is deemed to be a sufficient distance from the Scheme, with intervening topography and surrounding similar land use, that no inter-project cumulative impacts to landscape and visual amenity are anticipated.</p> <p>Water Resources and Flood Risk:</p> <p>The committed development is located within Flood Zone 1 and a condition in the Decision Notice (CBC, 2022) sets out the requirement for a surface water management plan to be produced to minimise flood risk. As such, it is anticipated that there will be no inter-project impacts during operation.</p> <p>Land and Ground Conditions:</p> <p>During operation, it is deemed unlikely that there would be any aspects of the committed development that would lead to inter-project cumulative impacts.</p> <p>Socioeconomics and Human Health:</p> <p>The committed development will have limited socioeconomic impacts during operation due to its nature. As such, no inter-project cumulative impacts on socioeconomic and human health are anticipated.</p>
4	Due to the nature of the committed development, the nature of the land use within the wider hospital environment, and the intervening topography of Chesterfield, it is deemed unlikely that there will be any inter-project cumulative impacts during operation.
5	Due to the nature of the committed development, the nature of the land use and the intervening topography of the A617, it is deemed unlikely that there will be any inter-project cumulative impacts during operation.
6	Due to the nature of the committed development, the nature of the land use and the intervening topography of Chesterfield, it is deemed unlikely that there will be any inter-project cumulative impacts during operation.

Committed Development	Inter-project Cumulative Impacts
7	<p>Landscape and Visual:</p> <p>The committed development and the Scheme would both be located within the same local landscape character area. Given the proximity of the committed development and the Scheme, it is anticipated that there could be an inter-project cumulative impact on the local landscape character during operation.</p> <p>An inter-project cumulative visual amenity impact is anticipated for residential receptors and PRow users during the operational phase.</p> <p>Water Resources and Flood Risk:</p> <p>There is the potential for the committed development to increase flood risk in the surrounding area. Drainage and flood risk impact of the committed development during operation has been considered as part of a planning condition. As such, no inter-project cumulative impact is anticipated during operation.</p> <p>Land and Ground Conditions:</p> <p>During operation, it is deemed unlikely that there are any aspects of the committed development that would lead to inter-project cumulative impacts.</p> <p>Socioeconomics and Human Health:</p> <p>Given the nature of the committed development, operational staff numbers are assumed to be small. In addition, no permanent impacts to PRowS are anticipated. As such, no inter-project cumulative impacts are anticipated.</p>
8	<p>Due to the nature of the committed development, the nature of the land use and the intervening topography of the A617, it is deemed unlikely that there will be any inter-project cumulative impacts during operation.</p>
9	<p>Landscape and Visual:</p> <p>The committed development and the Scheme would both be located within the same local landscape character area. Given the proximity of the committed development and the Scheme, it is anticipated that there could be an inter-project cumulative impact on the local landscape character during operation.</p> <p>An inter-project cumulative visual amenity impact is anticipated for residential receptors and PRow users during the operational phase.</p> <p>Water Resources and Flood Risk:</p> <p>It is assumed that the flood risk impact of the committed development during operation will be considered as part of the developing design or as a planning condition. As such, no inter-project cumulative impact is anticipated during operation.</p>

Committed Development	Inter-project Cumulative Impacts
	<p>Land and Ground Conditions:</p> <p>During operation, it is deemed unlikely that there are any aspects of the committed development that would lead to inter-project cumulative impacts in relation to land and ground conditions.</p> <p>Socioeconomics and Human Health:</p> <p>At the time of writing, operational staff numbers are unknown, but given the nature of the committed development, these are assumed to be small. In addition, no permanent impacts to the availability of PROWs are anticipated from the Scheme. As such, no inter-project cumulative impacts are anticipated.</p>
10	<p>Due to the nature of the committed development, the nature of the land use and the intervening topography of the A617, it is deemed unlikely that there will be any inter-project cumulative impacts during operation.</p>
11	<p>Landscape and Visual:</p> <p>The committed development and the Scheme would both be located within the same local landscape character area. Despite the proximity of the committed development and the Scheme, and the nature of the committed development, it is not anticipated that there would be an inter-project cumulative impact on the landscape or visual amenity during operation.</p> <p>Water Resources and Flood Risk:</p> <p>It is assumed that the flood risk impact of the committed development during operation will be considered as part of the developing design or as a planning condition. As such, no inter-project cumulative impact is anticipated during operation.</p> <p>Land and Ground Conditions:</p> <p>During operation, it is deemed unlikely that there are any aspects of the committed development that would lead to inter-project cumulative impacts in relation to land and ground conditions.</p> <p>Socioeconomics and Human Health:</p> <p>Given the nature of the committed development, there will be no operational staff. In addition, no permanent impacts to the availability of PROWs from the Scheme are anticipated. As such, no inter-project cumulative impacts are anticipated.</p>
12	<p>Landscape and Visual:</p> <p>The committed development and the Scheme would both be located within the same local landscape character area. Despite the proximity of the committed development and the Scheme, the smaller scale nature of the committed development, in addition to its orientation and proposed screening planting, it is not</p>

Committed Development	Inter-project Cumulative Impacts
	<p>anticipated that there would be an inter-project cumulative impact on the landscape or visual amenity during operation.</p> <p>Water Resources and Flood Risk:</p> <p>It is assumed that the flood risk impact of the committed development during operation will be considered as part of the developing design or as a planning condition. As such, no inter-project cumulative impact is anticipated during operation.</p> <p>Land and Ground Conditions:</p> <p>During operation, it is deemed unlikely that there are any aspects of the committed development that would lead to inter-project cumulative impacts in relation to land and ground conditions.</p> <p>Socioeconomics and Human Health:</p> <p>Given the nature of the committed development, change to operational staff numbers are assumed to be small. In addition, no permanent impacts to the availability of PRowS are anticipated. As such, no inter-project cumulative impacts are anticipated.</p>
13	<p>The committed development overlaps with the Scheme in such a way that it could not be developed in its current form if the Scheme were to go ahead. For that reason, there would not be inter-project cumulative impacts.</p>
14	<p>Landscape and Visual:</p> <p>The committed development and the Scheme would both be located within the same local landscape character area. Despite the proximity of the committed development and the Scheme, and the similar nature of the committed development, its context within existing land use, as well as intervening topography, it is not anticipated that there would be an inter-project cumulative impact on the landscape or visual amenity during operation.</p> <p>Water Resources and Flood Risk:</p> <p>It is assumed that the flood risk impact of the committed development during operation will be considered as part of the developing design or as a planning condition. As such, no inter-project cumulative impact is anticipated during operation.</p> <p>Land and Ground Conditions:</p> <p>During operation, it is deemed unlikely that there are any aspects of the committed development that would lead to inter-project cumulative impacts in relation to land and ground conditions.</p>

Committed Development	Inter-project Cumulative Impacts
	<p>Socioeconomics and Human Health:</p> <p>Given the nature of the committed development, change to operational staff numbers are assumed to be small. In addition, no permanent impacts to the availability of PRowS are anticipated. As such, no inter-project cumulative impacts are anticipated.</p>
15	<p>Based on the information publicly available, a thorough inter-project cumulative assessment cannot be fully undertaken. Due to the nature of the committed development not being an EIA development (NEDDC, 2025), and the distance from the Scheme, it is anticipated that there will be no inter-project cumulative impacts during construction.</p>
16	<p>Landscape and Visual:</p> <p>The committed development and the Scheme would both be located within the same local landscape character area. Given the proximity of the committed development and the Scheme, it is anticipated that there could be an inter-project cumulative impact on the local landscape character during operation.</p> <p>An inter-project cumulative visual amenity impact is anticipated for residential receptors and PRowS users during the operational phase.</p> <p>Water and Flood Risk:</p> <p>There is the potential for the committed development to increase flood risk in the surrounding area. It is assumed that the flood risk impact of the committed development during operation will be considered as part of the developing design or as a planning condition. As such, no inter-project cumulative impact is anticipated during operation.</p> <p>Land and Ground Conditions:</p> <p>During operation, it is deemed unlikely that there are any aspects of the committed development that would lead to inter-project cumulative impacts.</p> <p>Socioeconomics and Human Health:</p> <p>At the time of writing, operational staff numbers are unknown, but given the nature of the committed development and the associated lack of need for full time on-site operational staff, these are assumed to be small. In addition, no permanent impacts to the availability of PRowS are anticipated. As such, no inter-project cumulative impacts are anticipated.</p>

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15. Summary

15.1 Construction Control Measures and Impacts

15.1.1 Table 15.1 summarises the key existing baseline identified for each discipline as part of this EAR. For further information on the baseline for each discipline, please refer to the corresponding chapter of this EAR.

Table 15.1 Summary of construction control measures and impacts

Discipline	Control, enhancement and monitoring measures	Level of residual impact
Ecology	<p>The Scheme boundary will be subject to fencing to ensure the works area is clearly demarcated, and no works, site personnel or machinery shall enter into designated sites or protected habitats.</p> <p>A CEMP shall be in place to manage any potential environmental effects during the construction phase.</p> <p>Works will be undertaken under a PWMS and ecological watching brief provided by the Site Ecologist/ECow.</p> <p>Opportunities for habitat retention have been iteratively incorporated into the design of the Scheme.</p> <p>Suitable native tree and hedge species local to the area will be planted as on-site woodland, scattered tree and hedgerow replacement (re-provisioning) as part of the BNG and landscape strategy.</p> <p>Vegetation removal to be carried out during the reptile active season and will avoid the winter hibernation period (October – March, inclusive). A two-stage vegetation clearance in a single direction approach will be undertaken as best practice for ecological receptors.</p> <p>Avoid removing and dismantling potential reptile hibernacula during hibernation season (November – March, inclusive).</p>	No residual impacts

Discipline	Control, enhancement and monitoring measures	Level of residual impact
	<p>Where possible, removal of vegetation will be timed outside of the bird nesting season (i.e. March to August, inclusive). If nesting birds are found to be present, the ecologist will implement a suitable buffer zone. Works in this area will be avoided until the chicks have fledged and regular monitoring by an ecologist will be undertaken to confirm that the young have fledged.</p> <p>The provision of bird boxes will also provide sheltering and roosting opportunities for a range of species.</p> <p>A pre-construction badger survey should be undertaken in suitable habitats located within 30m of the proposed works. If any construction activities are required within 30m of any active sett, it may be necessary to obtain a development licence from Natural England and/or carry out the works under a method statement and ecological supervision, with licensable activities only permitted between July and November, inclusive.</p> <p>Any excavations required for construction works should be covered at night or a soil ramp or wooden plank installed to ensure that any animals can escape.</p> <p>The suitable potential hibernation sites for hedgehogs are removed/dismantled prior to animals going into hibernation (November to March, inclusive).</p>	
Landscape and Visual	Construction will be managed by a CEMP. The CEMP will include controls around lighting, screening, vegetation retention and removal, PRoW management and reinstatement.	There will temporary adverse impacts on landscape and visual amenity during the construction phase.
Cultural Heritage and Archaeology	Construction will be managed by a CEMP. Traffic management measures will be included in the CTMP.	No residual impacts. It is noted that there is potential for buried archaeological remains relating to past industrial activity to be impacted as they are within the Site.

Discipline	Control, enhancement and monitoring measures	Level of residual impact
Air Quality	Implementation of a DMP as part of the CEMP.	Negligible adverse impacts are anticipated throughout the construction phase.
Water Resources and Flood Risk	<p>Construction will be managed by a CEMP including method statements and controls, such as an emergency spillage response plan, to protect water environment receptors, manage surface water runoff, and promote water use efficiency.</p> <p>Site drainage will be managed and attenuated.</p> <p>Any dewatering of excavations will comply with relevant permits (where applicable), and discharges to be made to ground, following suitable treatment where necessary.</p> <p>Prior to construction, site-specific ground investigations will be undertaken to identify the groundwater depth and seasonal variations. The condition of any historic mining features (e.g. soughs and shafts) will also be confirmed.</p>	There would be a low to negligible temporary impact to water environment resources.
Land and Ground Conditions	<p>Construction will be managed by a CEMP and a Construction Phase (Health and Safety) Plan.</p> <p>Update of the mining risk assessment with the information from the ground investigation.</p> <p>Should piled foundations be required it is recommended that a piling risk assessment be carried out to identify possible risks to groundwater, surface water and potentially from ground gases.</p>	There will be a temporary slight adverse to neutral impact during the construction phase.
Noise and Vibration	The residual impacts of construction noise and vibration have been scoped out of this EAR on the basis that this will be mitigated through the implementation of a CEMP and due to the temporary nature of the construction impact.	Construction noise has been scoped out of this EAR and has not been assessed.

Discipline	Control, enhancement and monitoring measures	Level of residual impact
Traffic and Transport	Construction traffic will be managed by a CTMP, covering but not limited to site access control, segregation of routes, HGV booking, traffic marshalling, delivery logistics, road condition surveys, management of abnormal load deliveries, wheel washing/dry rumble and a staff travel plan.	A negligible to slight adverse impact is anticipated during the construction phase.
Agriculture and Soils	Implementation of an SMP to protect agricultural land quality and soil resources as part of the CEMP.	No residual impact.
Socioeconomics and Human Health	Construction will be managed by a CEMP and associated management plans for dust, traffic (i.e. CTMP), PRowS, and health and safety. Adoption of mitigation measures, including the implementation of sustainable drainage, emergency spillage response plan, best practice in material storage, dewatering excavation in accordance with relevant permits and attenuated water discharges.	There will be temporary negligible beneficial impacts on socioeconomics during construction as well as negligible adverse impacts on human health during the construction phase. There will be a residual low adverse impact on PRow users.
Cumulative Impacts	Construction will be managed by a CEMP and associated management plans, including a CTMP.	No intra-project cumulative impacts are anticipated. The following inter-project cumulative impacts are anticipated: Landscape and Visual (committed developments 7, 9 and 16); Cultural Heritage and Archaeology (committed developments 9, 11 and 16); Air Quality (committed development 16); and Traffic and Transport (committed developments 7, 9 and 16).

15.2 Operational Control Measures and Impacts

15.2.1 Table 15.2 summarises the key control, enhancement and monitoring measures, and residual impacts identified for the operational phase for each discipline as part of

Table 15.2 Summary of operational control measures and impacts

Discipline	Control, Enhancement and Monitoring Measures	Level of Residual Impact
Ecology	<p>There is an existing fence around Furnace Hillock which will continue to be fenced off in the long-term and clearly segregated, thereby avoiding increases of use/higher levels of localised disturbance.</p> <p>The creation and retention of hedgerow, woodland and scrub will provide a buffer between the new substation infrastructure and surrounding Site area. This will protect biodiversity through noise reduction and provide aesthetic improvements. Suitable native tree species local to the area will be planted on-site as woodland replacement (re-provisioning) as part of the BNG and landscape strategy.</p> <p>Opportunities for habitat retention have been iteratively incorporated into the design of the Scheme.</p> <p>Habitat areas of value for amphibians will be created in the longer-term. Areas suitable for commuting and foraging will also be provided. Suitable native on-site habitat placement (re-provisioning) will be provided.</p> <p>There will be a mandatory speed limit in place to limit speeding on the access roads and within the substation. Suitable site speed limits will be determined by on-site personnel, often 10-20mph, to ensure safety for vehicles, personnel and wildlife.</p> <p>The provision of bird boxes, of various sizes and structures, will provide sheltering and nesting opportunities for a range of species.</p> <p>The Lighting Strategy will ensure landscape features including hedgerow/boundary features and valuable habitats, such as Furnace Hillock woodland, remain unlit throughout the operational phase of the Scheme.</p>	No residual impact.

Discipline	Control, Enhancement and Monitoring Measures	Level of Residual Impact
Landscape and Visual	<p>Embedded design measures including landscape and biodiversity planting and permanent PRow diversions.</p> <p>Retention and protection of existing screening vegetation.</p>	<p>Once proposed mitigation planting has matured, there will be a residual minor adverse impact to landscape.</p> <p>In terms of visual amenity for residential receptors, there are residual adverse impacts following the proposed mitigation planting maturing: Wrays Hill Farm and Laurel Farm will experience moderate to minor adverse impacts, Hall Flash Farm will experience a minor adverse impact, and Southwood Chase will experience a neutral impact. A number of additional residential receptors that are likely to experience views of the Scheme to varying degrees, which will reduce to minor to negligible adverse as vegetation matures.</p> <p>Recreational receptors will experience negligible impacts following the maturity of proposed mitigation planting, with the exception of those PRowS passing through or immediately adjacent to the Site, which will experience minor adverse impacts to visual amenity.</p>
Cultural Heritage and Archaeology	None identified.	No residual impacts.
Air Quality	None identified.	No residual impacts.
Water Resources and Flood Risk	Provision of SuDS as part of the Scheme drainage design.	There would be a low residual impact on the water environment receptors.

Discipline	Control, Enhancement and Monitoring Measures	Level of Residual Impact
Land and Ground Conditions	Provision of SuDS as part of the Scheme drainage design	There would be a slight adverse impact to groundwater. There would be a slight adverse impact to geology. No other residual impacts are anticipated for land and ground conditions.
Noise and Vibration	Acoustic enclosures for the SGTs.	No residual impacts.
Traffic and Transport	Permanent diversions of PRoWs NE5/25/1 and NE5/16/1.	There would be a slight adverse impact to PRoWs NE5/25/1 and NE5/16/1.
Agriculture and Soils	Implementation of an SMP.	No residual impacts.
Socioeconomics and Human Health	Embedded design measures, including landscape and biodiversity planting, as well as permanent PRoW diversions. Retention and protection of existing screening vegetation. EMF compliance.	There would be a low adverse impact on PRoWs NE5/25/1 and NE5/16/1. There would be a low adverse impact to physical activity. No other residual impacts for Socioeconomics and Human Health are anticipated.
Cumulative Impacts	Embedded design measures including landscape and biodiversity planting. Retention and protection of existing screening vegetation.	No intra-project cumulative impacts are anticipated. The following inter-project cumulative impacts are anticipated: Landscape and Visual (committed developments 7, 9 and 16).

Appendix A. Glossary and Abbreviations

Appendix A

Glossary and Abbreviations

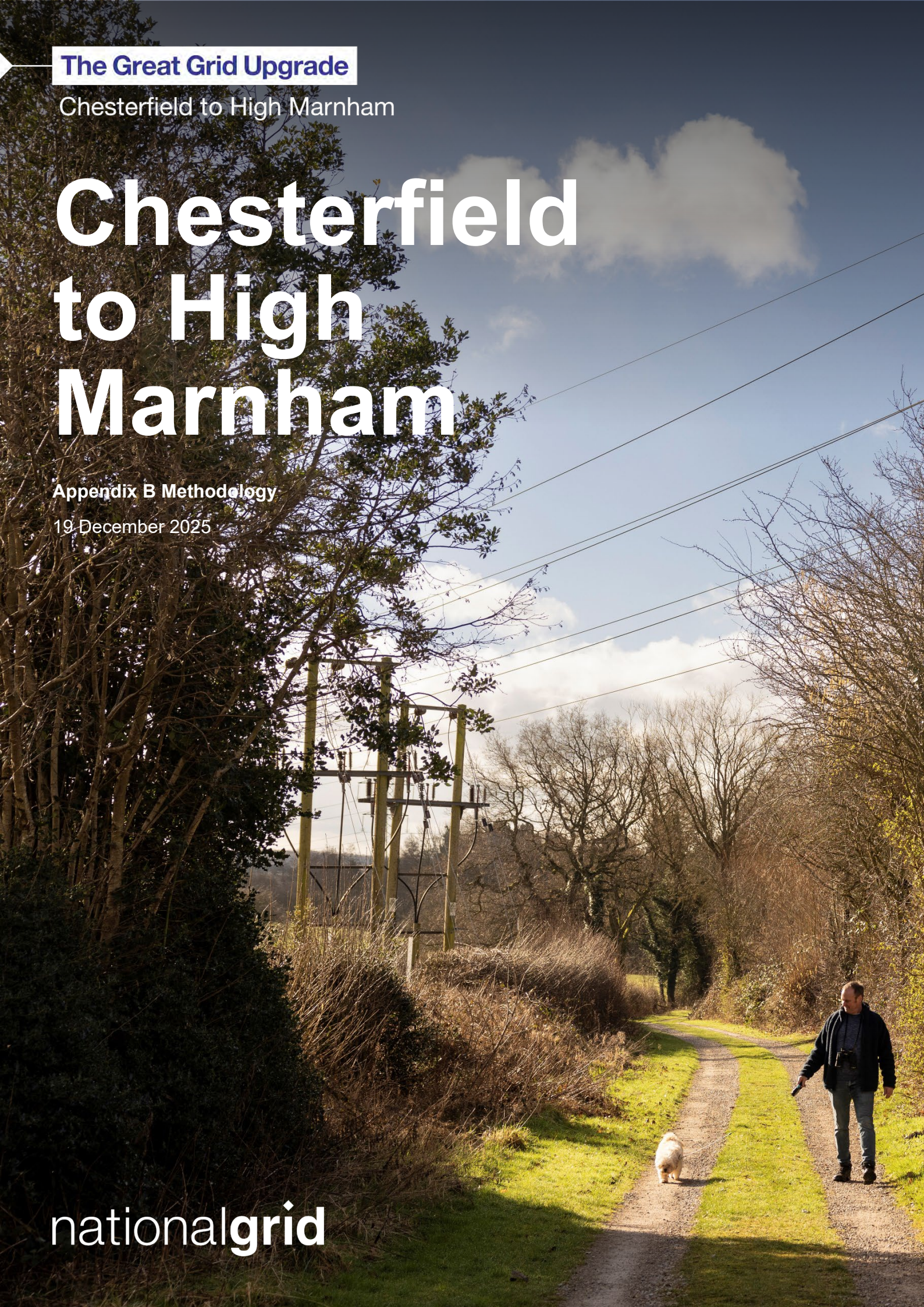
Term	Definition
AADT	Annual Average Daily Traffic
AAR	Average annual rainfall
AAWT	Annual Average Weekday Traffic
AIL	Abnormal Indivisible Load
ALC	Agricultural Land Classification
AOD	Above Ordnance Datum
AT0	Accumulated temperature
ATC	Automatic Traffic Count
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
BCT	Bat Conservation Trust
BESS	Battery Energy Storage System
BGL	Below ground level
BGS	British Geological Survey
BMV	Best and Most Versatile
BNG	Biodiversity Net Gain
BoCC	Birds of Conservation Concern
CBC	Chesterfield Borough Council
CCTV	Closed-circuit television
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CIRIA	Construction Industry Research and Information Association
CSE	Cable Sealing Ends
CTMP	Construction Traffic Management Plan
CVT	Capacitor Voltage Transformer
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMP	Dust Management Plan

Term	Definition
DNO	Distribution Network Operator
DWT	Derbyshire Wildlife Trust
EAR	Environmental Appraisal Report
ECow	Ecological Clerk of Works
eDNA	Environmental DNA
EIA	Environmental Impact Assessment
EMF	Electric and Magnetic Field
EPS	European Protected Species
FCD	Field Capacity Days
FRA	Flood Risk Assessment
GB	Great Britain
GIB	Gas Insulated Busbar
GIS	Gas Insulated Switchgear
HDV	Heavy Duty Vehicle
HGV	Heavy Goods Vehicle
HPI	Habitats of Principal Importance
IAQM	Institute of Air Quality Management
IEMA	Institute of Environmental Management and Assessment
IMD	Indices of Multiple Deprivation
INNS	Invasive Non-Native Species
LB	Listed Building
LCT	Landscape Character Type
LDV	Light Duty Vehicle
LGV	Light Goods Vehicle
LHA	Local highway authority
LPA	Local planning authority
LWS	Local Wildlife Site
NBW	Night-time Bat Walk
NCA	National Character Area
NEDDC	North East Derbyshire District Council
NO2	Nitrogen dioxide

Term	Definition
OCEMP	Outline Construction Environmental Management Plan
OCTMP	Outline Construction Traffic Management Plan
OS	Ordnance Survey
OSMP	Outline Soil Management Plan
OSWMP	Outline Site Waste Management Plan
PDAS	Planning and Design and Access Statement
pLWS	Potential Local Wildlife Site
PM	Particulate Matter
PM ₁₀	Particulate Matter less than 10 microns in diameter
PM _{2.5}	Particulate Matter less than 2.5 microns in diameter
PPE	Personal Protective Equipment
PRF	Potential Roost Feature
PRoW	Public Right of Way
PWMS	Precautionary working method statement
RNAG	Reasons for Not Achieving Good
RPE	Respiratory Protective Equipment
RV	Representative Viewpoint
SAC	Special Area of Conservation
SGT	Super grid transformer
SoPI	Species of Principal Importance
SPA	Special Protection Area
SRN	Strategic Road Network
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems
SWMP	Site Waste Management Plan
TCPA	Town and Country Planning Act
TEMPro	Trip End Model Presentation Program
WCA	Wildlife and Countryside Act
WCH	Walking, cycling and horse-riding
WFD	Water Framework Directive
ZoI	Zone of Influence

Appendix B.

Methodology

A man in a dark jacket and jeans is walking a small white dog on a leash along a gravel path. The path is flanked by green grass and dense trees. In the background, a tall power line tower stands among the trees under a blue sky with scattered clouds. The overall scene is a mix of nature and infrastructure.

The Great Grid Upgrade

Chesterfield to High Marnham

Chesterfield to High Marnham

Appendix B Methodology

19 December 2025

nationalgrid

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1. Ecology Methodology

1.1 Legislation, Policy and Guidance

1.1.1 The ecological appraisal has been undertaken in accordance with current national legislation, and national, regional and local plans and policies relating to ecology in the context of the Scheme. A summary of the relevant legislation, policies and guidance, the requirements of these policies and the Scheme response, is provided below.

Legislation

1.1.2 The following key legislation is of direct relevance to the appraisal of the Scheme.

Table 1.1 Legal framework

Legislation	Details
The Conservation of Habitats and Species Regulations 2017 (as amended) ('Habitats Regulations')	The Habitats Regulations require authorities on behalf of the Secretary of State to maintain a list of sites which are important for either habitats or species (Special Areas of Conservation (SACs) and Special Protection Areas (SPAs)) and to provide protection for these sites through designation, planning, and other controls. The Habitats Regulations make it an offence (subject to exceptions) to deliberately, kill, injure, disturb, capture, or trade in the animals listed in Schedule 2, or pick, collect, cut, uproot, destroy, or trade in the plants listed in Schedule 4. However, these actions can be made lawful through the granting of licences by the appropriate authorities (Natural England, in England). Licences may be granted for several purposes (such as science and education, conservation, preserving public health and safety), but only after the appropriate authority is satisfied that there are no satisfactory alternatives and that such actions will have no detrimental effect on the favourable conservation status of the species concerned.
Wildlife and Countryside Act 1981 as amended (WCA)	The Wildlife and Countryside Act 1981 is the main mechanism for legislative protection of wildlife in England. It gives protection to native species (particularly threatened species), their resting places and places of shelter by making it an offence to kill, injure, take, damage, destroy, sell, or possess them (with exceptions). The Act gives protection to certain species of wild plants and safeguards important habitats by making it an offence to damage or destroy certain types of designated habitats, such as Sites of Special Scientific Interest (SSSIs) and National Nature Reserves (NNRs). This Act also prohibits the spread and release of certain non-native species into the wild.
Protection of Badgers Act 1992	Badger (<i>Meles meles</i>) and their setts are protected under the Protection of Badgers Act 1992. This protects badgers and their setts by making it an offence to:

Legislation	Details
	<p>wilfully kill, injure, or take a badger;</p> <ul style="list-style-type: none"> • damage a badger sett or any part of it; • destroy a badger sett; • obstruct access to, or any entrance of, a badger sett; or • disturb a badger when it is occupying a badger sett. <p>A licence from Natural England is required for any activity that would result in obstruction, disturbance, or closure (temporarily or permanently) of an active sett. If a main sett requires closure, mitigation must be provided by the construction of an artificial sett along with proof of uptake by badgers.</p>
Countryside and Rights of Way Act 2000	<p>The Countryside and Rights of Way Act 2000 places a duty on government departments to have regard to the conservation of biodiversity and maintain lists of species and habitats for which conservation steps should be taken or promoted, in accordance with the Convention on Biological Diversity (this duty was strengthened in the Natural Environment and Rural Communities Act 2006). It also strengthens legal protection for species considered to be threatened under the WCA and increases powers for the protection and management of SSSIs.</p>
Natural Environment and Rural Communities Act 2006 (NERC Act)	<p>The NERC Act places a duty upon public bodies to maintain Section 41 lists of flora, fauna, and habitats and to consider these ecological features as a material consideration in planning. It also requires decision-makers to have regard to the conservation of biodiversity in England, when carrying out their normal functions.</p>
The Invasive Alien Species (Enforcement and Permitting) Order 2019	<p>This Order strengthens the legislation in relation to widely spread species of European Union concern; requiring effective management measures to be put in place to minimise their impacts. A person who plants or otherwise causes to grow in the wild any specimen of a species of plant which is included in Part 2 of Schedule 2 is guilty of an offence.</p>
Environment Act 2021	<p>In line with the 25 Year Plan for the Environment, new development should identify and pursue opportunities for securing measurable net gains for biodiversity and for the wider environment. The Environment Act 2021 introduces a mandatory requirement for 10 per cent biodiversity net gain for new developments to ensure that they enhance biodiversity and create new green spaces for local communities to enjoy. Integrating biodiversity net gain into the planning system will provide a step change in how planning and development is delivered. There is also a strong focus on delivering environmental net gain. This would preferably be achieved on-site, however there are options to deliver these gains off-site and this will be demonstrated via the Statutory Biodiversity Metric calculation tool.</p>

Policy

- 1.1.3 The following key planning policies are of relevance to the appraisal of the Scheme on ecology.

National policy

- 1.1.4 The National Planning Policy Framework (Ministry of Housing, Communities and Local Government (MHCLG), 2024a) sets out the Government's planning policies for England and how these are expected to be applied by local authorities within their Local Development Frameworks. Section 15: Conserving and enhancing the natural environment, covers habitats and biodiversity and provides a list of principles that local planning authorities should apply when determining planning applications. These include:
- if significant harm to biodiversity cannot be avoided, adequately mitigated or as a last resort compensated for, then planning permission should be refused;
 - developments likely to have an adverse effect on a SSSI should not normally be permitted;
 - development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland, and ancient or veteran trees) should normally be refused; and
 - developments whose primary objective is to conserve or enhance biodiversity should be supported. Opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure net gains for biodiversity.

Local policy

- 1.1.5 The following policies within the North East Derbyshire District Council Local Plan 2014 to 2034 (NEDDC, 2021) relate to biodiversity and nature conservation:
- Policy SS1: Sustainable Development:
 - This policy sets out how sustainable growth will be delivered in North East Derbyshire. It states that development proposals will need to contribute through protecting and / or enhancing the character, quality and diversity of the District's green infrastructure and local landscapes, the wider countryside and ecological and biodiversity assets.
 - Policy SDC2: Trees, Woodland and Hedgerows, sets out the following:
 - '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. Developments 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.'*

- Policy SDC4: Biodiversity and Geodiversity states:

'The Council will protect and enhance the District's natural environment and seek to increase the quantity and quality of biodiversity and geodiversity by:

- a) Protecting designated national and local sites of nature conservation importance and geodiversity value including SSSIs, LNRs, LWSs, and RIGSs as shown on the Policies Map. Development proposals affecting designated sites will not be permitted unless it can be demonstrated that significant harm can be avoided, mitigated, or as a last resort, compensated for by the development. Any proposed development that would be likely to adversely affect designated SSSI's will not be permitted.*
- b) Promoting the qualitative enhancement of all sites of biodiversity and geodiversity value (including designated SSSIs, LNRs, LWSs and RIGSs, and other sites with protected and priority species) by supporting measures that improve wildlife habitat connectivity and create new wildlife habitats. Such measures could include maintaining trees, native vegetation and improving green infrastructure for the benefit of wildlife.*
- c) Not permitting development which would adversely affect the integrity of designated sites of international importance for nature conservation (SPAs and SACs) located outside of the Plan area; except for imperative reasons of overriding public interest, and only where adequate compensatory measures are provided.'*

- Policy SDC5: Development within Conservation Areas, states:

'1. Development proposals within or impacting upon Conservation Areas will be permitted where they preserve or enhance the character or appearance of the area and its setting.

2. Development proposals will be considered in relation to how well the design and location of the proposal has taken account of:

- a) The development characteristics and context of the area, in terms of important buildings, spaces, landscapes, walls, trees, and views within, into or out of the area; and*
- b) The form, scale, size and massing of nearby buildings, together with materials of construction.'*

- Policy SDC13: Environmental Quality:

- The policy requires all development proposals to be assessed in relation to their impact on air, light, noise, ground and water pollution. The policy highlights that planning permission will be refused for any proposal where

pollution would pose an unacceptable risk to public health, quality of life or the environment.

- The policy states that development proposals will be expected to contribute positively to the water environment and its ecology and will only be permitted where they do not adversely affect surface or ground water quality in line with the requirements of the Water Framework Directive.
- For those planning applications for development with the potential to pose a risk of pollution, the policy recommends that they should be accompanied by an assessment of the likely impact of the development on environmental quality. Assessments of the risk of air, light, noise, ground or water pollution should relate to all stages of development.
- Policy ID7: Green Infrastructure
 - The policy states that development proposals should conserve and where appropriate improve and extend the Green Infrastructure Network running through and beyond North East Derbyshire.
 - Development proposals that would result in the loss or isolation of existing green infrastructure will not be permitted unless the affected site or feature does not have a significant recreational, ecological, landscape or townscape value, the affected site can be demonstrated to be surplus to local requirements, or a compensatory amount of green infrastructure of an equivalent or better quality can be provided in the local area.
 - To ensure the quality of new or improved Green Infrastructure, development proposals shall, where appropriate, incorporate Green Infrastructure as an integral part of designs at an early stage in the planning process; contribute to the character and creation of high quality and locally distinctive places and have regard to the landscape, townscape and ecological character of the locality; incorporate native species and habitats in line with Policy SDC4; and capitalise on any opportunities provided by rivers, streams, ditches, drains and canals in order to improve their ecological status.

- 1.1.6 Derbyshire County Council developed the Lowland Derbyshire Biodiversity Action Plan (Derbyshire County Council, 2011) comprising two biodiversity action plans which cover Derbyshire. It sets actions and gives targets to work towards stopping loss of biodiversity across the area.

Guidance

- 1.1.7 The Chartered Institute of Ecology and Environmental Management (CIEEM) is the leading professional membership body representing and supporting ecologists and environmental managers in the UK. CIEEM's Competency Framework (CIEEM, 2021) specifies the skills and levels of competence expected of members in the profession. All the Scheme's surveys and assessments have been undertaken by suitably qualified and experienced ecologists as per CIEEM's Competency Framework. CIEEM has developed to promote good practice in Ecological Impact Assessment (EcIA) (CIEEM, 2018). EcIA can be used for the appraisal of projects of any scale, including the ecological component of EIA. All the Scheme's surveys and assessments have been made in line with CIEEM's guidelines for EcIA.

1.1.8 National Planning Practice Guidance for Biodiversity Net Gain (MHCLG, 2024b) was first published on 14 February 2024 and was last updated on 1 May 2024. Under the statutory framework introduced by Schedule 7a of the TCPA 1990 (inserted by Schedule 14 of the Environment Act 2021), this objective is for development to deliver at least a 10 per cent increase in biodiversity value relative to the pre-development biodiversity value of the onsite habitat. This increase can be achieved through onsite biodiversity gains, registered offsite biodiversity gains or statutory biodiversity credits.

1.2 Consultation

1.2.1 Table 1.2 provides a summary of the issues raised and agreed during consultation with respect to ecology and how they have been addressed.

Table 1.2 Summary of consultation

Consultee/Date	Summary of Issues Raised/Agreed
NEDDC 16 May 2024	<p>Important Ecological Features (IEFs) – <i>‘We have reviewed the submitted metric (baseline only), the baseline habitat map and a summary of ecological receptors and proposals for further survey work. These documents are well detailed and provide a helpful level of information at this stage.’</i></p> <p>The impacts and potential effects on priority habitats and protected species have been assessed within the Environmental Appraisal Report (EAR).</p> <p>Biodiversity Net Gain – <i>‘We note a discrepancy in the classification of this woodland between the metric and the constraints document, with one classifying it as ‘other broadleaved woodland’ and one as ‘lowland mixed deciduous woodland’. The classification should be evidenced by survey data, as the type of woodland will dictate the compensation required.’</i></p> <p>The full metric will be provided, as well as an accompanying Biodiversity Net Gain Assessment that will assess and address any likely significant effects.</p> <p>The woodland discrepancy was a mistake within the Scoping Matrix document, with clear description of the habitat being of Other woodland; broadleaved and not Lowland Mixed Deciduous. Further surveys have been undertaken to verify the classification. This is detailed in the EAR report.</p> <p>Priority Habitats – <i>‘We would expect to see the habitat survey results provided within the Ecological Impact Assessment (EclA), including condition assessment sheets, to ensure accurate classification has been made. This is particularly pertinent to grassland and woodland classification. We note that condition assessment was carried out towards the end of the season (Sep/Oct 2023) and that some additional assessment is planned for May 2024 where changes have been made to the Site boundary. If either the woodland or grassland classification or condition are borderline, we would strongly advise that these are checked</i></p>

Consultee/Date	Summary of Issues Raised/Agreed
	<p>/ updated as part of the May visit to avoid further queries / delays when the application is reviewed.'</p> <p>The impacts and potential effects on priority habitats have been assessed within the EAR.</p>
	<p>Protected Species – <i>'The details provided regarding protected species seem reasonable for the most part, however we have some concern regarding ground-nesting birds. Grassland and arable land are suitable for a range of species, which suffer regular habitat loss from development. We would advise that the opportunity is taken to carry out at least one survey this year, at the earliest opportunity, to update results and ensure any ground-nesting species are fully considered.'</i></p> <p>The impacts and potential effects on protected species have been assessed within the EAR. Existing data from 2021 surveys (Grassroots Ecology, 2021) identified 28 bird species, mainly common bird species, considered to be an assemblage typical of farmland dominated by hedgerows and there remains extensive retained habitat in the wider landscape which can be utilised by farmland birds. This information was considered sufficient to scope out impact to ground nesting birds. As part of BNG enhancements, the aim is to enhance and create habitats that will provide better suitability for nesting birds.</p>

1.3 Study Area

- 1.3.1 Table 1.3 summarises the search areas used for ecological receptors with regard to the appraisal of the Scheme.

Table 1.3 Ecological receptors search area

Designation	Search Area from Site
International or European statutory designated sites	Site and within 10km of the Site
National statutory designated sites	Site and within 2km of the Site
Other statutory designated sites	Site and within 2km of the Site
Non-statutory designated sites	
Protected and notable species	
Invasive non-native species	
Granted European Protected Species	
Mitigation (EPSM) licences	
Protected and notable habitat (including ancient woodland)	Site and within 200m of the Site

1.4 Surveys

Desk Study

- 1.4.1 The desk study, originally undertaken in April 2023 and updated in March 2025, comprised a review of existing available information including the following:
- Multi-Agency Geographical Information for the Countryside (Department for Environment, Food and Rural Affairs (Defra), 2025) was used to search for statutory designated sites of nature conservation value, granted EPSM licence applications within the last 10 years, ancient woodland, and Habitats of Principal Importance (HPI) listed under Section 41 of the Natural Environment and Rural Communities Act 2006.
 - Ordnance Survey (OS) mapping and aerial photography were studied to place habitats within the study area in the wider context; identify potential ecological features that may not be evident on the ground during the field survey; and identify potential barriers to animal movements (such as road networks, built development and major watercourses) (OpenStreetMap, 2025).
 - The Derbyshire Biological Records Centre was approached to provide ecological records of protected and notable species, habitats and non-statutory designated sites within 2km of the Site. Only species recorded within the last 20 years were included in this assessment.

Site Surveys

Habitat survey

- 1.4.2 An Extended Phase 1 survey was conducted between March and September 2023. An updated walkover was conducted in April 2025, to ensure the baseline conditions of the Site had not changed. The surveys followed methodology in line with the Guidelines for Preliminary Ecological Appraisal (CIEEM, 2017). These surveys included searches of the Site for field signs of protected species and species of principal importance.
- 1.4.3 A UK Habitat Classification (UKHab) survey was undertaken at the same time as the Extended Phase 1 survey, in compliance with the UKHab guidance documents (UKHab Ltd, 2023). Primary habitats on the Site were classified using Level 3 and Level 4 of the UKHab hierarchy.

Invasive non-native species

- 1.4.4 The invasive non-native species (INNS) surveys involved walking across the Site and recording any evidence of INNS presence listed on Schedule 9 of the WCA 1981 or The Invasive Alien Species Order (Enforcement and Permitting) 2019. This survey was conducted September 2023 while undertaking the Extended Phase 1 survey and updated during surveys in April 2025.

Great crested newt

- 1.4.5 The aim of the surveys was to assess waterbodies within 500m of the Site to determine their suitability to support great crested newt (*Triturus cristatus*) and to undertake, where appropriate, additional surveys to determine the presence/absence of great crested newt in order to inform mitigation relating to the Scheme.
- 1.4.6 Initially four ponds were scoped into the assessment during a review of OS Mapping (OpenStreetMap, 2023) and aerial imagery (Google, 2023). Only one pond was found to be potentially suitable for great crested newt during the field surveys. The pond (Pond 1) was located approximately 240m south east of the Site. A Habitat Suitability Index assessment was undertaken following best practice guidance (Amphibian and Reptile Groups of the UK, 2010) and was also subject to an environmental DNA (eDNA) test for great crested newt, in accordance with guidance published by Biggs et al. (2014). These surveys were completed by suitably qualified Arcadis ecologists in June 2023.

Roosting bats

- 1.4.7 All trees, within and immediately adjacent to the Site, were subject to an external visual assessment for suitability to support roosting bats, undertaken from ground-level. The initial ground level tree assessment (GLTA) undertaken in March 2023 was undertaken using the Bat Conservation Trust (BCT) Best Practice Guidelines 3rd edition (Collins, 2016), as these were the most up to date guidelines at the time of the survey. A day walkover to update the baseline conditions on site was undertaken in April 2025, following the Best Practice Guidelines 4th edition (Collins, 2023).
- 1.4.8 Where the GLTA and daytime walkover categorised trees as having potential roost features (PRF), a more detailed assessment was required to record characteristics and re-categorise the PRFs following the updated guidance (Collins, 2023), through a single PRF aerial inspection survey. The PRF aerial inspection survey to re-categorise PRF trees and identify hibernation potential was undertaken in January 2024 and May 2025 via roped tree climbing by staff certified to both climb trees and perform aerial rescues and led by a surveyor who held a Natural England bat survey licence.
- 1.4.9 In accordance with BCT Guidelines (Collins, 2023), where it was not possible to undertake further surveys through aerial inspection due to health and safety concerns, dusk emergence surveys determined the presence/ likely absence of roosting bats on PRF-M trees.
- 1.4.10 As per the BCT Guidelines (Collins, 2023), trees re-categorised as PRF-M are viable for multiple bats and have the potential to be used as a maternity roost. Trees categorised as PRF-M were subject to three aerial close inspections in May, June and July 2025 by a bat licensed surveyor.
- 1.4.11 Further details on the methodology can be found within Appendix F, Chesterfield Substation and Overhead Lines Ecology Report.

Commuting and foraging bats

- 1.4.12 In accordance with the BCT Guidelines (Collins, 2023), three night-time bat walks were undertaken. A pre-determined transect was followed, taking full spectrum acoustic recordings and observations of any commuting and foraging bats within the Site in September 2023, April 2024 and June 2024.
- 1.4.13 Automated static monitoring surveys were also undertaken on Site in accordance with the BCT Guidelines (Collins, 2023). Two static bat detectors were positioned at strategic locations according to a 'judgemental' sampling protocol in order to target areas of the Site that bats were more likely to use. The static bat detectors were left to record for a minimum of five nights on a seasonal basis in May, August and September 2024.

Badger

- 1.4.14 Evidence of badger within and immediately adjacent to the Site was surveyed concurrently with the Extended Phase 1 survey in 2023 and during the updated survey in April 2025. The identification of badger field signs followed standard methodology detailed in Surveying Badgers (Harris, Cresswell, & Jefferies, 1989). This included surveying for badger setts, latrine/dung pits, foraging marks, feeding signs and pathways.

1.5 Appraisal Approach

Method of Assessment

- 1.5.1 The EclA method has followed the current applicable guidance, including the CIEEM Guidelines for EclA (CIEEM, 2018).
- 1.5.2 The current guidance on EclAs (CIEEM, 2018) recommends that all ecological factors that occur within a 'zone of influence' (Zol) for a proposed development are investigated. The Zol is variable depending on the ecological receptors affected and is commonly decided using experience and professional judgement.
- 1.5.3 The following assessment process, which will cover all phases of the Scheme, involves:
- determining the importance of ecological features affected, through survey and/or research and with reference to available contextual information;
 - assessment of impacts potentially affecting important features;
 - characterisation of the impacts, e.g. extent, magnitude, duration, reversibility, timing and frequency; and
 - identification of cumulative impacts.
- 1.5.4 The assessment of impacts should take into account the baseline conditions to allow a description of how these will change as a result of the Scheme and associated activities and the identification of cumulative impacts arising from the proposal and other relevant developments.

1.6 Limitations and Assumptions

1.6.1

The following assumptions and limitations are relevant to the appraisal of ecology. Any specific limitations to the survey effort are noted within the relevant technical appendices.

- A precautionary approach has been taken in the prediction of impacts. Where there is any doubt, a species will be assumed present, and an impact will be given the higher level of significance.
- Field surveys are limited by a variety of factors which affect the presence of flora and fauna (i.e., climatic variation, season and species behaviour). A lack of evidence of a protected species during a survey does not mean that the species is absent; hence the survey also records and assesses the ability of habitats to support such species. The time frame in which the survey is implemented provides a snapshot of activity within the survey area and cannot necessarily detect all evidence of use by a species. The initial habitat survey at the Site was undertaken in March 2023, at a time when many floral species would not be in flower and as such, may be more difficult to identify. However, further visits to the Site were made in September 2023 and April 2025, ensuring that the surveys were carried out at different times of the year including within the optimal season to add robustness to the data collected. Furthermore, the study does not intend to provide an exhaustive species list and it is considered that the habitats present within the Site could be appropriately identified and a suitable conservation value assigned at these times of year.
- During the great crested newt surveys on Pond 1, although approximately 80 per cent of the pond edge was accessible, the pond margins were shallow (maximum 10 cm) and very silty, and the water surface was completely covered with duckweed (*Lemna minor*). This posed difficulty when attempting to collect clear water samples, however these were still collected and successfully tested without contamination. In addition, the dense bramble meant that some areas of Pond 1 could not be accessed, therefore 100 per cent pond coverage was not possible, however, sufficient coverage was made, thus samples collected were reliable.
- The second night-time bat walk survey undertaken in April 2024, as well as 1 June and 11 September static detector surveys, were within sub-optimal conditions which was unusual for the time of year with the temperature being less than 10°C (8°C) at the start of the survey with some patches of rain. Bats were still recorded during the surveys and as the Site was of low suitability to foraging and commuting bats, this is unlikely to affect its suitability status for foraging and commuting bats.
- The automated static detector surveys recorded less than the required five nights of data, due to detector malfunctions and land access limitations. During the spring deployment at both locations, the data were standardised to bat passes per hour, so this was not considered a limitation and constraint to have impacted the robustness of the baseline data.
- Based on the BTC Good Practice Guidelines (Collins, 2023), emergence surveys to determine presence/absence on PRF-M trees should be undertaken May to September, with at least two of surveys between May and August. Although no surveys were undertaken later than July, this is unlikely to affect the suitability status of the Site for roosting bats as the surveys were still spread out to sample as much of the recommended survey period as possible, at least three weeks apart and within the core maternity season, therefore maximising the possibility of detecting a maternity roost.

References

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2. Landscape and Visual Methodology

2.1 Legislation, Policy and Guidance

- 2.1.1 This appraisal has been undertaken in accordance with current national legislation, and national, regional and local plans and policies relating to landscape character and visual amenity matters in the context of the Scheme. A summary of the relevant legislation, policies and guidance, the requirements of these policies and the Scheme response is provided below.

Legislation

International

- 2.1.2 The UK is a signatory to the European Landscape Convention (ELC) (Council of Europe, 2000) which was ratified in 2006 and became binding in the UK from 1 March 2007.
- 2.1.3 The Convention is not an EU Directive, rather countries that ratify the Convention make a commitment to upholding the principles it contains within the context of their own domestic legal and policy frameworks.
- 2.1.4 There is no UK legislation specifically covering landscape or visual amenity, but the spirit of the ELC is carried through in planning policy.
- 2.1.5 Landscape is defined in the ELC as:
- ‘an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors.’*
- 2.1.6 2.1.6 Furthermore, it recognises that all landscapes are potentially important, irrespective of location or condition – signatories acknowledge:
- ‘...that the landscape is an important part of the quality of life for people everywhere: in urban areas and in the countryside, in degraded areas as well as in areas of high quality, in areas recognised as being of outstanding beauty as well as everyday areas.’*

National

- 2.1.7 The following legislation relates specifically to planning matters associated with energy infrastructure:
- Overarching National Policy Statement for Energy (EN-1) (Department for Energy Security & Net Zero (DESNZ), 2024a); and
 - National Policy Statement for Electricity Networks Infrastructure (EN-5) (DESNZ, 2024b).

Policy

National

- 2.1.8 The National Planning Policy Framework (NPPF) (MHCLG, 2024) attaches importance to the character of the built environment, emphasising that developments should add to the overall quality of the area, respond to local character and history, and reflect the identity of local surroundings and materials. The policies that are most relevant to landscape and views are as follows.
- 2.1.9 Section 12: Achieving well-designed places:
- Paragraph 135 sets out how planning policies and decisions should ensure that developments are sympathetic to local character and history, including the surrounding built environment and landscape setting, while not preventing or discouraging appropriate innovation or change.
- 2.1.10 Section 15: Conserving and Enhancing the Natural Environment
- Paragraph 187 states that the planning system should contribute to and enhance the natural and local environment by (inter alia):
 - protecting and enhancing valued landscapes; and
 - minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.
 - Paragraph 188 indicates that plans should distinguish between the hierarchy of international, national and locally designated sites and allocate land with the least environmental or amenity value, where consistent with policies in the Framework.
 - Paragraph 198 states that planning policies and decisions should limit the impact of light pollution from artificial light on local amenity.

Local

- 2.1.11 The majority of the study area lies within the administrative boundary of North East Derbyshire District Council with a minor extent in the north and the east lying within the administrative boundary of Chesterfield Borough Council.

North East Derbyshire Local Plan

- 2.1.12 North East Derbyshire Local Plan 2014-2034, adopted 2021 (North East Derbyshire District Council, 2021), sets out the council's policies and proposals to plan and manage growth and development, and to achieve the Plan's vision for North East Derbyshire.
- 2.1.13 Below are the key policy requirements from the adopted North East Derbyshire Local Plan with respect to Design, Landscape Character and Green Infrastructure.
- 2.1.14 Policy SS1: Sustainable Development
- 'In order to contribute to sustainable development in North East Derbyshire, development proposals will: [inter alia] 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.'

2.1.15 Policy SDC3: Landscape Character

'Proposals for new development will only be permitted where they would not cause significant harm to the character, quality, distinctiveness or sensitivity of the landscape, or to important features or views, or other perceptual qualities such as tranquillity.'

Development proposals should be informed by, and be sympathetic to, the distinctive landscape areas identified in the Derbyshire Landscape Character Assessment and the Areas of Multiple Environmental Sensitivity (AMES), or any successor document(s), and contribute, where appropriate, to the conservation and enhancement, or restoration and re-creation of the local landscape taking into account its wider landscape character type.

Planning permission will not be granted for development outside the Peak District National Park which would damage or significantly affect the National Park purposes or its valued characteristics.'

2.1.16 Policy SS9: Development in the Countryside

'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.'

Chesterfield Borough Local Plan

2.1.17 Chesterfield Borough Local Plan, adopted in 2020 (Chesterfield Borough Council, 2020), sets out the council's policies and proposals to plan and manage growth and development, and to achieve the Plan's vision for Chesterfield.

2.1.18 Policy CLP15: Green Infrastructure states:

'Chesterfield borough's green infrastructure network will be recognised at all levels of the planning and development process with the aim of protecting enhancing, linking and managing the network, and creating new green infrastructure where necessary.'

Development proposals should demonstrate that they will not adversely affect, or result in the loss of, green infrastructure, unless suitable mitigation measures or compensatory provision are provided.

Development proposals should, where relevant:

- a) not conflict with the aim and purposes of the Green Belt (as set out in the NPPF); and*
- b) not harm the character and function of the Green Wedges and Strategic Gaps; and*
- c) enhance connectivity between, and public access to, green infrastructure; and*
- d) (i) protect and enhance access to the multi-user trails network as shown on the Policies Map; and*

- (ii) increase the opportunities for cycling, walking and horse riding; and
- e) enhance the multi-functionality of the Borough's formal and informal parks and open spaces; and
- f) protect or enhance Landscape Character; and
- g) increase tree cover in suitable locations in the borough to enhance landscape character, amenity and air quality; and
- h) where new green infrastructure is proposed, there must be clear funding and delivery mechanisms in place for its long-term management and maintenance, prior to the development commencing.

Where necessary and appropriate development will be expected to make a contribution through planning obligations or CIL towards the establishment, enhancement and on-going management of green infrastructure by contributing to the development of a strategic green infrastructure network within Chesterfield Borough.'

2.1.19 Policy CLP 20: Design states:

'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.'

All development will be expected to:

- 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;*
- n) be able to withstand any long-term impacts of climate change.'*

Planning Practice Guidance (PPG)

2.1.20 Natural environment (MHCLG, 2025)

- Landscape character: The PPG advises that local plans should include policies that protect and enhance the intrinsic character and beauty of the countryside. Landscape character assessments and sensitivity studies should inform planning decisions to ensure that developments are sensitive to the landscape setting; and
- Valued landscapes: The PPG highlights that valued landscapes, particularly those with statutory designations (such as National Parks and Areas of Outstanding Natural Beauty), should be given strong protection, in line with the NPPF's requirements.

2.1.21 Design: process and tools (MHCLG, 2019)

- Context and local distinctiveness: The PPG advises that developments should be sympathetic to the local landscape and visual character, ensuring that new proposals respect the local distinctiveness and landscape context.
- Visual impact: Design guidance emphasises that proposals should minimise adverse visual impacts on both the immediate and wider surroundings. The PPG encourages using techniques such as planting, green infrastructure and sensitive design to mitigate these effects.

2.1.22 The following Technical Support Documents from Derbyshire County Council have also been considered.

2.1.23 Technical Support Document 1 - Areas of Multiple Environmental Sensitivity (AMES) (Derbyshire County Council, 2013a):

- The council identified AMES based upon three key indicators - ecology, historical landscape and visual unity. The study identifies areas of 'primary sensitivity', considered to be the most sensitive areas of landscape, which are most likely to be negatively affected by change or development. In these areas, there will be a strong focus on the protection and conservation of their environmental assets. Areas of 'secondary sensitivity' are still considered to have environmental sensitivities but are potentially weaker in one area. In these areas, the focus will be on management (conservation and enhancement), maintaining those features of existing value but also addressing those in decline (e.g. through landscape restoration and habitat creation).

- In North East Derbyshire, the AMES study identifies the key areas of primary sensitivity in the Peak Fringe.
- The substation Site and the tie-in works do not fall under any of the key areas of

2.1.24 Technical Support Document 2 – Tranquillity (Derbyshire County Council, 2013b):

- Within the landscape context, the council prepared a tranquillity map for Derbyshire which will be a material consideration when determining proposals under Policy SDC3 in the North East Derbyshire Local Plan 2014-2034.
- The Scheme fall within a Landscape Description Unit (LDU) which holds a score ranging between -46 to -18.
- The mean (average) value within this range is -18. In strategic planning terms it is considered that all LDUs with values above or equal to the mean i.e. the top three bands, are considered significant with respect to tranquillity. Therefore, the Site is not the most tranquil.

Guidance

2.1.25 The following guidance has been used during the writing of the appraisal.

Guidelines for Landscape and Visual Impact Assessment, 3rd Edition

2.1.26 The Landscape Institute is the governing body for the profession of landscape architects. With the Institute of Environmental Management and Assessment (IEMA), it published the third edition of the Guidelines for Landscape and Visual Impact Assessment (GLVIA3) (Landscape Institute and IEMA, 2013) which sets out the principles for assessing the landscape and visual effects of developments and their significance; and provides guidance on establishing methodologies for undertaking such assessments. This guidance document forms the basis of the Landscape and Visual Impact Assessment (LVIA) methodology.

2.1.27 Accompanying GLVIA3, the Landscape Institute prepared a ‘Statement of Clarification 1/13 10-06-13’ and guidance upon the ‘Visual Representation of Development Proposals 06/19’.

2.1.28 The Landscape Institute provided the guidance ‘Assessing Landscape Value Outside National Designations’ (Landscape Institute, 2021). Within this document, landscape value is defined as ‘the relative value or importance attached to different landscapes by society on account of their landscape qualities.’

The Horlock Rules

2.1.29 The Horlock Rules (The National Grid Company plc, 1989) is subtitled Substations and the Environment: Guidelines on Siting and Design.

The Holford Rules

2.1.30 The Holford Rules (The National Grid Company plc, 1959) provide guidelines on overhead line routeing.

2.2 Consultation

- 2.2.1 Table 2.1 provides a summary of the issues raised and agreed during consultation with respect to landscape character and visual amenity matters and confirms how they have been addressed.

Table 2.1 Summary of consultation

Consultee/Date	Summary of Issues Raised/Agreed
Principal Planning Officer at North East Derbyshire District Council 27 November 2023	Viewpoints of the Site were requested from high points at Grassmoor, North Wingfield, the bridge on the B6425 which crosses the A61 at Temple Normanton and when driving along Calow Lane and Calow Green approaching the Site from the east. Localised views from Hallflash Lane to be considered, along with the changes required around the edges of the Site in this location. Any viewpoints will have to take into account the scale of the proposed structures on Site.

2.3 Study Area

- 2.3.1 The study area for Landscape and Visual matters comprises a 3km offset from the Scheme Boundary. This has been established through analysis of the Zone of Theoretical Visibility (ZTV) plan (presented as Figures 5.4 and 5.5 in Appendix E) and the subsequent fieldwork undertaken.

2.4 Surveys

- 2.4.1 A desk-based survey of all potential Landscape and Visual receptors has been undertaken, followed by a field survey of publicly accessible areas (Public Rights of Way (PRoWs), public highways and public open space, etc.) within the study area in December 2023 and subsequently in May 2025.
- 2.4.2 The field work allowed the ground truthing of the findings of the ZTV and identified likely visual receptors which might be affected by the Scheme. The location of viewpoints from publicly accessible land, that are representative of these receptors are shown on Figure 5.6 in Appendix E.

2.5 Appraisal Approach

Overview

- 2.5.1 This section outlines the methodology for assessing the likely effects upon landscape character and visual amenity receptors during the construction and operation phases of the Scheme.
- 2.5.2 The methodology for the LVIA has been prepared in accordance with GLVIA3 (Landscape Institute and IEMA, 2013). The guidance contained within GLVIA3 is not prescriptive but instead seeks to establish certain principles that would help achieve a degree of consistency with regard to the production of such assessments. The key steps of the methodology are set out below.

- 2.5.3 In line with paragraph 1.15 of GLVIA3 this LVIA distinguishes between ‘impact’ (defined as the action being taken), and ‘effect’ (defined as the change resulting from that impact upon the sensitivity of a receptor). The process is referred to as ‘impact assessment’ but any changes identified as likely to arise from the Scheme are referred to as ‘effects’.
- 2.5.4 The assessment includes a combination of objective and subjective judgements. To avoid making assumptions regarding people’s expected responses, subjective judgements are avoided where possible, focusing instead upon what objectively will be experienced. Given the nature of landscape character and people’s differing connections with it, plus the differences between people’s expectations with regard to visual amenity, reasoned professional experience is required where subjective judgements are necessary.

Establishing Baseline Conditions

- 2.5.5 The establishment of the assessment’s baseline conditions has entailed:
- the gathering and understanding of published information on the landscape character, nature and value of the Site and its surrounds;
 - determination of an initial LVIA study area from which the Scheme may be visible, through the preparation of the ZTV;
 - identification of different groups of people who may experience views of the Scheme (the visual receptors) and the nature of their existing views, visual experience and their visual amenity;
 - identification of landscape receptors (areas of identifiable character), and their characteristics from a combination of analysis of published sources, research and field work;
 - visits to the Site and across the study area to publicly accessible areas nearest to the identified receptors; and
 - input into the planning of the Scheme as part of an iterative design process to ensure likely adverse effects are identified and where possible avoided, reduced, abated and/or compensated for, with mitigation measures that are embedded into the Scheme.

Landscape Character Baseline Study Methodology

- 2.5.6 The baseline study identified the existing character of the landscape, its constituent elements, features and its geographical and historical context. It assessed the condition of the landscape, the way it is experienced, the value attached to it and its susceptibility to change. The assessment of susceptibility to change examined whether the landscape receptor could accommodate the Scheme without significant changes to local character.
- 2.5.7 The identification of character areas was informed by published character assessments: The National Character Area (NCA) profiles published by Natural England provided the wider landscape context of the Site and published local landscape character assessments provided a more regional and local context. The

findings of the desk study were reviewed in conjunction with the Site survey to identify local and concentrated landscape character areas, which can be defined as broadly homogenous units of distinct features and elements.

2.5.8 The assessment considers:

- physical influences on the landscape resource – geology, soils, landform, drainage and water bodies;
- influence of human activity – land use, land management, the character of settlement and buildings, the pattern and type of fields and enclosure; and
- aesthetic and perceptual aspects of the landscape – scale, complexity, openness, tranquillity and wildness.

Landscape Resource/Receptors

2.5.9 The landscape resource describes the physical and perceptible nature of areas and places and the inherent features which give them their distinctive character. Visual amenity is a linked but separate resource which considers the views experienced by people within the landscape resource.

2.5.10 The assessment considers the effects upon identified areas of distinct landscape character within the study area, and in particular upon their key landscape components, characteristics, and perceptual and aesthetic qualities.

Landscape receptor susceptibility

2.5.11 ‘*Susceptibility*’ is defined in GLVIA3 (paragraph 5.40) (Landscape Institute and IEMA, 2013) as ‘*the ability of the landscape receptor (whether it be the overall character or quality/condition of a particular type or area, or an individual element and/or feature, or a particular aesthetic and perceptual aspect) to accommodate the proposed development without undue consequences of the baseline situation...*’.

2.5.12 Reasoned professional judgements on the susceptibility of landscape receptors are recorded as high, moderate or low. The descriptions of these are shown in Table 2.2.

Table 2.2 Susceptibility of landscape receptors

Susceptibility	Description
High	The landscape receptor is less able to accommodate the type of change that the Scheme may bring about without undue negative consequences to the baseline situation. Attributes that make up the character of the landscape offer limited opportunities for accommodating the change without its key characteristics being fundamentally altered, leading to a different landscape character.
Moderate	The landscape receptor is partly able to accommodate the type of change that the Scheme may bring about without undue negative consequences to the baseline situation. Attributes that make up the character of the landscape offer some opportunities for accommodating the change without its key characteristics being fundamentally altered.
Low	The landscape receptor is more able to accommodate the type of change that the Scheme may bring about, without undue negative consequences to the baseline situation. Attributes that make up the character of the landscape are resilient to being changed by the Scheme.

2.5.13 The ‘susceptibility’ that is determined is not absolute and relates to the type of change that is proposed. As a particular landscape receptor may exhibit differing levels of susceptibility, a narrative commentary is provided to describe and justify the indicative grading levels ascribed to that or the intermediate grading between them. Where intermediate ratings are given, e.g. Low/Moderate, this indicates a grading that is both less than Moderate and more than Low, rather than one which varies across the range.

2.5.14 The use of intermediate ratings in this way applies to all other similar categorisations across the rest of the methodology.

Landscape receptor value

2.5.15 In contrast to susceptibility, the categorisation of landscape ‘value’ of a landscape receptor relates purely to its existing baseline, and as such is independent of any development proposal.

2.5.16 ‘Value’ is defined in GLVIA3 (paragraph 5.19) (Landscape Institute and IEMA, 2013) as ‘...the relative value that is attached to different landscapes by society, bearing in mind that a landscape may be valued by different stakeholders for a whole variety of reasons.’

2.5.17 GLVIA3 goes on to state that ‘a review of existing landscape designations is usually a starting point in understanding landscape value, but the value attached to undesignated landscapes also needs to be carefully considered and individual elements of the landscape – such as trees, buildings or hedgerows may also have value. All need to be considered where relevant’.

2.5.18 Paragraph 5.20 of GLVIA3 indicates the following might contribute to landscape value:

- information about areas recognised by statute such as National Parks and Areas of Outstanding Natural Beauty;
- local planning documents for local landscape designations;
- information on features such as Conservation Areas, listed buildings, Tree Preservation Orders, important hedgerows, historic or cultural sites;
- art and literature, identifying value attached to particular areas or views; and
- material on landscapes of local or community interest, such as local green spaces, village greens or allotments.

2.5.19 Para 2.3.2 in the Landscape Institute Technical Guidance Note 02/21 states that ‘GLVIA3 recognises that landscape value is not always signified by designation: ‘the fact that an area of landscape is not designated either nationally or locally does not mean that it does not have any value’ (paragraph 5.26). GLVIA3 recommends that when undertaking a LVIA/LVA in an undesignated area, landscape value should be determined through a review of existing assessments, policies, strategies and guidelines and, where appropriate, by new survey and analysis (paragraphs 5.27 and 5.28). It is recommended that the process for identifying landscape value outside nationally designated areas is based upon a structured and transparent assessment process including community-based evidence where practical to do so.’ Section 2.3 Assessing Landscape Value Outside National Designations (Landscape Institute, 2021). Taking the guidance into account, the relative value of each landscape receptor has been determined using the eight criteria identified within Box 5.1 of GLVIA3. The value of each criterion has been graded as ‘High’, ‘Moderate’ or ‘Low’. The criteria and value grades are described in Table 2.3.

Table 2.3 Landscape receptor value

Criteria (from GLVIA3, Box 5.1)	Grade	Description
‘Landscape quality (condition): A measure of the physical state of the landscape. It may include the extent to which typical character is represented in individual areas, the intactness of the landscape and the condition of individual elements.’	High	Landscape in good condition with intact elements that are well-managed.
	Moderate	Landscape is in fair condition with some intact elements and limited signs of management.
	Low	Landscape is in poor condition with few intact elements and limited signs of management.
‘Scenic quality: The term used to describe landscapes that appeal primarily to the senses (primarily, but not wholly the visual senses).’	High	Landscape is of high scenic quality, usually recognised in some form of landscape designation (local or national).
	Moderate	Landscape is of moderate scenic quality.
	Low	Landscape is of low scenic quality.
‘Rarity:	High	Landscape has several rare elements or characteristics.

Criteria (from GLVIA3, Box 5.1)	Grade	Description
<i>The presence of rare elements or features in the landscape or the presence of rare characteristics.'</i>	Moderate	Landscape has few rare elements or characteristics.
	Low	Landscape has no rare elements or characteristics.
<i>'Representativeness: Whether the landscape contains a particular character and/or features or elements which are considered particularly important examples.'</i>	High	The area displays most of the characteristics of the corresponding identified area of distinct landscape character.
	Moderate	The area displays some of the characteristics of the corresponding identified area of distinct landscape character.
	Low	The area displays few or none of the characteristics of the corresponding identified area of distinct landscape character.
<i>'Conservation interests: The presence of features of wildlife, earth science or archaeological or historical interest can add to the value of the landscape as well as having value in their own right.'</i>	High	Landscape has several different conservation interests, often of national or international importance.
	Moderate	Landscape has some conservation interests, often of regional or local importance.
	Low	Landscape has few or no conservation interests.
<i>'Recreation value: Evidence that the landscape is valued for recreational activity where experience of the landscape is important.'</i>	High	Landscape is highly valued for recreation, likely to have many PRow's and potentially including some national trails or national cycle routes and/or a well-used destination public open space.
	Moderate	Landscape is locally valued for recreation, likely to have PRow's and cycle routes, and local/neighbourhood public open spaces.
	Low	Landscape is not greatly valued for recreation and is likely to be lacking in PRow's or public open space.
<i>'Perceptual aspects:</i>	High	Landscape has an overwhelming sense of aesthetic quality, low levels of human influence, and/or high sense of tranquillity/remoteness.

Criteria (from GLVIA3, Box 5.1)	Grade	Description
<i>A landscape may be valued for its perceptual qualities, notably wilderness and/or tranquillity.'</i>	Moderate	Landscape has a moderate sense of aesthetic quality, moderate levels of human influence, and/or is moderately tranquil/remote.
	Low	Landscape has a low degree of aesthetic quality; human influence is readily apparent and/or is not considered particularly tranquil or remote.
'[Cultural] Associations: <i>Some landscapes are associated with particular people, such as artists or writers, or events in history that contribute to perceptions of the natural beauty of the area.'</i>	High	Landscape has strong associations with people, literature or historic events that link directly with the characteristics and landscape elements/features of the area.
	Moderate	Landscape has associations with people, literature or historic events that link with the characteristics and elements of the area but do not necessarily rely solely on them.
	Low	Landscape has no associations that link with the characteristics and landscape elements/features of the area.

2.5.20 Based upon the considerations of each criterion set out in Table 2.3, a reasoned professional judgement is made as to relative overall 'value' of each landscape receptor, using the gradings high, moderate, low, or where necessary, intermediate grades between these. As a particular landscape receptor may exhibit differing levels of value, a narrative commentary is provided to describe and justify the indicative grading level ascribed to that.

Landscape receptor sensitivity

2.5.21 GLVIA3 (paragraph 3.26) (Landscape Institute and IEMA, 2013) states that the sensitivity of the landscape receptors identified should be determined by consideration of the 'susceptibility' of the receptor with the receptor's relative 'value', i.e., Landscape Sensitivity = Landscape Susceptibility + Landscape Value.

2.5.22 The values for susceptibility and value are considered, by use of reasoned professional judgement, to derive an overall sensitivity for each receptor – graded as per the criteria set out in Table 2.4.

2.5.23 The sensitivity that is determined is not absolute and relates to the type of change that is proposed. As a particular landscape receptor may exhibit differing levels of sensitivity, a narrative commentary is provided to describe and justify the indicative grading levels ascribed, or the intermediate grading between them.

Table 2.4 Sensitivity of landscape receptors

		Value of the Landscape Receptor (Indicative)		
		High	Moderate	Low
Susceptibility to change	High	High	Moderate/High	Moderate
	Moderate	Moderate/High	Moderate	Moderate/Low
	Low	Moderate	Moderate/Low	Low

Visual Receptors

- 2.5.24 This part of the assessment is concerned with potential effects upon the visual amenity of specific groups of people (the visual receptors) within the study area as a result of the Scheme. This includes groups such as residents, those in their place of work, those travelling through the study area, and recreational users of publicly accessible areas, etc.
- 2.5.25 The assessment of effects on settlements focuses on the visual amenity of users of public spaces and streets, though views from dwellings will also be noted in the descriptions.

Visual receptor susceptibility

- 2.5.26 As described in GLVIA3, the susceptibility of visual receptors to changes in visual amenity is a function of the 'occupation or activity of people experiencing the view' and 'the extent to which their attention is focussed on the views and visual amenity they experience at particular locations.' Drawn from the guidance within GLVIA3 this is recorded as high, moderate or low according to Table 2.5 or, where necessary, intermediate grades between these. As a particular visual receptor may exhibit differing levels of susceptibility, a narrative commentary describes the reasoned professional judgement used to justify the indicative grading level ascribed.

Table 2.5 Susceptibility of visual receptors

Susceptibility	Description
High	The landscape receptor is less able to accommodate the type of change that the Scheme may bring about without undue negative consequences to the baseline situation. Attributes that make up the character of the landscape offer limited opportunities for accommodating the change without its key characteristics being fundamentally altered, leading to a different landscape character.
Moderate	The landscape receptor is partly able to accommodate the type of change that the Scheme may bring about without undue negative consequences to the baseline situation. Attributes that make up the character of the landscape offer some opportunities for accommodating the change without its key characteristics being fundamentally altered.
Low	The landscape receptor is more able to accommodate the type of change that the Scheme may bring about without undue negative consequences to the baseline situation. Attributes that make up the character of the landscape are resilient to being changed by the Scheme.

Visual receptor value

- 2.5.26 2.5.27 Paragraph 6.3.7 of GLVIA3 (Landscape Institute and IEMA, 2013) suggests that when considering the visual receptor value, account should be taken of:
- *‘recognition of the value attached to particular views, for example in relation to heritage assets, or through planning designations;*
 - *indicators of the value attached to views by visitors, for example through appearances in guidebooks or on tourist maps, provision of facilities for their enjoyment (such as parking places, sign boards and interpretative material) and references to them in literature or art [...]*
- 2.5.27 Drawn from the guidance within GLVIA3 this is recorded as high, medium or low according to Table 2.6. The value that is determined is not absolute and relates to the type of change that is proposed. As a particular visual receptor may exhibit differing levels of value, a narrative commentary describes the professional judgement used to justify the indicative grading levels ascribed or the immediate grading between them.

Table 2.6 Value of visual receptors

Value (Indicative)	Description
High	Views experienced by receptors are widely known, well frequented and/or promoted as a beauty spot/visitor destination. The cultural associations of the visual experience are recognised in art, literature or other media. The view relates to the experience of other features, for example heritage assets.

Value (Indicative)	Description
Moderate	Views experienced by receptors, whilst they may be valued locally, are not widely known. The views experienced have no strong cultural association.
Low	Views experienced by receptors have little/no recognised value. The public are unlikely to visit to experience the views available.

Visual receptor sensitivity

Nature of visual receptors (sensitivity)

- 2.5.28 GLVIA3 states that the nature of visual amenity receptors, commonly referred to as their sensitivity, should be assessed in terms of the combination of the susceptibility of the receptor to the type of change proposed, with the value attached to the receptor, i.e.: Visual Amenity Sensitivity = Visual Amenity Susceptibility + Visual Amenity Value

Overall visual receptor sensitivity

- 2.5.29 The values for susceptibility and value are then considered together, by using reasoned professional judgement to derive an overall sensitivity for each receptor, graded as per the criteria set out in Table 2.7.
- 2.5.30 The sensitivity that is determined is not absolute and relates to the type of change that is proposed. As a particular visual receptor may exhibit differing levels of sensitivity, a narrative commentary describes and justifies the indicative grading levels ascribed or the intermediate grading between them.

Table 2.7 Sensitivity of Visual receptors

		Value of the Visual Receptor (Indicative)		
		High	Moderate	Low
Susceptibility to change	High	High	Moderate/High	Moderate
	Moderate	Moderate/High	Moderate	Moderate/Low
	Low	Moderate	Moderate/Low	Low

Assessing Magnitude of Change

- 2.5.31 The magnitude of landscape and visual change depends upon a combination of factors including the size, scale and nature of change in relation to the context, the geographical extent of the area influenced, and its duration and reversibility, as summarised in Table 2.8.

Table 2.8 Level of landscape and visual effect

Value	Size, Scale and Nature	Geographic Extent	Duration and Reversibility
High	Occupies much of the view or obstructs a significant portion. Forms a large or very noticeable or discordant element. Considerable change to key features or many existing elements of the landscape. Introduces elements considered totally uncharacteristic to the existing landscape. Very noticeable.	Ranging from notable change over extensive area to intensive change over a more limited area.	Long term; permanent/ non-reversible or partially reversible.
Moderate	Occupies a noticeable portion of the view or obstructs a noticeable portion. Forms a noticeable discordant element. Some considerable change to existing landscape elements and /or landscape character; discernibly changes the surroundings of a receptor, such that its baseline is partly altered. Readily noticeable.	Moderate changes in a localised area.	Medium term; semi-permanent or partially reversible.
Low	Occupies a small portion of the view; small change to existing landscape elements and/or landscape character; Slight, but detectable impacts that do not alter the baseline of the receptor materially. Not readily noticeable.	Minor changes in a localised area.	Short term/ temporary; partially reversible or reversible.

Level of effect criteria

- 2.5.32 The level of landscape and visual effect is assessed based on the sensitivity of the affected receptor, and the magnitude of change resulting from the Scheme, as set out for each above. The combined sensitivity and magnitude used to determine the level of effect is summarised in Table 2.9. Note that effects can be either 'beneficial' or 'adverse' and in some cases 'neutral' (neither beneficial nor adverse).

Table 2.9 Level of landscape and visual effect

Magnitude	Sensitivity		
	High	Moderate	Low
High	Major	Major to Moderate	Moderate to Minor
Medium	Major to Moderate	Moderate	Minor
Low	Moderate to Minor	Minor	Minor to Negligible
Negligible	Minor	Negligible	Negligible
No Change	Neutral	Neutral	Neutral

2.5.33 It should be noted that this matrix is intended as a framework only and that the level of effect will vary depending on the circumstances, the type and scale of development proposed, the baseline context and other factors.

2.5.34 The gradations of magnitude of change and level of effect used in the appraisal represent a continuum; the appraiser uses professional judgement when gauging the level of effect.

2.6 Limitations and Assumptions

Limitations

Extents of the study area

2.6.1 Based upon the findings of ZTV analysis, it is considered that the Scheme would not result in any notable effects upon receptors outside the visual envelope of the Scheme and beyond 3km from the location of the Site. Accordingly, landscape and visual receptors beyond this have been scoped out of the appraisal.

Assumptions

Professional judgement

2.6.2 To avoid making assumptions regarding other people's expected responses to changes in landscape character and visual amenity matters, subjective judgements are avoided where possible in this appraisal. The focus instead is predominantly upon what objectively will be experienced as a result of the Scheme. Given the nature of landscape character and people's differing connections with it, plus the differences between people's expectations with regard to visual amenity, reasoned professional experience is required where subjective judgements are necessary.

Distances

2.6.3 Approximate distances are given in the appraisal (rounded to the nearest 10m) between the nearest part of the Site and the nearest part of the receptor in question, unless explicitly stated otherwise.

References

- Ref 16 Chesterfield Borough Council (2020). Chesterfield Borough Local Plan. [online] Available at: <https://chesterfield.gov.uk/media/wfebaonf/chesterfield-borough-local-plan-2018-2035.pdf>
- Ref 17 Department for Energy Security & Net Zero (2024a). Overarching National Policy Statement for Energy (EN-1). [online] Available at: <https://assets.publishing.service.gov.uk/media/65bbfdbc709fe1000f637052/overarching-nps-for-energy-en1.pdf>
- Ref 18 Department for Energy Security & Net Zero (2024b). National Policy Statement for Electricity Networks Infrastructure (EN-5). [online] Available at: <https://assets.publishing.service.gov.uk/media/65a78a5496a5ec000d731abb/nps-electricity-networks-infrastructure-en5.pdf>
- Ref 19 Derbyshire County Council (2013a) Areas of Multiple Environmental Sensitivity (AMES). [online] Available at: <https://www.derbyshire.gov.uk/site-elements/documents/pdf/environment/conservation/landscapecharacter/technical-support-document-1-ames.pdf>
- Ref 20 Derbyshire County Council (2013b) Technical Support Document 2 – Tranquillity. [online] Available at: <https://www.derbyshire.gov.uk/site-elements/documents/pdf/environment/conservation/landscapecharacter/technical-support-document-2-tranquillity.pdf>
- Ref 21 Landscape Institute (2013) GLVIA3 Statement of Clarification 1/13 10-06-13. [online] Available at: <https://www.landscapeinstitute.org/technical-resource/glvia3-clarifications/>
- Ref 22 Landscape Institute (2019). Technical Guidance Note 06/19 Visual Representation of Development Proposals. [online] Available at: https://www.landscapeinstitute.org/wp-content/uploads/2019/09/LI_TGN-06-19_Visual_Representation-1.pdf
- Ref 23 Landscape Institute (2021). Technical Guidance Note 02/21: Assessing Landscape Value Outside National Designations. [online] Available at: <https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2021/05/tgn-02-21-assessing-landscape-value-outside-national-designations.pdf>
- Ref 24 Landscape Institute and Institute of Environmental Management and Assessment (IEMA) (2013). Guidelines for Landscape and Visual Impact Assessment 3rd Edition (GLVIA3). Routledge.
- Ref 25 Ministry of Housing, Communities and Local Government (MHCLG) (2019). Planning Practice Guidance - Design. [online] Available at: <https://www.gov.uk/guidance/design>
- Ref 26 Ministry of Housing, Communities and Local Government (MHCLG) (2024). National Planning Policy Framework. [online] Available at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

- Ref 27 Ministry of Housing, Communities and Local Government (MHCLG) (2025). Planning Practice Guidance - Natural Environment. [online] Available at: <https://www.gov.uk/guidance/natural-environment>
- Ref 28 North East Derbyshire District Council (2021). North East Derbyshire Local Plan 2014-2034. [online] Available at: <https://www.ne-derbyshire.gov.uk/documents/adopted-ned-local-plan-2014-2034/download?Itemid=189>
- Ref 29 The National Grid Company PLC (1959). The Holford Rules.
- Ref 30 The National Grid Company PLC (1989). The Horlock Rules.

3. Cultural Heritage and Archaeology Methodology

3.1 Legislation, Policy and Guidance

- 3.1.1 This assessment has been undertaken in accordance with current national legislation, and national, regional and local plans and policies relating to cultural heritage and archaeology in the context of the Scheme. A summary of the relevant legislation, policies and guidance, the requirements of these policies and the Scheme response is provided below.

Policy

National

- 3.1.2 The National Planning Policy Framework (NPPF) (MHCLG, December 2024) sets out Government planning policies for England and how these are expected to be applied. The NPPF provides a framework within which local and neighbourhood plans can be produced. Planning law requires that applications for planning permission must be determined in accordance with the development plan. The NPPF must be taken into account in the preparation of local and neighbourhood plans and is a material consideration in planning decisions. Section 16 of the NPPF 'Conserving and enhancing the historic environment' contains the government's policies relating to the historic environment.
- 3.1.3 Paragraph 202 sets out the range of assets which are classified as comprising the historic environment. It also states that:
- 'These assets are an irreplaceable resource, and should be conserved in a manner appropriate to their significance, so that they can be enjoyed for their contribution to the quality of life of existing and future generations.'*
- 3.1.4 Paragraph 207 states that:
- 'In determining applications, local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum the relevant historic environment record should have been consulted and the heritage assets assessed using appropriate expertise where necessary. Where a site on which development is proposed includes, or has the potential to include, heritage assets with archaeological interest, local planning authorities should require developers to submit an appropriate desk-based assessment and, where necessary, a field evaluation.'*

3.1.5 Paragraph 210 states that:

‘In determining planning applications, local authorities should take account of:

- a) the desirability of sustaining and enhancing the significance of heritage assets and putting them to viable uses consistent with their conservation;*
- b) the positive contribution that conservation of heritage assets can make to sustainable communities including their economic vitality; and*
- c) the desirability of new development making a positive contribution to local character and distinctiveness.’*

3.1.6 Paragraph 212 states that:

‘When considering the impact of a proposed development on the significance of a designated heritage asset, great weight should be given to the asset’s conservation (and the more important the asset, the greater the weight should be). This is irrespective of whether any potential harm amounts to substantial harm, total loss or less than substantial harm to its significance.’

3.1.7 Paragraph 213 states that

‘Any harm to, or loss of, the significance of a designated heritage asset (from its alteration or destruction, or from development within its setting), should require clear and convincing justification. Substantial harm to or loss of:

- a) grade II listed buildings, or grade II registered parks or gardens, should be exceptional;*
- b) assets of the highest significance, notably scheduled monuments, protected wreck sites, registered battlefields, grade I and II* listed buildings, grade I and II* registered parks and gardens, and World Heritage Sites, should be wholly exceptional.’*

3.1.8 Paragraph 216 states that

‘The effect of an application on the significance of a non-designated heritage asset should be taken into account in determining the application. In weighing applications that directly or indirectly affect non-designated heritage assets, a balanced judgement would be required having regard to the scale of any harm or loss and the significance of the heritage asset.’

3.1.9 Paragraph 218 states that

‘Local planning authorities should require developers to record and advance understanding of the significance of any heritage assets to be lost, (wholly or in part) in a manner proportionate to their importance and the impact, and to make this evidence (and any archive generated) publicly accessible. However, the ability to record evidence of our past should not be a factor in deciding whether such loss should be permitted.’

Local

3.1.10 The adopted North East Derbyshire Local Plan 2014-2034 (NEDDC, 2021), includes the following policies and guidance.

The Historic Environment

- 3.1.11 National planning guidance advises that local planning authorities should set out a positive strategy for the conservation and enjoyment of the historic environment, including heritage assets most at risk through neglect, decay or other threats.
- 3.1.12 North East Derbyshire is fortunate to have a wealth of heritage assets which are a unique and irreplaceable resource and valued by local communities throughout the District. An overview of the historic environment is set out in the 2012 Historic Environment Study and the subsequent addendum to it. Statutory designation requires the assessment of the importance of specific heritage values such as those relating to architectural or historical interest; but decisions about day to day management need to take account of all the values that contribute to significance. Moreover, all aspects of significance, including aesthetic and communal values should influence decisions about the historic environment.
- 3.1.13 The Derbyshire County Council maintained Historic Environment Record also contains a large number of known non-designated assets that contribute to the local distinctiveness of the district. It is important to recognise that these heritage assets are an irreplaceable resource which should be conserved in a manner appropriate to their significance. The Council believes that a positive and proactive strategy should be established for the conservation, enjoyment and if possible, enhancement of the historic environment which includes both designated and non-designated heritage assets, and industrial heritage, including those considered most at risk of neglect, decay and other threats.

Listed buildings

- 3.1.14 Policy SDC6: Development affecting Listed Buildings
- '1. Proposals for alterations to or changes of use of a listed building will be supported where they preserve the significance of the heritage asset and its setting including impacts on the character, architectural merit or historic interest of the building.*
- 2. Proposals should use materials, layout, architectural features, scale and design that respond to and do not detract from the listed building.*
- 3. Proposals which allow for viable uses that are compatible with the conservation of the fabric of the building and its setting will generally be supported.'*

Non-designated local assets

- 3.1.15 Policy SDC9: Non-designated Local Heritage Assets
- '1. Proposals for development that affect a non-designated local heritage asset will be permitted provided that they positively sustain or enhance the significance of the asset, its features, character and setting.*
- 2. Proposals involving the loss of or harm to, a local heritage asset will be subject to a balanced assessment taking account of the significance of the asset and the scale of the harm or loss.'*

Guidance

3.1.16 Guidance produced by the Chartered Institute for Archaeologists (CIfA) and Historic England has been taken into account as far as practicable and where relevant to this assessment as follows:

- CIfA
 - Code of Conduct (2022);
 - Regulations for Professional Conduct (2021);
 - Standards and Guidance for Historic Environment Desk-based Assessment (2020a); and
 - Standard and Guidance for Commissioning Work or Providing Consultancy Advice on Archaeology and the Historic Environment (2020b).
- Historic England
 - Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment (2008);
 - Historic Environment Good Practice Advice in Planning Note 2 (GPA 2) – Managing Significance in Decision-Taking (2015);
 - Historic Environment Good Practice Advice in Planning Note 3 (2nd edition) (GPA 3) – The Setting of Heritage Assets (2017);
 - Statements of Significance: Analysing Significance in Heritage Assets, Historic England Advice Note 12 (2019); and
 - Local Heritage Listing – Identifying and Conserving Local Heritage Advice Note 7 (Second Edition) (2021).
- National planning practice guidance (Ministry of Housing, Communities and Local Government)
 - Historic Environment (2023).

3.2 Consultation

3.2.1 Table 3.1 provides a summary of the issues raised and agreed during consultation with respect to Cultural Heritage and how they have been addressed.

Table 3.1 Summary of consultation

Consultation	Summary of Issues Raised/Agreed
Derbyshire Historic Environment Record 1 March 2023	The archaeological adviser for the local district authority of Derbyshire Historic Environment Record was consulted regarding the Scheme and replied indicating they were happy with the proposed desk-based assessment.

3.3 Study Area

- 3.3.1 The study area for Cultural Heritage comprises the Site and a 1km buffer. This is considered an appropriate study area based on professional judgement and technical knowledge of similar schemes, and the nature of the Scheme construction and operational activities.

3.4 Surveys

- 3.4.1 A desk-based assessment was undertaken by Arcadis for the Site in 2023. This included a walkover survey.
- 3.4.2 A geophysical survey has been conducted in 2025.

3.5 Appraisal Approach

Overview

- 3.5.1 In order to identify the environmental impacts of the Scheme, a comparison of the current environmental conditions immediately before the Scheme is implemented (baseline) was compared to a prediction of how the environmental conditions are likely to change once the construction and operation of the Scheme has been undertaken. An iterative process was followed during appraisal to develop appropriate control measures to avoid or reduce potential environmental impacts.
- 3.5.2 Historic England's guidance and assessment methodologies have been utilised to assess and articulate the significance of heritage assets (including the contribution made by their setting) as defined by the NPPF (MHCLG, 2024), and the potential effects of the Scheme on that significance. The significance of heritage assets is weighed by consideration of the potential for the asset to demonstrate the following value criteria:
- Evidential value – derives from the potential of a place to yield evidence about past human activity.
 - Historical value – derives from the ways in which past people, events and aspects of life can be connected through a place, to the present. It tends to be illustrative or associative.
 - Aesthetic value – derives from the ways in which people draw sensory and intellectual stimulation from a place.
 - Communal value – derives from the meanings of a place for the people who relate to it, or for whom it figures in their collective experience or memory. Communal values are closely bound up with historical (particularly associative) and aesthetic values but tend to have additional and specific aspects.
- 3.5.3 The appraisal approach has been used to assess the potential for construction activities and the operation of the Scheme to impact the significance of heritage assets. This has considered the proximity of receptors to construction activities and the likelihood of receptors being physically disturbed or indirectly impacted through changes to their setting. Appropriate control measures have been identified to avoid or reduce these impacts.

3.6 Limitations and Assumptions

- 3.6.1 Baseline conditions and impact appraisal have been informed using a range of desk study sources deemed to be reputable and trustworthy. However, data from Historic Environment Records (HERs) and other national datasets consist of secondary information derived from varied sources and therefore cannot be guaranteed to be accurate.
- 3.6.2 The precise location of buried archaeological remains is often uncertain as such sites in many cases have not been subject to archaeological investigation to modern standards. Assessment of the value of such sites is often reliant on informed extrapolation from limited data.
- 3.6.3 At the time of production of this report, the programmed archaeological trial trenching have not been undertaken. The appraisal is based on information available and professional judgement at the time of writing. Consequently, there is a potential for further information to become available (such as results from trial trenching, borehole ground investigation), which may result in different interpretations and conclusions from those made at the time.

References

- Ref 31 Chartered Institute for Archaeologists (CIfA) (2020a). Standard and guidance for historic environment desk-based assessment.
- Ref 32 Chartered Institute for Archaeologists (CIfA) (2020b). Standard and guidance for commissioning work or Providing Consultancy Advice on Archaeology and the Historic Environment.
- Ref 33 Chartered Institute for Archaeologists (CIfA) (2021). Regulations for Professional Conduct.
- Ref 34 Chartered Institute for Archaeologists (CIfA) (2022). Code of Conduct.
- Ref 35 Historic England (2008). Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment.
- Ref 36 Historic England (2015). Historic Environment Good Practice Advice in Planning Note 2 (GPA 2) – Managing Significance in Decision-Taking.
- Ref 37 Historic England (2017). Historic Environment Good Practice Advice in Planning Note 3 (2nd edition) (GPA 3) – The Setting of Heritage Assets.
- Ref 38 Historic England (2019). Statements of Significance: Analysing Significance in Heritage Assets, Historic England Advice Note 12.
- Ref 39 Historic England (2021). Local Heritage Listing – Identifying and Conserving Local Heritage Advice Note 7 (Second Edition).
- Ref 40 Ministry of Housing, Communities and Local Government (MHCLG). Planning Practice Guidance – Historic environment. [online] Available at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>.
- Ref 41 North East Derbyshire District Council (2021). Adopted North East Derbyshire Local Plan 2014-2034. [online] Available at: <https://www.ne-derbyshire.gov.uk/documents/adopted-ned-local-plan-2014-2034/download?Itemid=189>

4. Air Quality Methodology

4.1 Legislation, Policy and Guidance

4.1.1 This assessment has been undertaken in accordance with current national legislation, and national, regional and local plans and policies relating to air quality assessment in the context of the Scheme. A summary of the relevant legislation, policies and guidance, the requirements of these policies and the Scheme response is provided below.

Legislation

4.1.2 A summary of the key legislation considered is outlined in Table 4.1.

Table 4.1 Key legislation applicable to the Scheme

Legislation	Legislative Context
Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe	This sets legally binding limits for concentrations of specific air pollutants. It merges, consolidates and replaces the majority of previous EU air quality legislation, and incorporates the Fourth Daughter Directive. While the UK has now left the EU, the Air Quality Standards Regulations 2010 (as amended) which implement the Directive still apply in UK legislation as 'retained EU law'.
The Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019	These regulations amend the Air Quality Standards Regulations 2010 to reflect the UK's departure from the EU.
The Air Quality (England) Regulations 2000	The Air Quality (England) Regulations 2000 set national air quality objective levels for local authorities to meet in England.
The Air Quality (England) (Amendment) Regulations 2002	The Air Quality (England) (Amendment) Regulations 2002 set national air quality objective levels for local authorities to meet in England.
Part IV of the Environment Act 1995	The Environment Act 1995 contains provisions for protecting air quality in the UK and for local air quality management. It requires the UK Government to produce a national Air Quality Strategy (AQS) which contains standards, objectives and measures for improving ambient air quality, and defines Local Air Quality Management (LAQM). It introduced an obligation on local authorities, where the air quality standards are not being met, to issue an order designating an Air Quality Management Area (AQMA).

Legislation	Legislative Context
Environmental Protection Act 1990 (EPA 1990)	Part III of the EPA 1990 provides legislation around statutory nuisance, which applies to dust.
The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020	Regulation 2 of The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 updated the Air Quality Standards Regulations 2010 to include a Limit Value of 20µg/m ³ for PM _{2.5} from 2020. The Limit Values for NO ₂ and PM ₁₀ remained the same concentration levels as the relevant AQS objectives.
Environment Act 2021	Creates the legislative framework by which statutory air quality targets are set by reference to plans such as the Environmental Improvement Plan 2023.
The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023	The legislation sets out targets to reduce concentrations of PM _{2.5} to be equal to or less than 10µg/m ³ by 2040. It also states that exposure to PM _{2.5} must be reduced by at least 35 per cent by 2040, compared to a baseline year of 2018.

4.1.3 The ambient air quality standards and objectives are given statutory backing in England through The Air Quality (England) Regulations 2000 and The Air Quality (England) (Amendment) Regulations 2002. The Limit Values were given statutory backing through The Air Quality Standards Regulations 2010. The AQS objectives for the protection of human health and applicable to this assessment are presented in Table 4.2.

Table 4.2 Air Quality Objectives and Limit Values for NO₂, PM₁₀ and PM_{2.5}

Pollutant	Air Quality Objectives			Limit Values		
	Concentration	Averaging Period	Compliance Date	Concentration	Averaging Period	Compliance Date
NO ₂	200µg/m ³	1-hour mean (not to be exceeded more than 18 times per year)	31 December 2005	200µg/m ³ (18 exceedances)	1-hour mean (not to be exceeded more than 18 times per year)	1 January 2010
	40µg/m ³	annual mean	31 December 2005	40µg/m ³	annual mean	1 January 2010
PM ₁₀	50µg/m ³	24-hour mean (not to be exceeded)	31 December 2010	50µg/m ³ (35 exceedances)	24-hour mean (not to be exceeded)	1 January 2005

Pollutant	Air Quality Objectives			Limit Values		
	Concentration	Averaging Period	Compliance Date	Concentration	Averaging Period	Compliance Date
		more than 35 times per year)			exceeded more than 35 times per year)	
	40µg/m ³	Annual mean	31 December 2004	40µg/m ³	Annual mean	1 January 2005
PM _{2.5}	No existing AQS objective for PM _{2.5}	20µg/m ³	annual mean	1 January 2020	No existing AQS objective for PM _{2.5}	20µg/m ³

Policy

4.1.4 A summary of relevant national planning policy considered is outlined in Table 4.3.

Table 4.3 The relevant national planning policies applicable to the Scheme

Policy Document	Policy Context
NPPF (Ministry of Housing, Communities & Local Government, 2024), Paragraph 199	The NPPF states that decisions and policies should regard Limit Values or national Objectives and take into account AQMAs and Clean Air Zones as well as cumulative impacts. Mitigation should be identified.
PPG (Ministry of Housing, Communities & Local Government, 2019)	Provides guidance on the relevant principles of air quality assessment including the regulatory framework, the role of plan making, available air quality information, when assessment is required, what potential air quality issues require consideration, the level of detail required, and mitigation.
Environmental Improvement Plan 2023 (DEFRA, 2023), Goal 2 - Clean Air	Details government actions to reduce air pollution over next 25 years to achieve 'clean air' as a means of complying with concentration and emissions reduction targets, such as those facilitated by the Environment Act 2021. The delivery plan focuses on reducing domestic emissions, empowering local authorities to deliver clean air, maintaining and improving the regulatory framework for industrial emissions, reducing agricultural ammonia emissions and reducing emissions from transport.

4.1.5 A summary of relevant local planning policy considered is outlined in Table 4.4.

Table 4.4 The relevant local policy applicable to the Scheme

Policy Document	Policy Context
Chesterfield Borough Local Plan (2020) (Chesterfield Borough Council, 2020)	<p>Strategic Objective S9: Tackle traffic congestion, improve air quality, secure strategic improvements to the transport system in the borough and enable healthier and more sustainable transport choices.</p> <p>Where appropriate, development proposals will include an assessment of impact on air quality and incorporate measures to avoid or mitigate increases in air pollution and minimise the exposure of people to poor air quality.</p>

Guidance

4.1.6 The following relevant guidance, specific to air quality assessment, has informed the EAR.

Planning Practice Guidance (PPG)

4.1.7 The Government has revised and updated Planning Practice Guidance (MHCLG, 2019) in respect of air quality, to support the NPPF in order to make it more accessible. The guidance includes advice relating to planning and air quality, the role of Local Plans with regard to air quality, when air quality is likely to be relevant to a planning decision, what should be included within an air quality assessment and how impacts on air quality can be mitigated.

Guidance on the assessment of dust from demolition and construction (Institute of Air Quality Management (IAQM), 2024)

4.1.8 This provides a mechanism for the assessments to consider both the magnitude of emissions and sensitivity of an area to define the level of risk of dust soiling and human health impacts during the construction phase. Defining the construction dust risk levels allows proportionate mitigation measures to be adopted. This guidance is referred to hereafter as the ‘IAQM construction dust guidance’.

Land-Use Planning & Development Control: Planning For Air Quality (IAQM, 2017)

4.1.9 This is applicable in assessing the effect of changes in exposure of members of the public resulting from developments. It provides guidance on how to decide whether an air quality assessment is required, how to undertake a suitable assessment of air quality impacts and whether these are to be considered significant or not, and how to identify whether additional mitigation is required. This guidance would be used to inform the assessment methodology for construction and operational phase vehicle emissions. This guidance is referred to hereafter as the ‘IAQM development control guidance’.

A guide to the assessment of air quality impacts on designated nature conservation sites (IAQM, 2020)

- 4.1.10 This document has been produced by the IAQM to assist its members in the assessment of the air quality impacts of development on designated nature conservation sites. It may also be useful for ecologists who use the results of air quality assessments to evaluate the effects of air pollution on habitats and species, by increasing their understanding of the information provided by air quality specialists. This document focuses on air quality assessments in support of Habitats Regulations Assessment, but its principles can be used as the basis for assessing the air quality impact on national or local designated nature conservation sites. This guidance is referred to hereafter as the ‘IAQM guidance on the assessment of ecological sites’.

Local Air Quality Management Technical Guidance (LAQM.TG22) (DEFRA, 2022)

- 4.1.11 This provides best practice principles for the technical assessment of local air quality including the use of monitoring data, selection of receptors and verification procedure. LAQM.TG22 also provides guidance for the application of DEFRA tools and resources used for the technical assessment of air quality.

Design Manual for Roads and Bridges LA 105 Air Quality (Highways England, 2019)

- 4.1.12 This is applicable in screening the requirement for assessment of designated ecological sites and compliance risk assessment.

4.2 Consultation

- 4.2.1 Table 4.5 provides a summary of the issues raised and agreed during consultation with respect to the Scheme and how they have been addressed.
- 4.2.2 No air quality issues were raised in during the public consultation events.

Table 4.5 Summary of consultation

Consultee/Date	Summary of Issues Raised/Agreed
Chesterfield Borough Council, 22 September 2025	<p>A request was submitted to Chesterfield Borough Council to view the latest air quality annual status report available, or to obtain relevant monitoring data for the baseline section.</p> <p>The current annual status report at the time was not yet publicly available, however Chesterfield Borough Council provided the relevant monitoring data.</p>
North East Derbyshire District Council, 11 November 2025	<p>A request was submitted to NEDDC to view the latest air quality annual status report available, or to obtain relevant monitoring data for the baseline section.</p> <p>No data was obtained, the most recent publicly available data has been used.</p>

4.3 Study Area

Construction Dust Risk Assessment

- 4.3.1 A construction risk dust assessment has been undertaken to establish the requisite level of mitigation required in order to minimise and control dust emissions during construction. The IAQM construction dust guidance provides the relevant assessment methodology for undertaking the dust risk assessment.
- 4.3.2 In accordance with the IAQM construction dust guidance, the study area for the construction phase dust risk assessment will be:
- up to 250m from the locations of demolition, construction and earthworks activities for human receptors and up to 50m for ecological receptors; and
 - up to 50m from the route(s) used by construction vehicles on the public highway, up to 250m from the Scheme's entrance(s).
- 4.3.3 The area within 250m of the Scheme boundary and within 50m of the construction routes largely comprises rural uninhabited fields. The nearest sensitive human receptors are residential and holiday properties located approximately 220m south east of the Scheme boundary.
- 4.3.4 There are no ecological receptors located within the construction dust study area.

Construction and Operational Phase Vehicle Emissions: Human Receptors

- 4.3.5 The Air Quality study area for vehicle emissions is defined as the area within 200m of any roads that exceed the traffic change criteria detailed in the IAQM development control guidance.
- 4.3.6 The screening criteria for vehicle emissions assessment is as follows:
- A change in Light Duty Vehicle (LDV) flows of >100 Annual Average Daily Traffic (AADT) within or adjacent to an AQMA, or >500 AADT elsewhere; and
 - A change in Heavy Duty Vehicle (HDV) flows of >25 AADT within or adjacent to an AQMA, or >100 AADT elsewhere.
- 4.3.7 During the construction phase, the screening criteria are not exceeded at any point. Therefore, a construction phase air quality assessment of vehicle emissions is scoped out.
- 4.3.8 During the operational phase of the Scheme, it is understood that the only traffic generated will be associated with infrequent repair, routine maintenance and inspection activities (assumption of 10 vehicles per year). This number of vehicle movements is well below screening thresholds, therefore an operational phase air quality assessment of vehicle emissions is scoped out.

4.4 Surveys

- 4.4.1 No Air Quality monitoring surveys were undertaken to support the assessment of the Scheme. This is because the Site is rural in nature and the anticipated traffic increases in both the construction and operational phases were expected to be screened out against the IAQM (2017) development control guidance.

4.5 Appraisal Approach

Construction Dust Risk Assessment

- 4.5.1 There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined in the IAQM (2024) construction dust guidance. The methodology is summarised in the following paragraphs.
- 4.5.2 It should be noted that the purpose of the IAQM construction dust guidance is to define the level of mitigation that is required to effectively control construction dust. It therefore requires the assessor to determine the unmitigated risk of dust impacts on soiling and human health. This then allows the categorisation of risk of impacts from the various aspects of construction which in turn defines the level and nature of mitigation measures.
- 4.5.3 The risk of dust emissions from construction/demolition activities causing an adverse effect on human receptors, depends on:
- the type and duration of construction activities being undertaken;
 - the size of the construction site;
 - the meteorological conditions (such as wind speed, wind direction and rainfall);
 - the proximity of the receptors to the construction activities;
 - the effectiveness of the dust deposition mitigation measures; and
 - receptor sensitivity to dust.
- 4.5.4 Construction activities on the Site are divided into four types to reflect their different potential impacts. These are demolition, earthworks, construction, and trackout (the vehicle-borne transfer of mud and debris onto the highway).
- 4.5.5 The potential for dust emissions was assessed for each activity that is likely to take place and considers two separate dust effects including annoyance due to dust soiling and the risk of health effects due to an increase in exposure to PM10.
- 4.5.6 Table 4.6 summarises how the dust risk is calculated based on the dust emissions magnitude and the sensitivity of area for each of three impact pathways (dust soiling and human health).

Table 4.6 Dust risk for the Scheme calculated based on the sensitivity of the Scheme and the dust emission magnitudes from associated construction activities

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
Demolition			
High	High Risk	Medium Risk	
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible
Earthworks			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Construction Activities			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Trackout			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

4.5.7 The IAQM construction dust guidance seeks to categorise the unmitigated risk of dust impacts on human health and amenity as a means of identifying proportional dust emissions mitigation required to ensure that residual impacts are no greater than negligible. A higher dust impact risk rating means that more stringent mitigation measures are required in order to avoid a residual significant risk of effects. These measures are then to be integrated into an Outline Construction Environment Management Plan (OCEMP).

4.6 Limitations and Assumptions

4.6.1 The following limitations and assumptions have been identified:

- There is limited detail available for Non-road Mobile Machinery (NRMM) during the construction and maintenance phases and regarding the potential use of diesel generators at this stage. It is assumed that emissions will be temporary and transient in nature and therefore negligible in terms of air quality impacts.

- The construction dust assessment assumes that all proposed construction activities may take place on the Scheme boundary. This is a conservative approach that has been adopted to ensure that potential impacts at receptors within 250m of the Scheme boundary have been considered. It is assumed that exhaust emissions from plant will be minimised with the application of the mitigation measures detailed in Chapter 7 Air Quality.

4.6.2 Advice was taken from the traffic and transport specialists on the speeds to set on each road in order to calculate an emission rate. Best practice guidance regarding the manual adjustment of speeds as detailed in DEFRA's LAQM TG22 was applied alongside professional judgement to reflect any potential congestion.

4.6.3 The decision to screen in or screen out certain assessment elements has been informed by existing information, or where there is an absence of information, the decision has been informed by experience and professional judgement.

References

- Ref 42 Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019. [online] Available at: <https://www.legislation.gov.uk/uksi/2019/74/contents>
- Ref 43 Chesterfield Borough Council (2020). Chesterfield Borough Local Plan. [online] Available at: <https://chesterfield.gov.uk/media/wfebaonf/chesterfield-borough-local-plan-2018-2035.pdf>
- Ref 44 Environment Act 1995. [online] Available at: <https://www.legislation.gov.uk/ukpga/1995/25/part/IV>
- Ref 45 Environment Act 2021. [online] Available at: <https://www.legislation.gov.uk/ukpga/2021/30/contents>
- Ref 46 Environmental Protection Act 1990. [online] Available at: <https://www.legislation.gov.uk/ukpga/1990/43/contents>
- Ref 47 Ministry of Housing, Communities & Local Government (MHCLG) (2019). Planning Practice Guidance – Air quality. [online] Available at: <https://www.gov.uk/guidance/air-quality--3>
- Ref 48 Ministry of Housing, Communities & Local Government (MHCLG) (2024). National Planning Policy Framework. [online] Available at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>.
- Ref 49 Department for Environment, Food and Rural Affairs (DEFRA). (2022). Local Air Quality Management Technical Guidance (TG22).
- Ref 50 Department for Environment, Food and Rural Affairs (DEFRA). (2023). Environmental Improvement Plan 2023.
- Ref 51 Highways England (2019). Design Manual for Roads and Bridges (DMRB) LA 105 Air quality.
- Ref 52 Institute of Air Quality Management (2017). Land-use Planning & Development Control: Planning for Air Quality. v1.2. [online] Available at: <https://iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf>
- Ref 53 Institute of Air Quality Management (2020). A guide to the assessment of air quality impacts on designated nature conservation sites. v1.1. [online] Available at: <https://iaqm.co.uk/text/guidance/air-quality-impacts-on-nature-sites-2020.pdf>
- Ref 54 Institute of Air Quality Management (2024). IAQM Guidance on the assessment of dust from demolition and construction V2.2. [online] Available at: <https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf>
- Ref 55 Official Journal of the European Union (2008) Ambient Air Quality and Cleaner Air for Europe (2008/50/EC).

- Ref 56 The Air Quality (England) (Amendment) Regulations 2002. [online] Available at: <https://www.legislation.gov.uk/uksi/2002/3043/contents>
- Ref 57 The Air Quality (England) Regulations 2000. [online] Available at: <https://www.legislation.gov.uk/uksi/2000/928/contents/made>
- Ref 58 The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020. [online] Available at: <https://www.legislation.gov.uk/uksi/2020/1313/contents/made>
- Ref 59 The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023. [online] Available at: <https://www.legislation.gov.uk/uksi/2023/96/contents/made>

5. Water Resources and Flood Risk Methodology

5.1 Legislation, Policy and Guidance

- 5.1.1 This appraisal has been undertaken in accordance with current national legislation, and national, regional and local plans and policies relating to water resources and flood risk in the context of the Scheme. A summary of the relevant legislation, policies and guidance, the requirements of these policies and the Scheme response is provided below.

Legislation

- 5.1.2 The following key legislation is of direct relevance to the assessment of effects of the Scheme.
- 5.1.3 The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017, as amended by The Floods and Water (EU Exit) Regulations 2019, implemented the Water Framework Directive (WFD) in England and Wales. The 2019 regulations, specifically regulation 20, specify that the substance of the WFD regime that applied pre-EU Exit will continue to apply with only relatively minor amendments. The assessment identifies WFD waterbodies within the study area and appraises the potential for the Scheme to cause deterioration of these waterbodies.
- 5.1.4 The Land Drainage Act 1991 together with the Water Resources Act 1991 provide for the Environment Agency to prevent the obstruction of any main river through the construction of flow control structures, culverts, or any other structure in a main river. Where culverting or other works have a potential to affect the flow regime of ordinary watercourses, consent is required from the Lead Local Flood Authority (LLFA) under the Flood and Water Management Act 2010 which provides for more comprehensive management of flood risk for people, homes, and businesses. The Environmental Permitting (England and Wales) Regulations 2016 also impose certain controls in relation to the placing of structures and the carrying out of works affecting main rivers and other watercourses.
- 5.1.5 The Flood Risk Assessment (FRA) that has been prepared assesses the effects of the Scheme on the flood regimes and floodplains of watercourses within the study area. Secondary consents for all relevant qualifying works will be secured from the Environment Agency and LLFA under this legislation.

Policy

- 5.1.6 The NPPF (MHCLG, 2024) sets out Government policy on development and flood risk. Its aims are to ensure that flood risk is taken into account at all stages of the planning process, to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas of highest risk. Where new development is exceptionally necessary in such areas, policy aims to make it safe, without increasing flood risk elsewhere, and, where possible, reducing flood risk overall. An FRA has been produced in line with the requirements of the NPPF.

Guidance

- 5.1.7 Several key sources have guided the water resource and flood risk appraisal.
- 5.1.8 Design Manual for Roads and Bridges LA 113 Road Drainage and the Water Environment (Highways England, 2020) provides guidance on the assessment of the effects on linear infrastructure schemes on water environment receptors, including flood risk.
- 5.1.9 Flood Risk and Coastal Change Planning Practice Guidance (PPG) (MHCLG, 2022) provides advice regarding the potential impacts of climate change on rainstorm intensity and river flows, and how these should be factored into a site-specific FRA.
- 5.1.10 Various Construction Industry Research and Information Association (CIRIA) publications, for example, C532: Control of water pollution from construction sites (CIRIA, 2001), provide construction good practice for preventing pollution of the water environment.
- 5.1.11 Derbyshire County Council Preliminary Flood Risk Assessment (PFRA), as the LLFA for Chesterfield (Derbyshire County Council, 2011), is the most recent update to the PFRA in 2017 (Derbyshire County Council, 2017). The PFRA and its addendum include information on local sources of flood risk, including past flood events and future flood risks, and informs the Local Flood Risk Management Strategy for Derbyshire.

5.2 Consultation

- 5.2.1 Table 5.1 provides a summary of the issues raised and agreed during consultation with respect to water resources and flood risk and how they have been addressed.

Table 5.1 Summary of consultation

Consultee/Date	Summary of Issues Raised/Agreed
Derbyshire County Council	The council highlighted that historic mining operations, including existing old soughs may exist which could potentially have an impact on groundwater flooding and recharge. This information has fed into the appraisal.
Derbyshire County Council	No historic records of flooding have occurred in the area.

5.3 Study Area

- 5.3.1 The study area, defined in Appendix E, Drawings, Figure 8.1, has been defined to include all surface water and groundwater receptors within 500m of the Scheme boundary. This is considered an appropriate study area based on professional judgement and technical knowledge of similar schemes, and the nature of the Scheme construction and operational activities.

5.4 Surveys

- 5.4.1 No surveys were required in support of the water resources and flood risk appraisal.

5.5 Appraisal Approach

- 5.5.1 In order to identify the environmental impacts of the Scheme, a comparison of the current environmental conditions immediately before the Scheme is implemented (the baseline) was compared to a prediction of how the environmental conditions are likely to change once the construction and operation of the Scheme has been undertaken. An iterative process was followed during appraisal to develop appropriate control measures to avoid or reduce potential environmental impacts.
- 5.5.2 Receptors have been identified, and their existing qualities characterised, using a range of desk study data sources. The potential for construction activities and the operation of the Scheme to impact these receptors has been identified by applying the source-pathway-receptor principle. The proximity of receptors to construction works activities and the likelihood of them being physically disturbed or receiving discharges or surface water drainage from the Scheme have been considered in assessing potential impacts and measures to avoid or reduce impacts have been identified.

Sources of Baseline Data

- 5.5.3 Baseline information on the water environment and flood risk from a range of sources within this study area has been sourced from the following datasets:
- Flood Map for Planning - Flood Zones (Environment Agency, 2025a);
 - Risk of Flooding from Rivers and Sea (Environment Agency, 2025b);
 - Risk of Flooding from Surface Water (Environment Agency, 2025c);
 - Reservoir Flood Extents (Environment Agency, 2025d);
 - Environment Agency Catchment Data Explorer (Environment Agency, 2025e);
 - Groundwater Source Protection Zones and Aquifers (Environment Agency and DEFRA, 2017);
 - Geology Viewer (British Geological Survey, 2025);
 - Requested local abstraction and discharge data (EIR2025/03516);
 - Environment Agency Statutory Main Rivers (Environment Agency, 2020); and
 - Ordnance Survey (OS) Open Rivers (Ordnance Survey, 2025).

5.6 Limitations and Assumptions

- 5.6.1 This chapter has been informed by several data sources which Arcadis believes to be trustworthy. However, Arcadis is unable to guarantee the accuracy of information provided by others. This chapter is based on information available at the time of writing.

- 5.6.2 Baseline conditions have been characterised using desk study information and the impact appraisal has assumed that the recommendations of the FRA and Surface Water Drainage Strategy, which have been prepared for the Scheme, will be implemented.

References

- Ref 60 British Geological Survey (2025). BGS Geology Viewer.
- Ref 61 Construction Industry Research and Information Association (CIRIA) (2001). C532: Control of water pollution from construction sites
- Ref 62 Derbyshire County Council (2011). Preliminary flood risk assessment: Derbyshire County Council.
- Ref 63 Derbyshire County Council (2017). Preliminary flood risk assessment: Derbyshire County Council.
- Ref 64 Environment Agency (2020). Statutory Main River Map.
- Ref 65 Environment Agency (2025a). Flood Map for Planning - Flood Zones.
- Ref 66 Environment Agency (2025b). Risk of Flooding from Rivers and Sea.
- Ref 67 Environment Agency (2025c). Risk of Flooding from Surface Water.
- Ref 68 Environment Agency (2025d). Reservoir Flood Extents (Individual).
- Ref 69 Environment Agency (2025e). Catchment Data Explorer.
- Ref 70 Environment Agency and Department for Environment, Food & Rural Affairs (2024). Groundwater Protection. [online] Available at: <https://www.gov.uk/government/collections/groundwater-protection>
- Ref 71 Flood and Water Management Act 2010. [online] Available at: <https://www.legislation.gov.uk/ukpga/2010/29/contents>
- Ref 72 Highways England. (2020). Design Manual for Roads and Bridges LA 113 Road drainage and the water environment.
- Ref 73 Land Drainage Act 1991. [online] Available at: <https://www.legislation.gov.uk/ukpga/1991/59/contents>
- Ref 74 Ministry of Housing, Communities & Local Government (MHCLG) (2025). Planning Practice Guidance – Flood risk and coastal change. [online] Available at: <https://www.gov.uk/guidance/flood-risk-and-coastal-change>
- Ref 75 Ministry of Housing, Communities & Local Government (MHCLG) (2024). National Planning Policy Framework. [online] Available at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>.
- Ref 76 Ordnance Survey (2025). OS Open Rivers. [online] Available at: <https://www.data.gov.uk/dataset/dc29160b-b163-4c6e-8817-f313229bcc23/os-open-rivers1>
- Ref 77 The Environmental Permitting (England and Wales) Regulations 2016. [online] Available at: <https://www.legislation.gov.uk/uksi/2016/1154/contents/made>

- Ref 78 The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. [online] Available at:
<https://www.legislation.gov.uk/uksi/2017/407/contents/made>
- Ref 79 Water Resources Act 1991. [online] Available at:
<https://www.legislation.gov.uk/ukpga/1991/57/contents>

6. Land and Ground Conditions Methodology

6.1 Legislation, Policy and Guidance

- 6.1.1 This appraisal has been undertaken in accordance with current national legislation, and national, regional and local plans and policies relating to land and ground conditions in the context of the Scheme. A summary of the relevant legislation, policies and guidance, the requirements of these policies and the Scheme response is provided below.

Legislation

- 6.1.2 The Environmental Protection Act 1990 defines, within England, Wales and Scotland, the structure and authority for waste management and control of emissions into the environment. The Act was intended to strengthen pollution controls and support enforcement with heavier penalties. Before the Act there had been separate environmental regulation of air, water and land pollution and the Act brought in an integrated scheme that would seek the 'best practicable environmental option'.
- 6.1.3 Part 2A of the Environmental Protection Act 1990 (which was inserted into that Act by section 57 of the Environment Act 1995) contains a regulatory regime for the identification and remediation of contaminated land. In addition to the requirements contained in the primary legislation, operation of the regime is subject to regulations and statutory guidance. The main objective underlying the introduction of the Part 2A contaminated land regime was to provide an improved system for the identification and remediation of land where contamination is causing unacceptable risks to human health or the wider environment, assessed in the context of the current use and circumstances of the land. The identification of contaminated land, as defined in Part 2A comprises a risk-based approach. For harm to the non-aquatic environment or pollution of controlled waters to occur, there must be a 'pollutant linkage'. This linkage is based on the following being present:
- A source of contamination (hazard);
 - A pathway for the contaminant that links the source to receptor; and
 - A receptor (target), which is affected by the contaminant. This includes humans, ecosystems, controlled waters, physical systems and built structures, which could be affected by the hazard.

Policy

- 6.1.4 The planning policy relevant to Ground Conditions and Contaminated Land and how this policy has been taken into account is provided in Table 6.1.

Table 6.1 Planning Policy

Policy Document	Policy/ Reference	Description in Relation to Ground Conditions and Pollution	Project Response
National Planning Policy Framework (NPPF) (MHCLG, 2024)	Paragraphs 196 to 201	Requirement to ensure that a site should be suitable for its proposed use taking consideration of any risks from land contamination and land instability with appropriate assessment and mitigation, including land remediation. Statement on responsibility of developer and/or landowner to ensure the Site development is 'safe' with respect to land contamination and stability.	The assessment considers the ground conditions and risks arising from land instability and contamination, including from natural hazards (including mining) and former activities.
North East Derbyshire Local Plan 2014 – 2034	Policy SDC13 Environmental Quality	Requirement to assess proposals in relation to ground and water pollution, accompanied with an assessment of impact to environmental quality.	The assessment considers the groundwater conditions and potential risks to groundwater contamination.
North East Derbyshire Local Plan 2014 – 2034	Policy SDC14: Land potentially affected by Contamination or Instability	Development proposals must demonstrate that any land potentially affected by contamination or instability will be addressed by appropriate mitigation measures to ensure that the Site is suitable for the proposed use and does not result in unacceptable risks which would adversely impact upon human health, and the built and natural environment. The surrounding	The assessment considers the potential impacts from the Scheme and proposed control measures to limit effects.

Policy Document	Policy/ Reference	Description in Relation to Ground Conditions and Pollution	Project Response
		environment must also not become contaminated or unstable from the proposed development. Appropriate investigation and risk management measures are required to address issues.	
North East Derbyshire Local Plan 2014 – 2034	Policy SDC15: Development near Hazardous Uses	Proposed developments within Minerals Consultation Areas require consultation to allow adequate and effective protection of mineral resources.	The assessment considers the potential for mineral resources.
Derbyshire and Derby Mineral Local Plan (2022-2038) Pre-submission Draft Plan January 2023	Policy SP17: Mineral Safeguarding Areas and Consultation Areas	Locally and nationally important mineral resources, permitted reserves, permitted mineral operations and allocated mineral sites will be safeguarded from sterilisation by non-minerals development through the designation of mineral safeguarding areas, which include a 500m buffer for hard rock resources and a 250m buffer for other resources, as identified on the Policies Map. Proposals for non-mineral development in mineral safeguarding areas will be required to demonstrate, through a mineral resource assessment undertaken by a suitably qualified person, that the mineral resource would not be sterilised as a result of the development or that	The Scheme has been assessed against the local plans for mineral safeguarding areas.

Policy Document	Policy/ Reference	Description in Relation to Ground Conditions and Pollution	Project Response
		there are other sustainable overriding reasons why the mineral resource should not be extracted prior to that development taking place.	

Guidance

6.1.5 The following guidance has informed this chapter:

- Design Manual for Roads and Bridges LA 109: Geology and soils (Highways England, 2019) informed the approach to assigning sensitivity of receptors and magnitude of impacts with respect to ground conditions.
- Land contamination risk management (Environment Agency, 2020) guidance informed the evaluation of land contamination risks, following the ‘source, pathway receptor’ approach.
- CIRIA Report 552 (C552) informed the evaluation of significance of effect.

6.2 Consultation

6.2.1 Table 6.2 provides a summary of the issues raised and agreed during consultation with respect to land and ground conditions and confirms how they have been addressed.

Table 6.2 Summary of consultation

Consultee/Date	Summary of Issues Raised/Agreed
North East Derbyshire District Council (Environmental Protection Officer) 26 July 2024	<p>No comments or further suggestions were given on the comments on the proposed layout and content of the Land Quality and Ground Conditions chapter.</p> <p>The Site is not declared as being contaminated.</p> <p>Recommendations of at least a Phase 1 contaminated land study shall be undertaken with recommendations followed. This will likely be requested as a planning conditions.</p> <p>Notification of the following records from the council GIS system:</p> <ul style="list-style-type: none"> • historic landfill site (former Calow Railway Cutting) 260m north; • the Site is within a SSSI impact risk zone; • the area is a Smoke Control Zone; and • the land is affected by past shallow coal mining.

6.3 Study Area

- 6.3.1 The study area for the Land Quality and Ground Conditions chapter, as seen in Appendix E, Figure 9-1, comprises the land within the Scheme boundary, or the Site, plus a 250m buffer on all sides. For ground conditions, the study area reflects the surrounding geological environment and considers the distance over which significant effects can reasonably be thought to have the potential to occur. For contamination, the study area is considered appropriate as this is the distance over which potentially contaminative sites could cause more significant impact on the Scheme, e.g., migration of gases from a landfill site, migration of contamination in the air, within groundwater, or surface water.

6.4 Surveys

- 6.4.1 The study area, incorporating the Site, has previously been subject to a Phase 1 Ground Conditions and Contaminated Land Desk Study Report, the findings of which have been utilised within this Appraisal to present the baseline conditions.
- 6.4.2 A site walkover survey was also undertaken during April 2024.

Sources of Baseline Data

- 6.4.3 The baseline review has been informed by the following publicly available resources and information provided by the Applicant:
- British Geological Survey (BGS) published geological sheet map (sheets 112 for Chesterfield) and the BGS GeoIndex Viewer, including relevant archive borehole records;
 - Groundsure Geo Insight Report with Ordnance Survey Maps (Groundsure reference: GSIP-2024-14636-17578 dated: 01/03/2024);
 - Arcadis, 2025, Phase 1, Ground Conditions and Contaminated Land Assessment Desk Study Report, Document Ref: EDEU-ARC-ENV-REP-0011;
 - Coal Authority Consultants Coal Mining Reports, Ref. 51003373983002. 2024, & Ref. 5100339490700;
 - Zetica website and Zetica Unexploded Ordnance (UXO) Pre-Desk Study Assessment; and
 - Derbyshire and Derby Minerals Local Plan. Towards a Mineral Local Plan: Proposed Draft Plan – December 2021.

6.5 Appraisal Approach

- 6.5.1 In order to identify the environmental impacts of the Scheme, a comparison of the current environmental conditions immediately before the Scheme is implemented (baseline) was compared to a prediction of how the environmental conditions are likely to change once the construction of the Scheme has been undertaken. An iterative process was followed during appraisal to develop appropriate control measures to avoid or reduce potential environmental impacts.

- 6.5.2 Operational phase contamination risks are scoped out. It is expected that any significant adverse effects from historical (pre-existing) ground and groundwater contamination that require mitigation will be either reduced to acceptable levels by the time the substation and infrastructure is operational or mitigated through design. Sensitive geological features and mineral resources will be considered as part of the appraisal in relation to the operation phase.
- 6.5.3 The Scheme will operate in accordance with standard operating procedures and legislative controls and wider standard operating procedures to prevent it being a potential source of contamination, so this aspect has also been scoped out.
- 6.5.4 A review of the baseline conditions and primarily the conceptual site model and preliminary risk assessment as is laid out in the desk study, and summarised above, have been utilised to identify potential receptors, with viable source-pathway-receptor linkages which have potential to impact the construction and operational phases of development. The preparations of the Phase 1 Desk Study for the Scheme have been undertaken in general accordance with the guidance provided in: BS 5930 Code of Practice for Ground Investigation (British Standards Institution (BSI) 2020); BS 10175 Investigation of potentially contaminated sites – Code of Practice (BSI, 2017) and Land contamination risk management (LC:RM) guidance (Environment Agency, 2020). Appropriate control measures are then presented in the Land and Ground Conditions Chapter to reduce or avoid any potential impacts that may occur in construction and operation phases of the Scheme.

Significance Criteria

- 6.5.5 The adopted assessment methodology comprises a number of stages and has drawn from the DMRB LA 109 (Highways England, 2019). The value of the identified receptors/resources have been assessed against the criteria shown in Table 6.3.

Table 6.3 Criteria for determining value/sensitivity of receptors/resources

Receptor Value (Sensitivity)	Description
Very high	<p>Contamination:</p> <p>Human Health: Very high sensitivity land use such as residential with gardens or allotments.</p> <p>Surface Water: Watercourse having a Water Framework Directive (WFD) classification shown in a River Basin Management Plan (RBMP) and flow of $Q95 \geq 1.0\text{m}^3/\text{s}$; Site protected/ designated under European Commission (EC) or UK legislation (SAC, SPA, SSSI, Ramsar site, salmonid water)/ Species protected by EC legislation LA 108 (Highways England, 2020).</p> <p>Groundwater: Principal Aquifer providing a regionally important resource and/ or supporting a site protected under EC and UK legislation LA 108; Groundwater locally supports Groundwater Dependent Terrestrial Ecosystems (GWDTE); Groundwater Source Protection Zone (SPZ) 1.</p> <p>Geology:</p> <ul style="list-style-type: none"> Very rare and of international importance with no potential for replacement (e.g. UNESCO World Heritage Sites, UNESCO Global

Receptor Value (Sensitivity)	Description
	Geoparks, SSSIs and Geological Conservation Review sites where citations indicate features of international importance). Geology meeting international designation citation criteria but which is not designated as such.
High	<p>Contamination:</p> <p>Human Health: High sensitivity land use such as public open space</p> <p>Surface water: Watercourse having a WFD classification shown in an RBMP and $Q95 < 1.0\text{m}^3/\text{s}$; Species protected under EC or UK legislation LA 108 (Highways England, 2020).</p> <p>Groundwater: Principal Aquifer providing locally important resource or supporting a river ecosystem; Groundwater supports a GWDTE; Groundwater SPZ 2 (Outer).</p> <p>Geology:</p> <p>Rare and of national importance with little potential for replacement (e.g. geological SSSI, National Nature Reserves). Geology meeting national designation citation criteria but which is not designated as such.</p>
Medium	<p>Contamination:</p> <p>Human Health: Medium sensitivity land use such as commercial or industrial.</p> <p>Surface Water: Watercourses not having a WFD classification shown in an RBMP and $Q95 > 0.001\text{m}^3/\text{s}$.</p> <p>Groundwater: Aquifer providing water for agricultural or industrial use with limited connection to surface water; Groundwater SPZ 3.</p> <p>Geology:</p> <p>Of regional importance with limited potential for replacement (e.g. Regionally Important Geological Site). Geology meeting regional designation citation criteria but which is not designated as such.</p>
Low	<p>Contamination:</p> <p>Human Health: Low sensitivity land use such as highways and rail.</p> <p>Surface Water: Watercourses not having a WFD classification shown in an RBMP and $Q95 \leq 0.001\text{m}^3/\text{s}$.</p> <p>Groundwater: Unproductive Strata.</p> <p>Geology:</p> <p>Of local importance/interest with potential for replacement (e.g. non-designated geological exposures, former quarries/mining sites).</p>
Negligible	<p>Contamination:</p> <p>Human Health: Undeveloped surplus land/ no sensitive land use proposed.</p> <p>Geology:</p> <p>No geological exposures, little/no local interest.</p>

- 6.5.6 In consideration of human health, the duration and frequency of exposure to contamination, and number of pathways of exposure to contamination, increases from commercial/industrial (minimum) to residential with private garden (maximum) land uses, when considering land uses with a regular human presence. Therefore, future users of industrial sites are considered to be of low sensitivity as they would have minimal contact with underlying soil, whilst residential end users are likely to be in contact with underlying soil on a more regular basis and are therefore attributed very high sensitivity/value.
- 6.5.7 The magnitude of impacts has been determined using the criteria outlined in Table 6.4.

Table 6.4 Criteria for determining the scale of impact

Magnitude of Impact	Definition
Major Adverse	<p>Geology – The Scheme is very damaging to the geological environment/ soil resource of the study area; may result in loss of or damage to areas designated as being of regional or national geodiversity value; and the effects cannot be mitigated.</p> <p>Human Health – Significant harm to a designated receptor (e.g. human health) is likely to arise from an identified hazard at the Site without appropriate remedial action.</p> <p>Hydrogeology – Loss of, or extensive change to an aquifer used for potable supply, potential high risk of pollution of groundwater.</p> <p>Hydrology – Major decrease in water quality; loss or extensive change to a fishery, loss or extensive change to a designated Nature Conservation Site</p> <ul style="list-style-type: none"> Buildings and Infrastructure – Catastrophic damage to buildings, structures or the environment.
Moderate Adverse	<p>Geology – The Scheme may result in the loss of or damage to areas designated as being of national and/ or regional geodiversity value within the study area. Some mitigation may be possible but would not prevent damage to the geological environment, as some features of interest will be lost or partly destroyed.</p> <p>Human Health – It is possible that without appropriate remedial action, significant harm to a designated receptor (e.g. human health) could arise to a designated receptor but it is relatively unlikely that any such harm will be severe and if any harm were to occur, it is likely that such harm will be relatively mild.</p> <p>Hydrogeology – Partial loss or change to an aquifer, potential medium risk of groundwater pollution. Partial loss of the integrity of groundwater supported designated wetlands.</p> <p>Hydrology – Moderate decrease in water quality; partial loss in productivity of a fishery.</p> <p>Buildings – Significant damage to buildings, structures or the environment.</p>

Magnitude of Impact	Definition
Minor Adverse	<p>Geology – The Scheme would not affect areas with regional or national geodiversity value but may result in the loss of or damage to areas of local geodiversity value. The effects cannot be completely mitigated but opportunities exist for local enhancement of geodiversity value.</p> <p>Human Health – It is possible that harm could arise to a designated receptor (e.g. human health) from an identified hazard but it is likely that at worst this harm if realised would normally be mild.</p> <p>Hydrogeology – No significant change to an aquifer, potential low risk of pollution to groundwater. Minor effects on groundwater supported wetlands.</p> <p>Hydrology – Slight decrease in water quality.</p> <p>Buildings – Minor damage to sensitive buildings, structures services or the environment.</p>
Negligible Adverse	<p>Geology – The Scheme would result in very minor loss of geodiversity value of local areas of geological interest/soils resource such that mitigation is not considered practical.</p> <p>Human Health – There is a low possibility that harm could arise to a designated receptor. In the event of such harm being realised, it is likely to be mild or minor.</p> <p>Hydrogeology – The Scheme is unlikely to affect the integrity of the water environment.</p> <p>Hydrology – Negligible decrease in water quality.</p> <p>Buildings – Easily repairable effects of damage to buildings or structures.</p>
No Change	No observable effect either adversely or beneficially.
Negligible Beneficial	<p>Geology – The Scheme will be of minor benefit to geodiversity value by potentially providing greater exposure and or protection. The Scheme may resolve minor impact from existing land or water contamination.</p> <p>Contaminated Land – The Scheme may resolve slight impact from existing land or water contamination.</p>
Minor Beneficial	<p>Geology – The Scheme may result in the exposure of geological formations that may become of significant local interest.</p> <p>Contaminated Land – The Scheme may resolve minor impact from existing land or water contamination.</p>
Moderate Beneficial	<p>Geology – There is benefit to the geodiversity value of the geological/soil resource of the area as a result of the Scheme. The Scheme may result in the exposure of geological formations that may become of significant regional interest. The Scheme may resolve moderate impact arising from existing land or water contamination.</p> <p>Contaminated Land – The Scheme may resolve moderate impact arising from existing land or water contamination.</p>

Magnitude of Impact	Definition
Major Beneficial	<p>Geology – The Scheme is very beneficial to the geodiversity value of the geological/ soil resource of the area. The Scheme may result in the exposure of geological formations that may become of significant regional and or national interest. The Scheme may resolve major impact arising from existing land or water contamination. Note; although very few projects are likely to meet this criterion, enhancement of the SSSI presents such an opportunity.</p> <p>Contaminated Land – The Scheme may resolve major impact arising from existing land or water contamination.</p>

6.5.8 The determination of level of the effect is a factor of the value/sensitivity of the feature/resource (receptor) and the magnitude of the impact (change) as described above. Table 6.5 shows how the level of effect is derived.

Table 6.5 Determination of the level of effects

Magnitude of Impact (Change)	Value/Sensitivity of Receptor/Resource				
	Very High	High	Medium	Low	Negligible
Major	Very Large	Large/ Very Large	Moderate/ Large	Moderate	Slight
Moderate	Large/ Very Large	Moderate/ Large	Moderate	Slight	Neutral
Minor	Moderate/ Large	Moderate	Slight	Neutral	Neutral
Negligible	Slight	Slight	Neutral	Neutral	Neutral
No Change	Neutral	Neutral	Neutral	Neutral	Neutral

6.5.9 Levels of effect which are Very Large, Large, Moderate/Large or Moderate are considered to be significant for the purposes of EIA/EAR. Effects which are considered to be Slight or Neutral are considered to be non-significant and would not require further consideration.

6.6 Limitations and Assumptions

6.6.1 The appraisal has been based on available information referenced within this chapter. This is considered sufficient to inform the EAR. Ground investigation is required to inform detailed design.

6.6.2 At the time of production of this report a site-specific ground investigation has not been undertaken or made available.

- 6.6.3 This report has been compiled from a number of sources, which Arcadis believes to be trustworthy. However, Arcadis is unable to guarantee the accuracy of information provided by others. The report is based on information available at the time of writing. Consequently, there is potential for further information to become available, which may change this report's conclusion and for which Arcadis cannot be responsible.

References

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- Ref 84 Derby City Council and Derbyshire County Council (2023). Derbyshire and Derby Minerals Local Plan (2022-2038). Pre-submission Draft Plan January 2023 Derbyshire and Derby Minerals Local Plan. Towards a Minerals Local Plan: Proposed Draft Plan – December 2021. Available at: <https://www.derbyshire.gov.uk/site-elements/documents/pdf/council/have-your-say/minerals-local-plan/derbyshire-and-derby-minerals-local-plan-pre-submission-draft-plan-january-2023.pdf>
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- Ref 89 North East Derbyshire District Council (2021). North East Derbyshire Local Plan 2014 – 2034. [online] Available at: <https://www.ne-derbyshire.gov.uk/documents/adopted-ned-local-plan-2014-2034/download?Itemid=189>
- Ref 90 The Coal Authority (2024). Consultants Coal Mining Report, Ref. 51003373983002.
- Ref 91 The Coal Authority (2024). Consultants Coal Mining Report (North), Ref. 51003394907001.
- Ref 92 Zetica region UXO risk map available at <https://zeticauxo.com/downloads-and-resources/risk-maps/>
- Ref 93 Zetica UXO pre-desk study assessment, Chesterfield 10 April 2024.

7. Noise and Vibration Methodology

7.1 Legislation, Policy and Guidance

- 7.1.1 This appraisal has been undertaken in accordance with current national legislation, and national, regional and local plans and policies relating to noise and vibration in the context of the Scheme. A summary of the relevant legislation, policies and guidance, the requirements of these policies and the Scheme response is provided below.

Policy

- 7.1.2 The following planning policies are of relevance to the appraisal of Noise and Vibration for the Scheme:

- National Planning Policy Framework (NPPF), (MHCLG, 2024);
- Noise Policy Statement for England (NPSE) (DEFRA, 2010); and
- North East Derbyshire Local Plan (North East Derbyshire District Council, 2021).

- 7.1.3 A summary of the relevant information with respect to Noise and Vibration contained within the planning documentation listed above is presented below.

National Planning Policy Framework

- 7.1.4 The NPPF (MHCLG, 2024) sets out the Government's planning policies for England and how these should be applied. It provides a framework within which locally prepared plans for housing and other development can be produced. The NPPF was first published on 27 March 2012 and last updated on 12 December 2024.

- 7.1.5 With respect to noise, the NPPF states in Section 15, Paragraph 187:

'Planning policies and decisions should contribute to and enhance the natural and local environment by: [...]

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans'

- 7.1.6 Additionally, the NPPF document states in Section 15, Paragraph 198:

'Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason’.

Noise Policy Statement for England (NPSE)

- 7.1.7 The NPSE was published on 15 March 2010. It sets out the long-term vision of government noise policy, to promote good health and a good quality of life through the management of noise.
- 7.1.8 The NPSE should apply to all forms of noise including environmental noise, neighbour noise and neighbourhood noise. The NPSE does not apply to noise in the workplace (occupational noise).
- 7.1.9 The NPSE sets out the long-term vision of Government noise policy which is to:
‘Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.’
- 7.1.10 This long-term vision is supported by the following aims, through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:
- avoid significant adverse impacts on health and quality of life;
 - mitigate and minimise adverse impacts on health and quality of life; and,
 - where possible, contribute to the improvement of health and quality of life.
- 7.1.11 The aim of the NPSE is to provide clarity regarding policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion.
- 7.1.12 There are established concepts being applied to noise impacts and which are presented in the NPSE. They are:
- NOEL – No Observed Effect Level: This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise;
 - LOAEL – Lowest Observed Adverse Effect Level: This is the level above which adverse effects on health and quality of life can be detected; and
 - SOAEL – Significant Observed Adverse Effect Level: This is the level above which significant adverse effects on health and quality of life occur.
- 7.1.13 The first aim of the NPSE states that significant adverse effects on health and quality of life should be avoided while also considering the guiding principles of sustainable development.
- 7.1.14 The second aim of the NPSE refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also

considering the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur.

- 7.1.15 The third aim of the NPSE seeks, where possible, to improve health and quality of life through the proactive management of noise while also considering the guiding principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim.

North East Derbyshire Local Plan, 2021

- 7.1.16 The North East Derbyshire Local Plan, published in November 2021, sets out the framework for the growth and development of the area. It identifies how and where new development and regeneration should take place and thereby promotes and manages the future development of the Borough.
- 7.1.17 The Local Plan includes a number of strategic policies said to guide the amount, form and location of new development, and local policies that should guide the consideration of planning applications for new development.
- 7.1.18 Policy SDC13: Environmental Quality is relevant to noise and states:
- ‘1. All development proposals will be assessed in relation to their impact on air, light, noise, ground and water pollution. Planning permission will be refused for any proposal where pollution would pose an unacceptable risk to public health, quality of life or the environment.*
- [...]
- 3. Planning applications for development with the potential to pose a risk of pollution should be accompanied by an assessment of the likely impact of the development on environmental quality. Assessments of the risk of air, light, noise, ground or water pollution should relate to all stages of development.’*
- 7.1.19 Additional comments about noise are also discussed throughout the Local Plan, such as:
- ‘8.61 Planning has an important role to play in making sure that new development does not have, and is not at risk from, adverse environmental effects. Pollution can occur in terms of water, air, noise, light and land. Ensuring a safe environment is a prerequisite for safe and healthy communities and quality of life’.*
- [...]
- ‘8.66 Noise pollution is noise created by man-made sources which is excessive, causes disturbance or annoyance, and can affect wildlife and sensitive areas, including areas known for their tranquillity. It often occurs as a result of industrial operations, transportation, or roads. National Policy and the NPPF acknowledge that good planning should aim to prevent the adverse effects of noise from being unacceptable, both in identifying locations for new noise sensitive and noise generating development.’*

Guidance

7.1.20 The following guidance is of relevance to the appraisal of Noise and Vibration for the Scheme:

- Planning Practice Guidance – Noise, (MHCLG, 2019); and
- BS 4142:2014+A1:2019 – ‘Methods for Rating and Assessing Industrial and Commercial Sound’ (BSI, 2019).

Planning Practice Guidance – Noise

7.1.21 Planning practice guidance on Noise was published by the Ministry of Housing, Communities and Local Government in March 2014 and updated in July 2019.

7.1.22 Noise needs to be considered when development may create additional noise or will be sensitive to the prevailing acoustic environment, including any anticipated changes to that environment from activities that are permitted but not yet commenced.

7.1.23 Table 7.1 below, summarises the noise exposure hierarchy presented in the PPG.

Table 7.1 National planning practice guidance noise exposure hierarchy

Response	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level (NOEL)			
Not present	No effect	No observed effect	No specific measure required
No Observed Adverse Effect Level (NOAEL)			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measure required
Lowest Observed Adverse Effect Level (LOAEL)			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g., turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there	Observed Adverse Effect	Mitigate and reduce to a minimum

Response	Examples of Outcomes	Increasing Effect Level	Action
	is a small actual or perceived change in the quality of life.		
Significant Observed Adverse Effect Level (SOAEL)			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g., avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g., regular sleep deprivation/ awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

BS 4142:2014+A1:2019 – Methods for rating and assessing industrial and commercial sound

- 7.1.24 BS 4142:2014+A1:2019 (BSI, 2019) describes methods for rating and assessing sound of an industrial and/or commercial nature.
- 7.1.25 This includes sound from industrial and manufacturing processes, including sound from fixed installations comprising mechanical and electrical plant and equipment.
- 7.1.26 The methods described in BS 4142:2014+A1:2019 use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.
- 7.1.27 BS 4142:2014+A1:2019 assesses the likelihood of any adverse impact from proposed or existing industrial/commercial activities on existing or proposed noise sensitive receptors (NSRs).
- 7.1.28 To assess the potential impact, the measured background sound level at the closest NSR or at a representative location, is arithmetically subtracted from the rating level. This is the specific sound source level of the assessed source corrected for acoustical characteristics that may make the sound more subjectively noticeable to the NSRs.
- 7.1.29 The method in BS 4142:2014+A1:2019 is based on the difference between the measured background sound level, without the influence of any industrial noise

source assessed, and the rating level of the industrial source assessed, at the receiver location.

- 7.1.30 The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs.
- 7.1.31 Typically, the greater the difference between the background sound level and the rating level, the greater the magnitude of the impact.
- 7.1.32 A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- 7.1.33 A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
- 7.1.34 The lower the rating level is, relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.
- 7.1.35 Regarding the context, BS 4142:2014+A1:2019 states the following:
'An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context.'
- 7.1.36 Main specific terms used in BS 4142:2014+A1:2019 (BSI, 2019) are presented below:
- Ambient sound level, $L_a = L_{Aeq,T}$
 - equivalent continuous A-weighted sound pressure level, L_{Aeq} , of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T . The ambient sound level is a measure of the residual sound and the specific sound when present.
 - Background sound level, $LA_{90,T}$
 - A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90 per cent of a given time interval, T , measured using time weighting, F , and quoted to the nearest whole number of decibels.
 - Residual sound level, $L_r = L_{Aeq,T}$
 - ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.
 - Specific sound level, $L_s = L_{Aeq,Tr}$
 - equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, Tr .

- Rating level, L_{ar,T_r}
 - specific sound level plus any adjustment for the characteristic features of the sound.

- 7.1.37 The background sound level is an underlying level of sound over a period, T , and might in part be an indication of relative quietness at a given location. It does not reflect the occurrence of transient and/or higher sound level events and is generally governed by continuous or semi-continuous sounds.
- 7.1.38 The background sound level should be measured at the assessment location(s), where possible. Where this is not possible, an alternative location, representative of the assessment locations, can be used.
- 7.1.39 The measurement time interval should be sufficient to obtain a representative value of the background sound level for the period of interest. This should comprise continuous measurements of normally not less than 15 minute intervals, which can be contiguous or disaggregated.
- 7.1.40 The specific sound level needs to be determined at the assessment location(s) as a discrete entity, distinct and free of other influences contributing to the ambient sound. BS 4142:2014+A1:2019 suggests that the specific sound needs to be evaluated over an appropriate reference time interval, one hour during daytime and 15 minutes during night-time.
- 7.1.41 The daytime period is defined as the hours ranging from 7am to 11pm. The night-time period comprises the hours from 11pm to 7:am.
- 7.1.42 BS 4142:2014+A1:2019 (BSI, 2019) states that, where possible, the specific sound level by measurement of the ambient sound level and the residual sound level needs to be determined at the assessment location(s).
- 7.1.43 Where determining the specific sound level by direct measurement is not practicable, for example in the case of a source not yet in operation, the method of calculation has to be reported and justified in detail.
- 7.1.44 The rating level in BS 4142:2014+A1:2019 depends on certain acoustic features that can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level.
- 7.1.45 Where such features are present at the assessment location, a character correction is added to the specific sound level to obtain the rating level.
- 7.1.46 BS 4142:2014+A1:2019 states that it is typically feasible to undertake a subjective assessment of characteristics, based on the correction guidelines, as follows:
- Tonality: +2dB for a 'just perceptible' tone, +4dB for 'clearly perceptible', +6dB for 'highly perceptible' tones;
 - Impulsivity: +3dB for 'just perceptible' impulsivity, +6dB for 'clearly perceptible', rising to +9dB for 'highly perceptible' impulsivity;
 - Intermittency: if the on/off-time of the specific sound is readily distinctive at the NSRs, a +3dB character correction is added; and
 - Other sound characteristics: where the noise source features characteristics that are neither tonal nor impulsive, nor intermittent, though otherwise are readily

distinctive against the residual acoustic environment, a penalty of +3dB can be applied.

- 7.1.47 If characteristics likely to affect perception and response are present in the specific sound, within the same reference period, then the applicable corrections ought normally to be added arithmetically.
- 7.1.48 However, if any single feature is dominant to the exclusion of the others, then it might be appropriate to apply a reduced or even zero correction for the minor characteristics.
- 7.1.49 Given that transformers are industrial noise sources in nature, it is therefore considered that the methodology based on BS 4142:2014+A1:2019, 'Methods for rating and assessing industrial and commercial sound' is the most appropriate guidance to follow and consequently has been adopted for the assessment of the potential noise breakout from the Site at the identified NSRs, with the intention to design rating levels at or below background sound levels at NSRs.

7.2 Consultation

- 7.2.1 Table 7.2 provides a summary of the issues raised and agreed during consultation with respect to Noise and Vibration and how they have been addressed.

Table 7.2 Summary of consultation

Consultee/Date	Summary of Issues Raised/Agreed
NEDDC 6 March 2024	The noise impact assessment methodology was reviewed, agreed upon, and confirmed as appropriate.

7.3 Study Area

- 7.3.1 The study area for Noise and Vibration comprises the most exposed Noise Sensitive Receptors that could be affected by the Scheme.

7.4 Surveys

- 7.4.1 Baseline sound levels at the Site have been established by means of an automated noise survey completed between 13 to 23 August 2024, at two monitoring locations, considered representative of the closest NSRs shown in Table 7.3.

Table 7.3 Measurement locations and representative receptors

Measurement Location	Receptor
ML1	1 Calow Green, Hall Flash Farm, Southwood Chase

Measurement Location	Receptor
ML2	Nether House Farm, Laurel House

- 7.4.2 Class 1 sound level meters (SLMs) were used and calibrated as per the requirements presented in Section 5.2 of BS 4142:2014+A1:2019 (BSI, 2019). A field calibration check was carried out before and after every measurement session and the drift noted was less than 0.1dB in each case.
- 7.4.3 The weather conditions during the installation and collection of ML1 and ML2 were noted, and the weather conditions were also recorded during the unattended monitoring period at ML2 using a weather station Vaisala Weather Transmitter WXT530. Following the guidance presented within BS 4142:2014+A1:2019, measurement periods affected by adverse weather conditions (15 minute periods with wind speeds higher than 5m/s and periods where rainfall occurred) have been excluded.
- 7.4.4 Further details on the surveys can be found in the Noise Impact Assessment (EEN/564/NOTE2024).

7.5 Appraisal Approach

- 7.5.1 In order to identify the environmental impacts of the Scheme, a comparison of the current environmental conditions immediately before the Scheme is implemented (baseline) was compared to a prediction of how the environmental conditions are likely to change once the construction and operation of the Scheme has been undertaken. An iterative process was followed during appraisal to develop appropriate control measures to avoid or reduce potential environmental impacts.

Background Noise Levels

- 7.5.2 During night-time periods, the background sound levels are lower than the daytime background sound levels, and as the supergrid transformers (SGTs) operate 24/7, this makes the night-time period a more onerous assessment. Therefore, only the night-time assessment is presented in the appraisal.
- 7.5.3 Based on the analysis of the background levels from the survey, a representative background sound level of 33dB(A) has been selected for 1 Calow Green, Hall Flash Farm, and Southwood Chase, and 32dB(A) for Nether House Farm and Laurel House.
- 7.5.4 In line with BS 4142:2014+A1:2019 (BSI, 2019), a typical background sound level should be selected and should not automatically be assumed to be the minimum value. The typical background sound levels have been carefully selected based on the statistical cumulative percentage analysis, which indicates that background sound levels will typically exceed the chosen representative sound levels approximately 70-75 per cent of the time.

Noise sources scoped out of the appraisal

- 7.5.5 Under normal operating conditions, the cooling systems of the SGTs will rarely operate. Cooling systems may operate during emergency conditions and during times of unusually high demand, typically where the transformer is required to operate above 75 per cent of designed full load. Such conditions usually occur only during exceptional events, (i.e. extreme weather combined with faults elsewhere on the system, requiring an SGT to carry a higher than normal load). These conditions would usually persist for a short duration and as such, cooler operation can typically be regarded as an exceptional event.
- 7.5.6 Circuit breakers, disconnectors and switches are also a potential source of noise. Their purpose is to disconnect the Site from the high voltage transmission system in response to a fault or external event such as a lightning strike, and to isolate and earth parts of the Site for maintenance.
- 7.5.7 The sound from a circuit breaker is impulsive and sounds like a car door slam, similar in level and duration, and the sound of disconnectors and switches is less impulsive and sounds like a 'click' or 'clack'. This equipment would operate very rarely.
- 7.5.8 The majority of breaker activations would take place during commissioning when there may be 10 or 20 activations during working hours only. Once commissioned, they may typically operate just a few times a year and in some years, they may never operate at all. Whilst the sound of this equipment when operating may be audible just beyond the Site boundary, it is unlikely to be noticeable even in a quiet rural environment.
- 7.5.9 Other items of equipment form part of this development but do not produce noise, or produce very low-level noise that would generally not be audible beyond the Site boundary. These items of auxiliary equipment include small current transformers, voltage transformers, low voltage site supplies, control kiosks, battery rooms and site lighting.
- 7.5.10 The proposed substation uses GIS, which means that the insulating media is not air, but a special gas instead. Therefore, the majority of the high voltage equipment is enclosed within insulated pipes and is contained within a building, reducing the potential for noise breakout from this equipment as well.
- 7.5.11 Once a substation is operating it will be unmanned. Operational traffic noise is considered to be unnoticeable against normal traffic. Therefore, operational traffic noise is excluded from this assessment.
- 7.5.12 The installation of the SGTs typically employs measures to minimise vibrations from its operation, such as antivibration pads, therefore operational vibration is excluded from the scope of the assessment.

SGT Sound Power Levels

- 7.5.13 Sound power levels from the SGTs of the proposed site have been derived from National Grid's Technical Specification 2.03, Power Transformers and Reactors, TS 2.03, Issue 7, June 2021. This document specifies the maximum sound power level for transformer units under specific operating conditions, in accordance with IEC 60076-10, Power transformers - Part 10: Determination of sound levels.

- 7.5.14 The rated power of the proposed SGTs is 240 MVA. The maximum sound power level of the main unit at 50 per cent load and 102.5 per cent excitation voltage is 95dB(A).

Noise Model

- 7.5.15 The specific sound level at the NSRs have been calculated using a 3D sound model using acoustic modelling software Datakustik CadnaA. This software's calculation method is based on ISO 9613-2:1996 and considers the distance between source and receiver including reflection or screening effects from buildings.
- 7.5.16 An additional acoustic model was then created where the sound power levels of the SGTs have been adjusted with the use of acoustic enclosures.
- 7.5.17 Further details on the acoustic models and the results can be found in the Noise Impact Assessment (EEN/564/NOTE2024).

7.6 Limitations and Assumptions

- 7.6.1 The background sound levels derived from the acoustic survey for the assessment are considered to be suitably representative for surrounding NSRs. The weather conditions were continuously monitored during the unattended measurement using a weather station and those periods with wind speeds higher than 5m/s, and/or rainfall were discarded from the dataset for the assessment.
- 7.6.2 Source sound power levels have been based on higher voltages and loads than would typically occur, at 102.5 per cent voltage and 50 per cent load from the National Grid Technical Specification document.
- 7.6.3 Specific noise levels have been calculated using a 3D sound model and rated noise levels have considered character corrections.
- 7.6.4 Based on the aforementioned, it is considered that the uncertainty of the measurements, the determination of the background levels, and calculations for the appraisal have minimal influence on the outcome of the assessment.

References

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8. Traffic and Transport Methodology

8.1 Legislation, Policy and Guidance

- 8.1.1 This assessment has been undertaken in accordance with current national legislation, and national, regional and local plans and policies relating to traffic and transport in the context of the Scheme. A summary of the relevant legislation, policies and guidance, the requirements of these policies and the Scheme response is provided below.

Legislation

- 8.1.2 This section identifies the legislation in the context of traffic and transport, which includes the Highways Act 1980, Transport Act 2000, and the Environment Act 2021.

Highways Act 1980

- 8.1.3 The Highways Act 1980 outlines the duties of the highway authorities, and the management and operation of the highway network. The legislation most relevant to this traffic and transport chapter include 'Improvement of Highways', which is covered in Part V, and 'Environmental Impact Assessment', which is covered in Part VA.

Transport Act 2000

- 8.1.4 The Transport Act 2000 includes measures to create a more integrated transport system with the aim of improving local passenger transport services, alongside reducing congestion and pollution. This is exemplified by the requirement for local authorities to prepare, publish and review a local transport plan to achieve the outlined aims of this legislation. These plans have been taken into consideration in the assessment of traffic and transport.

Environment Act 2021

- 8.1.5 The Environment Act 2021 amends the Environment Act 1995. It established the Environment Agency and provides a framework for environmental protection and improvement including the impacts of transport.

Policy

National Planning Policy Framework

- 8.1.6 The NPPF (MHCLG, 2024) sets out the Government's economic, environmental, and social planning policies for England. Taken together, these policies articulate the Government's vision of sustainable development, which should be interpreted and applied locally to meet local aspirations.

- 8.1.7 The NPPF clearly promotes sustainable transport as the document highlights the following:
- Transport policies have an important role to play in facilitating sustainable development but also in contributing to wider sustainability and health objectives.
 - The transport system needs to be balanced in favour of sustainable transport modes, giving people a real choice about how they travel.
 - The Government recognises that different policies and measures will be required in different communities and opportunities to maximise sustainable transport solutions will vary from urban to rural areas.
 - The environmental impacts of traffic and transport infrastructure can be identified, assessed, and considered. Therefore, encouragement should be given to solutions which support reductions in greenhouse gas emissions and reduce congestion.
- 8.1.8 Transport specific policies are also highlighted throughout the NPPF with paragraph 109 stating that:
- ‘Transport issues should be considered from the earliest stages of plan-making and development proposals, using a vision-led approach to identify transport solutions that deliver well-designed, sustainable and popular places. This should involve:*
- a) making transport considerations an important part of early engagement with local communities;*
- b) ensuring patterns of movement, streets, parking and other transport considerations are integral to the design of schemes, and contribute to making high quality places;*
- c) understanding and addressing the potential impacts of development on transport networks;*
- d) realising opportunities from existing or proposed transport infrastructure, and changing transport technology and usage – for example in relation to the scale, location or density of development that can be accommodated;*
- e) identifying and pursuing opportunities to promote walking, cycling and public transport use; and*
- f) identifying, assessing and taking into account the environmental impacts of traffic and transport infrastructure – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains.’*
- 8.1.9 Paragraph 115 of the NPPF states that *‘In assessing sites that may be allocated for development in plans, or specific applications for development, it should be ensured that:*
- a) Sustainable transport modes are prioritised taking account of the vision for the site, the type of development and its location.*
- b) Safe and suitable access to the Site can be achieved for all users.*

c) the design of streets, parking areas, other transport elements and the content of associated standards reflects current national guidance, including the National Design Guide and the National Model Design Code.

d) any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree through a vision-led approach.'

- 8.1.10 Paragraph 116 of the NPPF states that *'Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network, following mitigation, would be severe, taking into account all reasonable future scenarios.'*
- 8.1.11 8.1.11 Paragraph 199 of the NPPF states that: *'Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management.'* This policy shows that the need to manage all traffic is essential to protect the natural environment as much as reasonably possible.
- 8.1.12 Considering development proposals, it should be ensured that:
- Appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location;
 - Safe and suitable access to the Site can be achieved for all users; and
 - Any significant impacts of the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree.

Derbyshire Local Transport Plan 3, 2011-2026

- 8.1.13 The Derbyshire Local Transport Plan (LTP) 3 (Derbyshire County Council, 2011) was published in April 2011. This outlined the transport vision, goals, and challenges to be tackled, and a long-term transport strategy up to 2026.
- 8.1.14 The five transport goals and key challenges of this LTP are as follows:
- Supporting a resilient local economy;
 - Tackling climate change;
 - Contributing to better safety, security and health;
 - Promoting equality of opportunity; and
 - Improving quality of life promoting a healthy natural environment.
- 8.1.15 Freight management has also been addressed within this LTP to reduce its impact. The LTP highlights that applying and enforcing weight limits to roads and lorry routeing and enforcement will help roads run more efficiently, aiming to minimise disruptions caused by lorries travelling through villages. It highlights that Derbyshire's Trading Standards division carried out a Weight Restriction Enforcement Project on roads and bridges due to complaints made by local residents and councillors. This represents further emphasis that freight management is an important area of work, attracting support and interest of residents in the affected areas. The LTP refers to the following policy: *'TFR2 Encourage the provision of service facilities and overnight*

lorry parks in locations served easily by major roads, subject to the minimisation of any environmental, social and congestion consequences this may have.'

- 8.1.16 Derbyshire is aiming to drive its maintenance programmes to provide a more strategic holistic view of the county. Those relevant to the Scheme include:
- *'Heavy goods vehicles - Capture speed and HGV prohibition area by polygon and extend/reduce limits to provide consistent and manageable areas subject to orders that will benefit maintenance strategies. Progress the provision of better data to Satellite Navigation'*

North East Derbyshire Local Plan, 2014 – 2034

- 8.1.17 The North East Derbyshire Local Plan 2014 – 2034 (North East Derbyshire District Council, 2021) was formally adopted by the council on 29 November 2021. It is the statutory development plan for North East Derbyshire and is used to guide decisions on planning applications and areas where investment should be prioritised.
- 8.1.18 Policy SS1 (Sustainable Development) sets out how sustainable growth will be delivered in North East Derbyshire. Development proposals are expected to contribute by locating 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.
- 8.1.19 Policy ID3 (Sustainable Travel) states that the council will seek to maximise walking, cycling, and the use of public transport through the location and design of new development, with the aim of reducing congestion and improving air quality and health.
- 8.1.20 The policy requires major development *'to promote sustainable travel through necessary interventions as identified through appropriate transport statements or assessments including the following:*
- a) Site-specific and area-wide travel demand measures;*
 - b) Improvements to existing pedestrian, cycle and public transport services and facilities, and provision of new walking and cycling routes. New routes should provide direct links to new or existing footpaths, cycling networks, and local facilities; and*
 - c) Optimisation of the existing highway network to prioritise walking, cycling, public transport and other forms of sustainable travel.'*
- 8.1.21 Highway capacity enhancements should deal with residual car demand where the initiatives required in criteria (a) to (c) above are insufficient to avoid significant additional car journeys.
- 8.1.22 In all cases, planning permission will only be refused on transport grounds if there will be an unacceptable impact on highway safety, or where the residual cumulative impacts on the road network would be severe.

Guidance

Design Manual for Roads and Bridges LA 104 Environmental Assessment and Monitoring

- 8.1.23 This document (Highways England, 2020) outlines the requirements for environmental assessment of projects, including the reporting and monitoring of significant environmental effects. This aligns with the requirements of the Directive 2011/92/EU as amended by 2014/52/EU 2014/52/EU. The document covers environmental assessment methodology including assigning value to receptors, magnitude of impact and significance of effect.

Guidelines for the Environmental Assessment of Road Traffic

- 8.1.24 The IEMA guidelines (IEMA, 2023) are for the assessment of the environmental impact of road traffic associated with major new development. The objective is to provide the basis for a systematic, consistent and comprehensive coverage for the assessment of traffic impacts arising from development projects. This will enable potential problems and possible solutions to be identified at an early stage.
- 8.1.25 The IEMA guidelines state that the environmental assessment process should run throughout the planning and design stages of projects. Section 2 of the document contains a checklist of environmental effects which include traffic noise, disruptions, pedestrian and cyclist impacts, and accidents and safety.
- 8.1.26 Within Section 3 of the IEMA guidelines, traffic issues have been covered. These include impacts relating to volume, traffic speeds, operational factors and traffic compositions, but also the perception of changes in traffic by humans and the impact on ecological systems. The assessment of the environmental impacts due to the associated traffic requires the following:
- determination of the existing and forecasted traffic levels, including the characteristics;
 - determination of the time period suitable for assessment;
 - determining the assessment year; and
 - identifying the geographical boundaries required for assessment.
- 8.1.27 Where possible, the ES should outline alternative sites considered, including the impacts and the reason for selecting the preferred site.

Transport Evidence Bases in Plan Making and Decision Taking

- 8.1.28 This guidance (MHCLG, 2015) is to help local planning authorities assess and reflect strategic transport needs in Local Plan making. The transport evidence base should identify the opportunities to encourage a modal shift towards sustainable transport usage. This will also enable transport impacts of developments to be assessed and in turn inform sustainable approaches. This guidance highlights the information required and what information needs to be considered when undertaking a transport assessment.

Travel Plans, Transport Assessments and Statements

- 8.1.29 This guidance (MHCLG, 2014) provides support for decision-making regarding travel plans, transport assessments and transport statements, outlining when these documents are required, in addition to what each should contain.
- 8.1.30 Travel plans, transport assessments and statements assess and mitigate the transportation impacts arising from development projects, and promote sustainable development. They are all required for developments which produce substantial traffic movements.
- 8.1.31 Assessments should be based on normal traffic flow and usage conditions, although it may be required to consider the implications of peak traffic flows. Any projections should use local traffic forecasts. The timeframe of the assessments should be agreed with the relevant local planning authorities in consultation with the relevant transport network operators and service providers.

8.2 Consultation

- 8.2.1 Table 8.1 provides a summary of the issues raised and agreed during consultation with respect to traffic and transport and how they have been addressed.

Table 8.1 Summary of consultation

Consultee/Date	Summary of Issues Raised/Agreed
Derbyshire County Council – Local Highway Authority 15 November 2024	<p>A request was submitted for an opinion on the traffic and transport proposed approach, which includes the methodology, the proposed construction route, and mitigation measures.</p> <p>The following response was received:</p> <p><i>‘In terms of the proposed methodology for the TA, this has been generally agreed. The potential predicted increase in vehicle flows for general traffic or HGVs will be dependent on the routes agreed for construction traffic. Both the A61 and A617 are both sensitive routes with high levels of congestion particularly in the peak hours – the A617 more so on the western approach to junction 29 of the M1.</i></p> <p><i>It was noted that both Calow Green and Calow Lane are not considered appropriate routes to access the Site; however, as the predicted flows, vehicle types, size and constraints are unknown at this time it is difficult to understand the potential impact on any route to and from the Site.</i></p> <p><i>Requested for the number and type of vehicles which are predicted to facilitate the works proposed to be provided once available in order to provide more detailed and meaningful comments.’</i></p>

Consultee/Date	Summary of Issues Raised/Agreed
Derbyshire County Council – Public Rights of Way Officer 7 August 2024	<p>A request was submitted for an opinion on the PRoWs that will be affected by the Scheme.</p> <p>The following response was received:</p> <p><i>‘Requested that once detailed proposals for the footpaths are available, this should be discussed with at an early stage, in order to voice any comments regarding any proposed permanent diversions or extinguishments. Noted to consider trying to avoid extinguishments and keep any diversions as close to the current alignments as possible.’</i></p>

8.3 Study Area

- 8.3.1 The study area for traffic and transport is limited to roads along the proposed construction route including the Calow Lane, the A632, B6425 Deepsick Lane/Moor Lane/Hassocky Lane and A617 (non-strategic road network section). Beyond these roads, the construction traffic will be distributed onto the M1 which forms part of the strategic road network (SRN) dispersing further along numerous SRN routes and the effect of the additional traffic will be diluted. The proposed construction route is shown on a plan in Appendix C, Proposed Site Layout.

8.4 Surveys

Desk-Based Study

- 8.4.1 This traffic and transport assessment has been informed by a desk-based study which included a review of existing traffic baseline, transport policy/plans, potential future transport improvements and major development proposals. Discussions with National Grid and its Front-End Engineering Design (FEED) contractor were held, in particular around anticipated construction traffic movements and proposed mitigation measures. Initial engagement with the local highways authority, Derbyshire County Council on the approach taken for this traffic and transport assessment, including the proposed construction route to/from the SRN and the Site, has been undertaken. Derbyshire County Council were also consulted with in regard to the Outline Construction Traffic Management Plan (OCTMP) ensuring their comments incorporated were appropriate.

Visual Inspection Survey

- 8.4.2 The Arcadis Traffic and Transport team have undertaken a Traffic and Transport Visual Inspection survey along the construction route for Chesterfield which includes Calow Lane, the B6425 Hassocky Lane and the A617 connecting to the M1 which forms part of the SRN, in addition to inspecting PRoWs which could potentially be affected by the Scheme.

- 8.4.3 Site surveys were undertaken on Monday 15 April 2024 to allow for a visual inspection of the potential construction vehicle routes, confirming findings of background data and identifying any unknown constraints or opportunities.

Traffic Surveys

- 8.4.4 Intelligent Data Collection were commissioned to undertake traffic surveys for sections of the proposed construction route where no DfT count data were available, and on both approaches to the substation site access to obtain classified flows and 85 percentile speed data over a one-week period.
- 8.4.5 Traffic surveys were undertaken for a one-week period, for 24 hours between 2 July and 8 July 2024 to avoid the school summer holidays. These data were collected via automatic traffic counts on Calow Lane, the B6425 and using a camera for the A617.
- 8.4.6 The traffic surveys which have been undertaken are shown on a plan in Appendix C, Proposed Site Layout.

8.5 Appraisal Approach

- 8.5.1 In order to identify the environmental impacts of the Scheme, a comparison of the current environmental conditions immediately before the Scheme is implemented (baseline) was compared to a prediction of how the environmental conditions are likely to change once the construction and operation of the Scheme have been undertaken. An iterative process was followed during appraisal to develop appropriate control measures to avoid or reduce potential environmental impacts.

Assessment Methodology

- 8.5.2 This transport appraisal methodology is broadly based on assessment criteria developed for similar infrastructure projects and IEMA Guidelines for the Environmental Assessment of Road Traffic (2023) (IEMA, 2023).
- 8.5.3 The appraisal has been undertaken to understand the changes in traffic flows on roads and links along the proposed construction route to and from the Site; to determine potential environmental effects associated with construction traffic generated by the Scheme, if any; and to ensure that proposed construction control measures identified in the EAR Chapter 11 and OCTMP presented in Appendix A, Glossary and Abbreviations are fit for purpose.
- 8.5.4 The IEMA guidelines (IEMA, 2023) suggest two broad rules that can be applied to the screening process to identify the appropriate extent of the assessment:
- Rule 1: include roads where traffic flows are predicted to increase by more than 30 per cent (or where the number of heavy goods vehicles (HGVs) is predicted to increase by more than 30 per cent); and
 - Rule 2: include any specifically sensitive areas where traffic flows are predicted to increase by 10 per cent or more.
- 8.5.5 Where traffic increases are less than the threshold, an assessment of traffic and transport related environmental effects are unlikely to be significant.

- 8.5.6 This transport appraisal is concerned with potential effects relating to impacts during the construction period and considers potential traffic and transport effects on:
- existing road users: drivers and passengers; pedestrians; cyclists; public transport users; operators and employees; commercial vehicle users; emergency vehicle users and freight users;
 - sensitive receptors: such as schools, playgrounds, hospitals, tourist attractions etc; and
 - transport infrastructure: road network, and pedestrian and cycle networks.
- 8.5.7 This appraisal has been informed by a desk-based study, and discussions with National Grid and its FEED contactor, in particular around anticipated construction traffic movements and proposed mitigation measures. Discussions have also been held with Derbyshire County Council to consult on the proposed construction route, existing traffic baseline, potential future transport improvements, major development proposals, and to incorporate their requirements.
- 8.5.8 The assessment examines a robust case in terms of traffic and transport effects. The assessment of construction traffic was undertaken for 2027, as this is the year when the highest predicted levels of construction HGV traffic are expected to occur. The assessment of the operational phase has been scoped out of the appraisal.

Sources of Baseline Data

- 8.5.9 The baseline data have been derived from multiple sources, and a desktop review undertaken. Sources of baseline data are provided below:
- Annual Average Daily Traffic (AADT) flows have been obtained from Department for Transport (DfT) static traffic counters (DfT, 2025). Location of the counters is shown on the plan in Appendix C, Proposed Site Layout;
 - AADT flows from the DfT counts were converted into average weekday traffic flows. 12-hour flows (7am-7pm) have been derived from the DfT traffic data by applying an appropriate factor. This has been based on a standard daily profile over a 24-hour period from the DfT's online road traffic statistics table TRA0307 (DfT, 2025);
 - traffic surveys have been undertaken by Intelligent Data Collection using automatic traffic counts and cameras. Location of the counters is shown on the plan in Appendix C. From these surveys, the 12-hour flows (7am-7pm) have been extracted;
 - the latest three-year personal injury collision data from CrashMap (2021-2023) (Crashmap, 2025);
 - PRoW mapping was provided by Derbyshire County Council;
 - information about public transport from the Traveline (2025) and Derbyshire County Council (2025); and
 - online mapping and aerial photograph from Google Maps.

8.6 Limitations and Assumptions

8.6.1 The following limitations and assumptions have been identified:

- Construction traffic forecasts are based on an initial high-level estimate of construction materials and programme and are considered to provide a reasonable worst-case scenario. It is considered that these limitations do not affect the robustness of the assessment.
- Traffic flows have been obtained from DfT's static traffic counters and traffic surveys to establish the future baseline for the traffic and transport assessment.
- An assessment has been undertaken to identify the likely percentage increase in HGV and in total traffic due to construction on the Local Road Network using the future baseline traffic flow data. The predicted increase has been assessed against 12-hour weekday flows (7am to 7pm).
- Working days are assumed to be Monday to Friday, 7am to 7pm, except during system outages. Systems outages are assumed to be permitted only within the clock change periods for standard summer working (end of March to end of October). During outages weekend working will be required. As such, the assessment of predicted impacts from construction traffic against 12-hour weekday flows (7am to 7pm) represent the worst-case scenario.
- It is anticipated that all construction HGV traffic would access the proposed construction routes from the SRN.
- It is assumed that the primary construction route will be between the M1 (part of the SRN) and the Site access travelling along the A617, B6425, A632 and Calow Lane.
- During normal operation of the Scheme, it is understood that the only traffic generated will be associated with infrequent (assumption of 10 vehicles per year) repair and routine maintenance and inspection activities and a small number of operational staff. Operational traffic numbers will also be dependent on any operational issues with the Site. Therefore, movements are not anticipated to have a material effect on the transport network and receptors, and therefore, no further assessment will be required.

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- Ref 113 Traveline (2025). Traveline. [online] Available at: <https://www.traveline.info/> (Accessed 21 March 2025)

9. Agriculture and Soils

9.1 Legislation, Policy and Guidance

- 9.1.1 This appraisal has been undertaken in accordance with current national legislation, and national, regional and local plans and policies relating to agriculture and soils in the context of the Scheme. A summary of the relevant legislation, policies and guidance, the requirements of these policies and the Scheme response is provided below.

Policy

- 9.1.2 The Agricultural Land Classification (ALC) assessment is consistent with the direction given by paragraph 187, Section 15: Conserving and enhancing the natural environment, of the NPPF (MHCLG, 2024) as follows:

‘Planning policies and decisions should contribute to and enhance the natural and local environment by: [...] (b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland’.

- 9.1.3 Footnote 65 at paragraph 188 of the NPPF also states that *‘where significant development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of a higher quality.’*

- 9.1.4 The NPPF defines best and most versatile agricultural land as land in grades 1, 2, and 3a under the ALC system.

- 9.1.5 The Overarching National Policy Statement for Energy (EN-1) (DESNZ, 2023) states that energy projects could have adverse effects on agriculture, as follows:

- Paragraph 5.11.12 states that *‘Applicants should seek to minimise impacts on the best and most versatile agricultural land (defined as land in grades 1, 2 and 3a of the Agricultural Land Classification) and preferably use land in areas of poorer quality (grades 3b, 4 and 5)’*; and
- Paragraph 5.11.34 states *‘The Secretary of State should ensure that applicants do not site their scheme on the best and most versatile agricultural land without justification. Where schemes are to be sited on best and most versatile agricultural land the Secretary of State should take into account the economic and other benefits of that land. Where development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of a higher quality.’*

- 9.1.6 The North East Derbyshire Local Plan 2014-2034 (adopted November 2021) states in Policy SS1 Sustainable Development that *‘In order to contribute to sustainable development in North East Derbyshire, development proposals will [...] Protect the productive potential of the District’s best quality agricultural land [...]’.*

Guidance

- 9.1.7 The Ministry of Agriculture, Fisheries and Food (MAFF, 1988) ALC system for grading land quality for land use planning, divides agricultural land into five grades (with Grade 3 land subdivided into Grades 3a and 3b). These grades divide land according to the degree of limitation imposed on land use by the inherent characteristics of climate, site and soils.
- 9.1.8 Protecting best and most versatile agricultural land and the undertaking of ALC is supported by the Natural England Guide to assessing development proposals on agricultural land (Natural England, 2021).
- 9.1.9 A description of each grade is set out below based on the ALC guidelines.

Grade 1 – excellent quality agricultural land

- 9.1.10 Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly includes top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.

Grade 2 – very good quality agricultural land

- 9.1.11 Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than Grade 1.

Grade 3 – good to moderate quality agricultural land

- 9.1.12 Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown the yields are generally lower or more variable than on land in Grades 1 and 2.

Subgrade 3a – good quality agricultural land

- 9.1.13 Land capable of consistently producing moderate to high yields of a narrow range of arable crops, especially cereals, or moderate yields of a wide range of crops including cereals, grass, oilseed rape, potatoes, sugar beet and the less demanding horticultural crops.

Subgrade 3b – moderate quality agricultural land

- 9.1.14 Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass, or lower yields of a wider range of crops, or high yields of grass which can be grazed or harvested over most of the year.

Grade 4 – poor quality agricultural land

- 9.1.15 Land with severe limitations which significantly restrict the range of crops and/or level of yields. It is mainly suited to grass with occasional arable crops (e.g. cereals and forage crops) the yields of which are variable. In moist climates, yields of grass may

be moderate to high, but there may be difficulties in utilisation. The grade also includes very droughty arable land.

Grade 5 – very poor-quality agricultural land

- 9.1.16 Land with very severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

9.2 Surveys and Appraisal

- 9.2.1 A desk study to collate baseline information for the Site, such as geology, available ALC and soil information, was undertaken prior to the field survey.
- 9.2.2 The ALC field survey and assessment was undertaken in accordance with:
- Soil Survey Field Handbook (Hodgson, 2022);
 - ALC guidelines (MAFF, 1988); and
 - Climatological data (Meteorological Office, 1989).
- 9.2.3 The detailed survey involved the examination of the physical soil properties at 16 auger bore locations and one soil pit location. The survey was undertaken on 28 April 2025.
- 9.2.4 The survey was conducted at a density of a 100m grid within the Scheme boundary and at 100m intervals along overhead lines, meeting the Guidance requirement of one auger bore examination per hectare. Auger bores (see Appendix A of the Chesterfield New 400kV Substation Agricultural Land Classification Report) were set out prior to the field survey and were loaded with Google Earth app into smartphones to locate auger bores in the field along with the paper map.
- 9.2.5 Soil profiles were examined up to a depth of 120cm by using a 5cm Dutch soil auger.
- 9.2.6 The following soil and site properties were examined/recorded:
- soil texture;
 - horizon depths;
 - stoniness;
 - calcareousness (using 10 per cent hydrochloric acid);
 - matrix colour (based on a Munsell Colour Chart (Munsell, 2010));
 - mottles (colour, size and number);
 - ped structure; and
 - slope (using a clinometer).
- 9.2.7 One soil pit was dug to further examine and assess subsoil structure using an insulated spade.
- 9.2.8 The auger bore logs are presented in Appendix B of the Chesterfield New 400kV Substation Agricultural Land Classification Report alongside the following parameters:

- Site: gradient, micro-relief and flooding;
- Interactive factors: soil wetness class and soil droughtiness; and
- Most limiting factors and final ALC grade.

9.2.9 A Cable Avoidance Tool and Signal Generator (CAT and Genny) were used to scan each auger bore or sampling location and the soil pit to avoid buried services before breaking ground. Soils from each auger bore and the soil pit were reinstated after examination.

9.3 Limitations

Climatic Limitations

- 9.3.1 The main parameters used in the assessment of overall climatic limitation are average annual rainfall (AAR), as a measure of overall wetness, and accumulated temperature (AT0), as a measure of warmth in the growing season.
- 9.3.2 According to the AAR and AT0 values presented in Chesterfield New 400kV Substation ALC Report, the Site is limited by climate to either Grade 1 or Grade 2, indicating that climatic conditions do not represent significant factors limiting crop production for the Site.

Site Limitations

Gradient and microrelief

- 9.3.3 South of Callow Lane the Site is either level or gently sloping (1-2°). As such, gradient and microrelief are not considered to represent limiting factors across the Site.

Flooding

- 9.3.4 Flooding from surface water, rivers and the sea is low risk (less than 0.1 per cent each year). Therefore, there is no limitation to grade as a result of flood risk across the Site.

Soil Limitations

Soil depth

- 9.3.5 The depth of soils is not a limiting factor for the Site, as the soils present are deep (i.e., greater than 60cm).

Stoniness

- 9.3.6 Topsoil across the Site mostly contained few hard stones (1-5 per cent) (see Appendix B of the Chesterfield New 400kV Substation ALC Report). Therefore, stoniness does not represent a significant limiting factor for the Site.

Soil texture

- 9.3.7 Topsoil texture is not a direct limiting factor for the Site, as the topsoils are loams, generally medium or heavy clay loams, with some medium silty clay loams (see Appendix B of the Chesterfield New 400kV Substation ALC Report).

Chemical Limitations

- 9.3.8 There was no chemical limitation on soil physical conditions, crop yield or growing observed from the onsite surveys. The survey areas of the Site are predominately either arable farming or grass fields.

Interactive Limitations

- 9.3.9 Soil wetness class assessment and soil droughtiness calculations indicate that soil wetness was a direct limiting factor, resulting in predominantly Grade 3b classification, with a limited area of Grade 4 land.
- 9.3.10 Soil droughtiness was not a direct limiting factor, with soil droughtiness grades of Grade 1.
- 9.3.11 Gleying was observed within 30cm – 45cm and slowly permeable layers were observed within 40cm for all the auger bores, typically limiting these soils by soil wetness to Grade 3b.
- 9.3.12 The soil wetness class was IV, resulting in Grade 3b land, with a small area of Grade 4 land being observed to the south of the Site (auger bore C10), due to heavy clay loam topsoil texture, rather than medium clay loam identified across the rest of the Site.
- 9.3.13 However, as auger bore C10 was in isolation (a singular point with a different ALC grade compared to surrounding boreholes), adjustment to the ALC grade was made.
- 9.3.14 Examination of the soil pit in the centre of the Site confirmed the depths of gleying and slowly permeable layers identified in the auger bore examinations. Photos and descriptions of the soil profile from this pit is presented in Appendix C of the Chesterfield New 400kV Substation ALC Report.

References

- Ref 114 Department for Energy Security & Net Zero (DESNZ) (2023). Overarching National Policy Statement for Energy (EN-1).
- Ref 115 Hodgson, J.M. (2022). The Soil Survey Handbook. Soil Survey Technical Monograph No. 5, Cranfield.
- Ref 116 Meteorological Office (1989). Climatological Data for Agricultural Land Classification. London: The Meteorological Office.
- Ref 117 Ministry of Agriculture, Fisheries and Food (MAFF) (1988). Agricultural Land Classification Criteria. [online] Available at: <https://publications.naturalengland.org.uk/publication/6257050620264448>
- Ref 118 Ministry of Housing, Communities & Local Government (MHCLG) (2025). National Planning Policy Framework. [online] Available at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>
- Ref 119 Munsell (2010). Munsell Soil Colour Charts.
- Ref 120 Natural England (2021). Guide to assessing development proposals on agricultural land. [online] Available at: <https://www.gov.uk/government/publications/agricultural-land-assess-proposals-for-development/guide-to-assessing-development-proposals-on-agricultural-land>
- Ref 121 North East Derbyshire District Council (2021). North East Derbyshire Local Plan (2014-2034). [online] Available at: <https://www.ne-derbyshire.gov.uk/planning-and-local-plan/planning-policy-and-local-plan/development-plan#ANE>

10. Socioeconomics and Human Health

10.1 Legislation, Policy and Guidance

- 10.1.1 This appraisal has been undertaken in accordance with current national legislation, and national, regional and local plans and policies relating to socioeconomics and human health in the context of the Scheme. A summary of the relevant legislation, policies and guidance, the requirements of these policies and the project response is provided below.

Legislation

- 10.1.2 This section provides a summary of legislation which is specific to the Socioeconomics and Human Health assessment:

- The Countryside and Rights of Way (CROW) Act (2000) (as amended in 2015) (HM Government, 2015) outlines the principal legislation governing the registration and protection of public footpaths, bridleways, byways open to all traffic and restricted byways.

Policy

- 10.1.3 This section provides a summary of policy which is specific to the Socio-economics and Human Health assessment:

- National Planning Policy Framework (MHCLG, 2024) sets out the Government's economic, social and environmental planning policies for England. These policies outline the Government's vision of sustainable development, 'support renewable and low carbon energy and associated infrastructure', and 'building a strong, competitive economy'.
- Planning Practice Guidance (PPG) offers guidance on a range of issues, including 'Healthy and safe communities' (MHCLG, 2022), and 'Open space, sports and recreation facilities, public rights of way and local green space' (MHCLG, 2014).
- The Chesterfield Borough Local Plan (Chesterfield Borough Council, 2020) sets out the vision for Chesterfield between 2018 and 2035. This includes A Healthy Environment (CLP14) which requires all developments to include an assessment of environmental impacts related to human health; and Green Infrastructure (CLP15) which recommends development to increase opportunities for cycling, walking and horse riding.

Guidance

- 10.1.4 This section provides a summary of guidance for the Socioeconomics and Human Health assessment:
- There is no specific guidance available on approaches in assessing the impacts of a substation on Socioeconomics. The methodology used has been based on experience from similar projects and professional judgement.
 - The assessment of community facilities, business, recreation and tourism assets is guided by DMRB LA 112 Population and Human Health (Highways England, 2020).
 - The assessment of human health is guided by the following:
 - Health in Environmental Impact Assessment - A Primer for a Proportionate Approach (IEMA, 2017)
 - Effective Scoping of Human Health in Environmental Impact Assessment (IEMA, 2022a)
 - Determining Significance for Human Health in Environmental Impact Assessment (IEMA, 2022b)
 - Mental Well-being Impact Assessment (MWIA) toolkit (NMWIA, 2011)
 - ICNIRP Guidelines for Limiting Exposure to Electromagnetic Fields (International Commission on Non-Ionizing Radiation Protection, 2020)

10.2 Consultation

- 10.2.1 Table 10.1 provides a summary of the issues raised and agreed upon during consultation with respect to socioeconomics and human health and how they have been addressed.

Table 10.1 Summary of consultation

Consultee/Date	Summary of Issues Raised/Agreed
Chesterfield and North East Derbyshire and Bolsover Ramblers Association	Ongoing consultation regarding a temporary closure programme as additional construction programme detail emerges.

10.3 Study Area

- 10.3.1 The study area for socioeconomics and human health comprises:
- Socioeconomics: This assessment is based on the local planning authority the Scheme falls within, North East Derbyshire District. For comparative purposes, East Midlands and England have also been identified.
 - Community facilities: This assessment is based on a 500m buffer from the Scheme boundary.

- Business, recreation and tourism assets: This assessment is based on a 500m buffer from the Scheme boundary.
- Human health: This assessment is based on the local planning authority the Scheme falls within, North East Derbyshire District.

10.4 Surveys

- 10.4.1 No surveys were required in support of the Socioeconomics and Human Health appraisal.

10.5 Appraisal Approach

- 10.5.1 In order to identify the environmental impacts of the Scheme, a comparison of the current environmental conditions immediately before the Scheme is implemented (baseline) was compared to a prediction of how the environmental conditions are likely to change once the construction and operation of the Scheme has been undertaken. An iterative process was followed during appraisal to develop appropriate control measures to avoid or reduce potential environmental impacts.
- 10.5.2 The Socioeconomics and Human Health assessment has been undertaken based on a desk-based review of publicly available information from the following sources:
- Nomis (Office of National Statistics, 2025);
 - English Indices of Deprivation (MHCLG, 2019);
 - Local Authority Health Profile (Department of Health and Social Care, 2025); and
 - Ordnance Survey (OS) mapping.
- 10.5.3 The appraisal undertakes a qualitative assessment and identifies the likely impacts on socioeconomics and human health receptors, including:
- Socioeconomics:
 - A temporary and/or permanent change in the local economy from the direct creation or loss of jobs.
 - Community facilities, business, recreation and tourism assets:
 - A temporary and/or permanent change in land use and access to community facilities, business, recreation and tourism assets.
 - A temporary and/or permanent change to recreational routes, including PRowS and cycle routes.
 - Human health:
 - A temporary and/or permanent change in environmental conditions, including air quality, noise, visual amenity and presence of HGV traffic, which may affect human health.
- 10.5.4 The assessment of impact has been assigned based on Table 10.2.

Table 10.2 Assessment matrix

Impact	Description
High	<p>Socioeconomics:</p> <ul style="list-style-type: none"> Number of employment opportunities is large in scale when compared to the combined local planning authorities' total number of employees within the sector (for example the construction employment opportunities to be generated by the proposal will represent the majority of the combined local planning authorities' total number of employees in the construction sector). <p>Community facility:</p> <ul style="list-style-type: none"> Loss of resource and/or quality and integrity of resource; or severe damage to key characteristics, features or elements (for example direct acquisition and demolition of facility); or introduction (adverse) or removal (beneficial) of complete severance with no/full accessibility provision. <p>Business, recreational and tourism asset:</p> <ul style="list-style-type: none"> Where the extent of impacts on receptors is large in scale (for example loss of recreational or tourism asset; or leads directly to closure); or where the recreational route will be fully stopped up with no access provision. <p>Human health:</p> <p>High exposure or scale; long-term duration; continuous frequency; severity predominantly related to mortality or changes in morbidity (physical or mental health) for very severe illness/injury outcomes; majority of population affected; permanent change; substantial service quality implications.</p>
Medium	<p>Socioeconomics:</p> <ul style="list-style-type: none"> Number of employment opportunities is moderate in scale when compared to the combined local planning authorities' total number of employees within the sector (for example the construction employment opportunities to be generated by the proposal will represent half of the combined local planning authorities' total number of employees in the construction sector). <p>Community facility:</p> <ul style="list-style-type: none"> Potential loss of/damage to key characteristics, features or elements (for example partial removal or substantial amendment to access or acquisition of facility); or introduction (adverse) or removal (beneficial) of severance with limited/moderate accessibility provision. <p>Business, recreational and tourism asset:</p>

Impact	Description
	<ul style="list-style-type: none"> Where the extent of impacts on receptors may be moderate (for example substantial amendment or partial closure to recreational or tourism asset); or where access to the recreational route will be fully affected with diversion in place. <p>Human Health:</p> <p>Low exposure or medium scale; medium-term duration; frequent events; severity predominantly related to moderate changes in morbidity or major change in quality-of-life; large minority of population affected; gradual reversal; small service quality implications.</p>
Low	<p>Socioeconomics:</p> <ul style="list-style-type: none"> Number of employment opportunities is small in scale when compared to the combined local planning authorities' total number of employees within the sector (for example the construction employment opportunities to be generated by the proposal will represent less than half of the combined local planning authorities' total number of employees in the construction sector). <p>Community facility:</p> <ul style="list-style-type: none"> A discernible change in attributes, quality or vulnerability; or minor loss of, or alteration to one (maybe more) key characteristics, features or elements (for example amendment to access or acquisition of land resulting in changes to operating conditions that do not compromise overall viability of the community facility; or introduction (adverse) or removal (beneficial) of severance with adequate accessibility provision. <p>Business, recreational and tourism asset:</p> <ul style="list-style-type: none"> Where the extent of impacts on receptors is considered to be small (for example minor amendment to recreational or tourism asset that do not compromise overall accessibility of recreational route; or minor reduction in annual visitor numbers but this is considered to be within the parameters of normal annual variability); or where access to the recreational route will be partially affected with diversion in place. <p>Human health:</p> <ul style="list-style-type: none"> very low exposure or small scale; short-term duration; occasional events; severity predominantly related to minor change in morbidity or moderate change in quality-of-life; small minority of population affected; rapid reversal; slight service quality implications.

Impact	Description
Negligible	<p>Socioeconomics:</p> <ul style="list-style-type: none"> number of employment opportunities is very small in scale when compared to the combined local planning authorities' total number of employees within the sector (for example the construction employment opportunities to be generated by the proposal will represent an insignificant number of the combined local planning authorities' total number of employees in the construction sector). <p>Community facility:</p> <ul style="list-style-type: none"> Very minor loss or alteration to one or more characteristics, features or elements (for example acquisition of non-operational land or buildings not directly affecting the viability of the community facility; or very minor introduction (adverse) or removal (beneficial) of severance with ample accessibility provision. <p>Business, recreational and tourism asset:</p> <ul style="list-style-type: none"> Where there is no credible scenario whereby the proposal could affect the operation of recreational or tourism asset, visitor numbers, tourism opportunities or benefits beyond a handful of individuals; or where there is no credible change to access to the recreational route. <p>Human health:</p> <ul style="list-style-type: none"> Negligible exposure or scale; very short-term duration; one-off frequency; severity predominantly relates to a minor change in quality-of-life; very few people affected; immediate reversal once activity complete; no service quality implication.

10.6 Limitations and Assumptions

- 10.6.1 The following limitations and assumptions have been identified for the Socioeconomics and Human Health assessment:
- The assessment relies in part on data provided by third parties (e.g. OS Mapping, Nomis) which are the most up-to-date, available at the time of the assessment. No significant changes or limitations in these datasets have been identified that would affect the robustness of the assessment for EAR purposes.
 - The assessment identifies population impacts down to the lowest defined population group available according to Office of National Statistics survey outputs (lower super output areas), further granularity of data has not been available. No significant changes or limitations in these datasets have been identified that would affect the robustness of the assessment for EAR purposes.
- 10.6.2 No site survey has been undertaken for the purpose of this assessment. However, this is not considered to affect the robustness of the assessment for EAR due to the baseline information being publicly available online.

References

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- Ref 123 Countryside and Rights of Way Act 2000 (as amended in 2015). [online] Available at: <https://www.legislation.gov.uk/ukpga/2000/37/contents>
- Ref 124 Department of Health and Social Care (2025). Local Authority Health Profile. [online] Available at: <https://fingertips.phe.org.uk/profile/health-profiles>
- Ref 125 Highways England (2020). LA 112 Population and human health. [online] Available at: <https://www.standardsforhighways.co.uk/tses/attachments/by-attachment-id/b1d18281-4f2d-4648-abc6-c2c17ee8064f?inline=true>
- Ref 126 Institute of Environmental Management & Assessment (IEMA) (2017). Health in Environmental Impact Assessment - A Primer for a Proportionate Approach.
- Ref 127 Institute of Environmental Management & Assessment (IEMA) (2022a). Effective Scoping of Human Health in Environmental Impact Assessment.
- Ref 128 Institute of Environmental Management & Assessment (IEMA) (2022b). Determining Significance for Human Health in Environmental Impact Assessment.
- Ref 129 International Commission on Non-Ionizing Radiation Protection (ICNIRP) (2020). ICNIRP Guidelines for Limiting Exposure to Electromagnetic Fields.
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- Ref 131 Ministry of Housing, Communities & Local Government (MHCLG) (2019). English Indices of Deprivation. [online] Available at: https://dclgapps.communities.gov.uk/imd/iod_index.html
- Ref 132 Ministry of Housing, Communities & Local Government (MHCLG) (2022). Planning Practice Guidance: Healthy and safe communities. [online] Available at: <https://www.gov.uk/guidance/health-and-wellbeing>
- Ref 133 Ministry of Housing, Communities & Local Government (MHCLG) (2024). National Planning Policy Framework. [online] Available at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>
- Ref 134 NMWIAC (2011). Mental Well-being Impact Assessment (MWIA) toolkit.
- Ref 135 Office of National Statistics (2025). Nomis. [online] Available at: <https://www.nomisweb.co.uk/>

11. Cumulative Impacts

11.1 Legislation, Policy and Guidance

- 11.1.1 As set out in the EIA screening report, Scheme is not considered to be an EIA development by the nature of the proposals, in combination with the receiving environment. The EAR gives consideration to the potential for cumulative impacts. Therefore, for the purposes of the EAR, the following text from the EIA Regulations has guided the approach to the appraisal:

‘a description of the likely significant effects of the development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the development’.

11.2 Consultation

- 11.2.1 No specific consultation for the appraisal of cumulative impacts has been undertaken at the time of writing.
- 11.2.2 An initial list of inter-project committed developments was included within the EIA screening letter. This list has been reviewed and refined as part of the EAR process, as set out below.

11.3 Study Area

- 11.3.1 For the appraisal of intra-project cumulative impacts, the study area was defined by taking into account the study areas set out for each environmental discipline. As such, the study area was reflective of the largest study area of the disciplines and extended to 5km.
- 11.3.2 For the short-list, this was then reduced to 2km using professional judgement and the findings from the appraisal of environmental impacts from the Scheme.

11.4 Surveys

- 11.4.1 Due to the nature of the appraisal, no surveys were conducted.

11.5 Appraisal Approach

Intra-project cumulative impacts

- 11.5.1 The appraisal of intra-project cumulative impacts was carried out using the below stages.

Stage 1 – Screening

- 11.5.2 This stage identifies whether a sensitive receptor experiences more than one type of residual impact. Sensitive receptors or receptor groups were identified based on the environmental appraisal and professional judgement.
- 11.5.3 Table 14-1 of the EAR summarises the sensitive receptors for each environmental discipline and whether they experience more than one residual impact. Impacts were defined as ‘minor or negligible impact’ or ‘moderate or above impact’ depending on their appraisal within the relevant environmental disciplines.

Stage 2 – Intra-project cumulative impacts

- 11.5.4 Following Stage 1, and the identification of receptors that had been subject to more than one type of residual impact, the residual impacts were then appraised to determine if there was an identified combined intra-project cumulative impact. This appraisal was informed by information available on the receptor, and the relevant environmental discipline chapters of the EAR.
- 11.5.5 From this appraisal, no intra-project cumulative impacts were identified, as such no further appraisal was undertaken.

Inter-project cumulative impacts

Stage 1 – Long and short list of committed developments

- 11.5.6 A long-list of committed developments was produced, using a 5km study area. This long-list contained planning applications within the previous 5 years. Planning applications of a notably small-scale, for example changes to one building, were excluded from this list based on professional judgement of the scope of impact of the planning application being unlikely to generate a cumulative impact.
- 11.5.7 The long-list was then refined into a short-list of committed developments using professional judgement, guided by the below criteria:
- A 2km study area;
 - Residential developments of over 10 dwellings;
 - Nationally Significant Infrastructure Projects;
 - Projects that are EIA;
 - Projects that were deemed, using professional judgement, to be of a nature of scale that had the potential to generate environmental impacts; and
 - Have submitted a planning application in the last 5 years and that this application is still valid (for example, it has not been refused).

Stage 2 – Information gathering

- 11.5.8 Publicly available information was used to carry out the appraisal of inter-project cumulative impacts. Where sufficient information was not publicly available, it was not possible to determine the potential for cumulative impacts with the committed developments.

- 11.5.9 The timing of works, the proximity of the committed development, and the associated impacts of the committed developments was taken into consideration where possible in determining the potential for inter-project cumulative impacts.

Stage 3 – Inter-project cumulative impacts

- 11.5.10 Table 14-3 of the EAR presents the appraisal of inter-project cumulative impacts.
- 11.5.11 The appraisal is based on the residual impacts identified in the environmental discipline chapters of the EAR as well as the publicly available information on the committed developments. The appraisal was carried out using professional judgement and environmental information relating to the committed developments available at the time of appraisal.
- 11.5.12 The following topics were scoped out of further appraisal of inter-project cumulative impacts because they were identified as having no impacts during construction or operation:
- Ecology;
 - Noise and Vibration; and
 - Agriculture and Soils.
- 11.5.13 The appraisal concluded whether an inter-project cumulative impact was or was not identified for each committed development.

11.6 Limitations and Assumptions

- 11.6.1 The appraisal of inter-project cumulative impacts arising from committed developments was limited to the level of publicly available information on the environmental impacts of those developments.
- 11.6.2 For the purpose of the appraisal of inter-project cumulative impacts, where the programme of the committed development was not known, a 'worst-case' approach was taken that assumed construction and operation of the committed development would overlap with the Scheme.

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