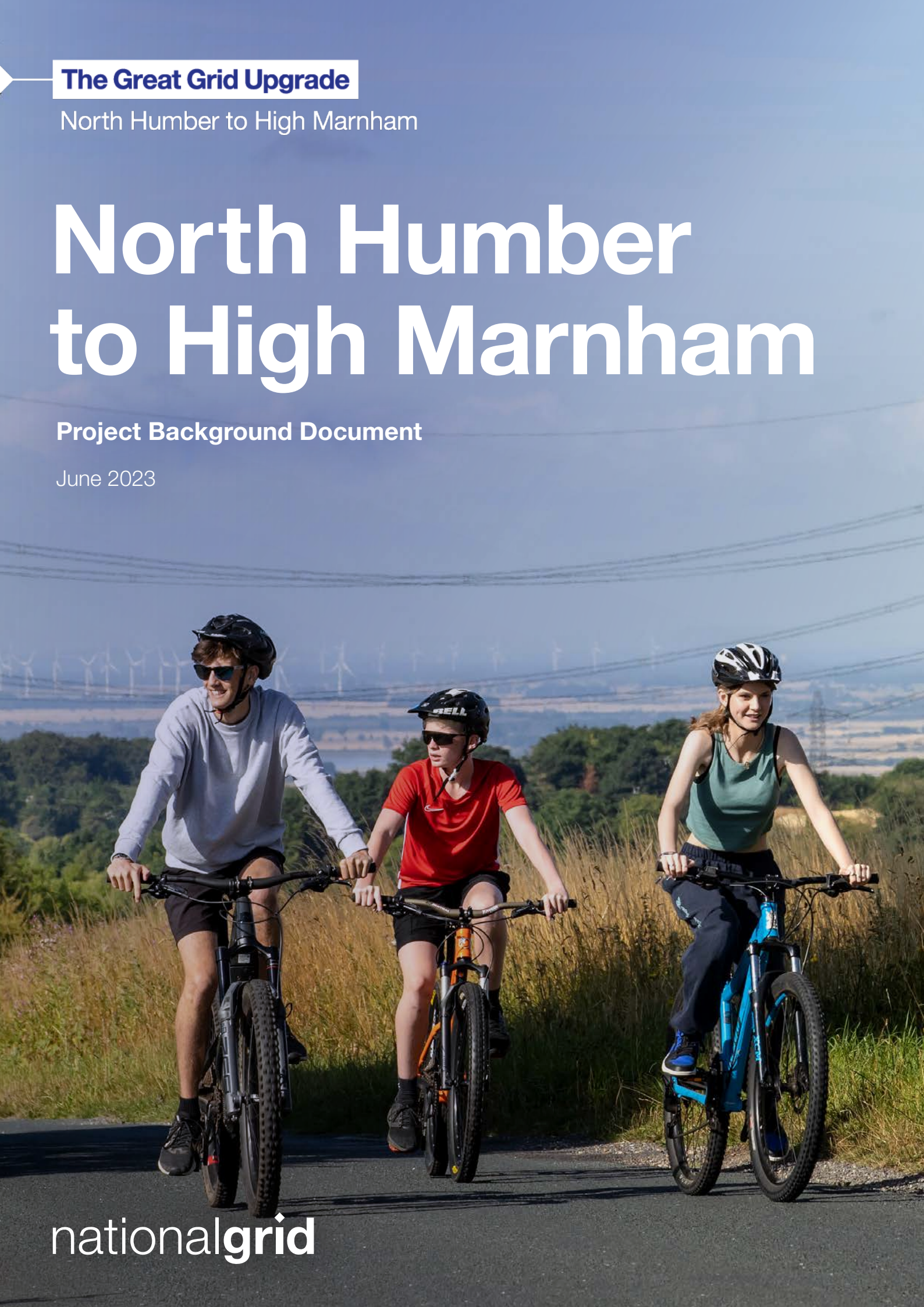
The Great Grid Upgrade

North Humber to High Marnham

North Humber to High Marnham

Project Background Document

June 2023



nationalgrid

The way we generate electricity in the UK is changing rapidly, and we are transitioning to cheaper, cleaner and more secure forms of energy like new offshore windfarms.

We need to make changes to the network of overhead lines, pylons, cables and other infrastructure that transports electricity around the country, so that everyone has access to the clean electricity from these new renewable sources. Our proposals are part of The Great Grid Upgrade – the largest overhaul of the grid in generations.

This first stage of our public consultation aims to introduce you to National Grid Electricity Transmission, explain why we must upgrade the grid in this area and outline our early proposals to upgrade the electricity transmission network between a new substation to the north of Hull and a new substation at High Marnham in Nottinghamshire.

We would like to hear from you about where the new infrastructure could be within the corridor we have identified and how we should approach building it. We commit to listening to your views and will consider these alongside planning policy, technical assessments and environmental surveys as we develop more detailed proposals.

Overview

We are proposing to build a new high voltage electricity transmission line and associated works between a new substation north of Hull at Creyke Beck in the East Riding of Yorkshire and a new substation at High Marnham in Nottinghamshire. The proposed upgrade is required to increase the capability of the electricity transmission network between the north of England and the Midlands. It is needed to facilitate the connection of proposed new offshore wind that is planned in the area.

This Project Background Document has been prepared to support the first stage of public consultation, which will run from 1 June 2023 to 27 July 2023. During this consultation, we are seeking views about:

- the emerging preferred corridor within which the reinforcement may be routed; and
- our work to-date to identify where the proposed reinforcement might be located.

Your views during this consultation will help inform our more detailed proposals, which we will be presenting and consulting on during a further stage of consultation, which will be a ‘statutory’ consultation in autumn 2024. Feedback from both stages of consultation will be carefully considered as we further shape our proposals before making an application to the Planning Inspectorate for permission to build, operate and maintain the reinforcement.

For further details on our approach to consultation, please see our Consultation Strategy, which can be found on our website. All documents published as part of this consultation, including this Project Background Document, can be found at **nationalgrid.com/nh-hm** or available on request by contacting the project team at **contact@nh-hm.nationalgrid.com** or **0800 051 4430**.

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Executive summary

The way we generate electricity in the UK is changing rapidly, and we are transitioning to cheaper, greener and more secure sources of energy like new offshore windfarms.

The UK Government has set out a commitment to achieve net zero emissions by 2050. This means achieving a balance between the greenhouse gases put into the atmosphere and those taken out. The energy industry plays a key part in this transition, from developing renewable energy generation, to upgrading the existing electricity transmission network to allow communities across the country to benefit from this clean energy. We are presenting some plans in your local area to help that transition and make sure the grid is ready. These proposals are part of The Great Grid Upgrade, the largest overhaul of the grid in generations.

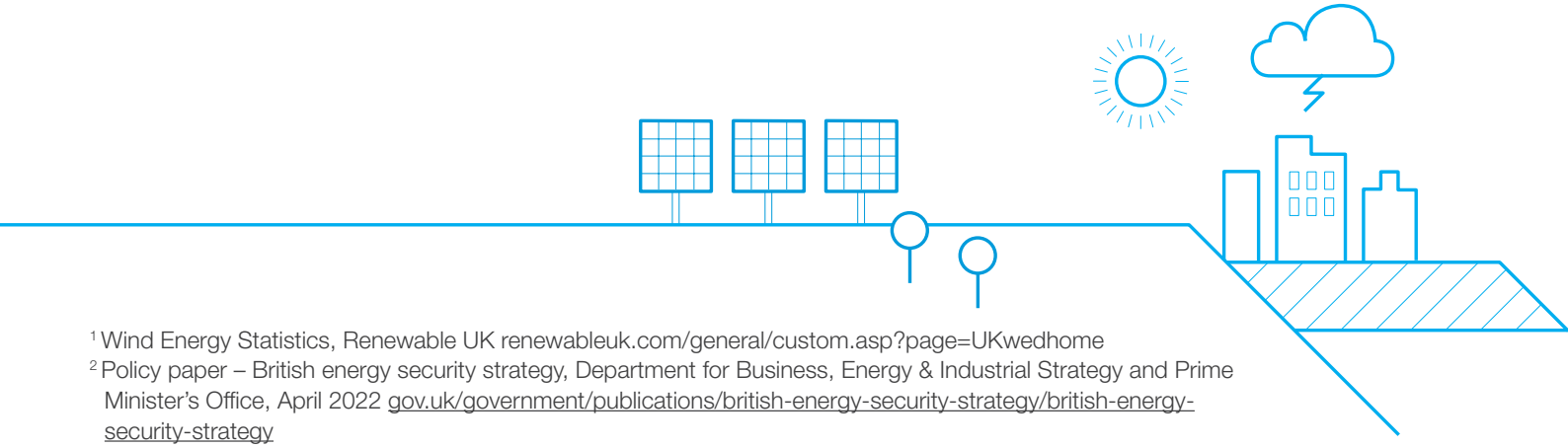
Decarbonising the energy system and delivering cheaper and more secure energy supplies is one of the biggest challenges facing our world. At National Grid Electricity Transmission (NGET) we have a critical role to play in the acceleration towards a cleaner future.

In Great Britain, we are in the middle of a transformation, with the energy we use increasingly coming from cleaner, greener sources. In 2019, for the first time since the industrial revolution, most of our electricity came from low carbon sources. NGET is at the heart of that energy transformation – investing around £1.3bn each year to adapt and develop our transmission network to connect new sources of low carbon and green energy to our homes and businesses.

Whilst it is vital that more of the energy we use comes from low carbon and renewable sources, both NGET and the Government recognise it is also important to keep the impact as low as possible on bills, people, communities and our natural environment. NGET is committed to finding the right balance between these factors to ensure our projects have a sustainable, positive impact.

The UK already has 13.6 gigawatts (GW) of offshore wind energy in operation[1]. The Government's recent British Energy Security Strategy[2] outlines the ambition to increase energy from offshore wind to 50 GW by 2030 – more than enough to power every home in the UK. In Powering up Britain[3], the Government explains that the grid needs to be expanded at an unprecedented scale and pace to deliver more clean power and increase our energy security.

Delivering the infrastructure needed to achieve this ambition will boost local economies, provide jobs and opportunities to learn new skills, and bring vital investment to towns right across the country.



[1] Wind Energy Statistics, Renewable UK renewableuk.com/general/custom.asp?page=UKwedhome

[2] Policy paper – British energy security strategy, Department for Business, Energy & Industrial Strategy and Prime Minister's Office, April 2022 gov.uk/government/publications/british-energy-security-strategy/british-energy-security-strategy

[3] Powering up Britain, Department for Energy Security and Net Zero, March 2023 assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1147340/powering-up-britain-joint-overview.pdf

It will allow the UK to decarbonise its energy system in a meaningful way that will not only meet net zero targets but, perhaps more urgently, will deliver a more secure and resilient energy system, that improves affordability through connection of renewable energy. Delivering a clean energy transition is the surest way to lower bills in the long-term.

The North Humber to High Marnham proposal will support the UK's net zero target by reinforcing the electricity transmission network between the north of England and the Midlands and facilitate the connection of planned offshore wind generation and interconnectors with other countries, allowing clean green energy to be carried on the network.

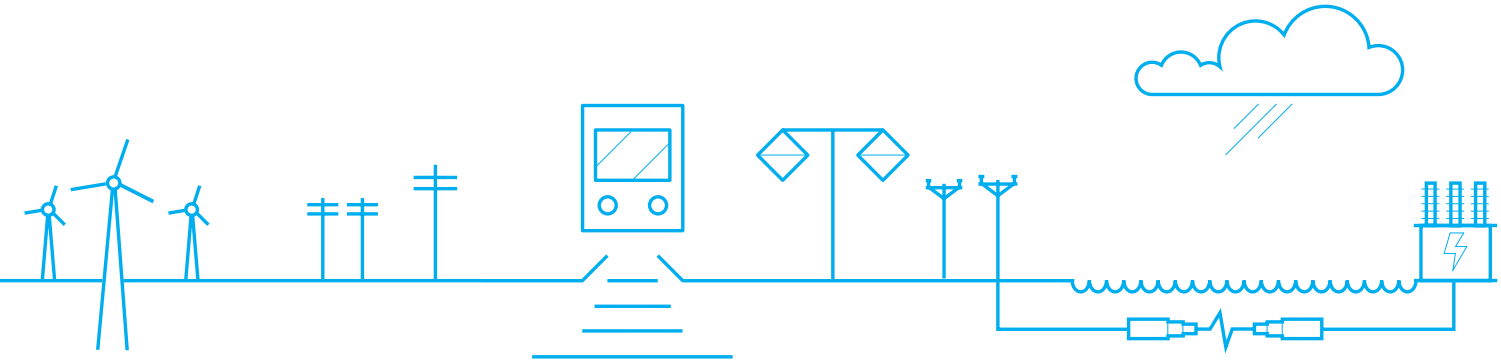
The reinforcement is needed because our existing power lines do not have sufficient capacity for all the new sources of electricity that we expect to connect to the network over the next ten years and beyond. Building North Humber to High Marnham, together with other proposals, will help meet this future energy requirement.

This document is supported by a number of technical documents, including:

- **Strategic Options Report** for North Humber to High Marnham and Grimsby to Walpole; and
- **Corridor Preliminary Routeing and Siting Study**; explaining the process and work undertaken to date to identify an emerging preferred corridor within which the proposed infrastructure may be located.

We recommend that you read these reports in more detail, which will help inform your feedback.

Our proposals include building a new 400,000 volt (400 kV) overhead electricity transmission line between a new 400 kV substation that is needed near our existing Creyke Beck substation to the north of Hull and a new 400 kV substation at High Marnham, in the Trent valley. This document provides more detail on our early works carried out to date, and our emerging preference for where the new overhead line and other infrastructure could be located.



Our public consultation

Our commitment to you

We want to ensure that all stakeholders are engaged in the development of our proposals and have opportunity to comment on the proposals at key decision-making points. From **1 June 2023 to 27 July 2023**, we are holding our first stage of public consultation to:

- introduce National Grid Electricity Transmission and our proposals to you;
- explain why we must build new electricity transmission infrastructure in this area and what technology is the best to use;
- outline the work carried out to identify our emerging preferred route corridor and graduated swathe;
- ensure all stakeholders have the opportunity to provide feedback on our work to date and hear your views about where within our emerging preferred corridor and graduated swathe the exact route could be located, and how we should approach building this vital infrastructure; and
- outline next steps and programme and how we will further develop our proposals.

This document sets out information on our plans, what we are consulting upon and how you can get involved. It also signposts to where we are publishing more detailed technical information. As well as providing information in this document and online, we are holding a range of both in-person and online public consultation events. We hope they will provide you with an opportunity to ask questions and comment on our proposals at an early stage of their development. Please see the 'Have your say' section toward the end of this document for all the details about our consultation, where you can find more information and how you can give us your views.

Your feedback is important in helping us to develop and refine our plans. This is the first stage of consultation on our proposals. We will carry out further consultation as our plans develop.

When we carry out further consultation, we will explain how feedback from this first stage of consultation has shaped our plans and we will outline the key themes in the feedback from this first stage. We will report on the feedback from each stage of public consultation, and our responses to your comments, in a Consultation Report which will be provided as part of our DCO application, which we are planning to submit in 2026. To find out more about how we develop our proposals, please see our video explaining how we work.

Our approach to public consultation

Certain types of energy infrastructure, including overhead electricity transmission lines of the type we are considering for North Humber to High Marnham, are nationally significant infrastructure projects under the Planning Act 2008. This means that we will be preparing and submitting a Development Consent Order (DCO) application to the Planning Inspectorate, who will consider our proposals and make a recommendation to the Secretary of State for Energy Security and Net Zero, who will decide on whether development consent should be granted. Local planning authorities, along with others, remain important consultees in the process. To find out more about the DCO process[4], please see the Planning Inspectorate website.

Consultation to support our DCO application is planned to take place over two stages. Stage 1 is our first stage, or non-statutory, public consultation about our early proposals, which will be held over an 8-week period from **1 June 2023 to 27 July 2023**. The next stage of public consultation, will happen in 2024 before we finalise our proposals and submit a DCO application, most likely in spring 2026.

[4] The Planning Act 2008 process, Planning Inspectorate https://infrastructure.planninginspectorate.gov.uk/application-process/the-process/

About National Grid

National Grid Electricity Transmission (NGET) owns, builds and maintains the network in England and Wales. It is NGET that is developing plans for North Humber to High Marnham.

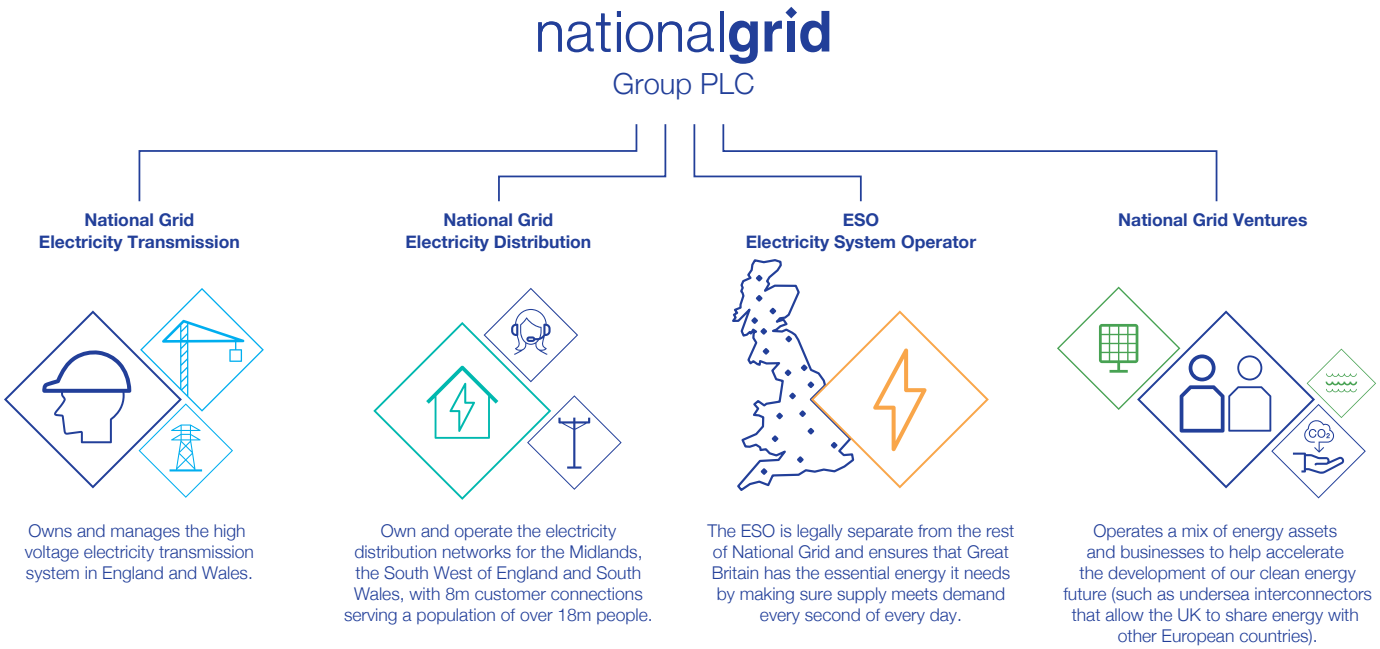
NGET sits at the heart of Britain's energy system, connecting millions of people and businesses to the energy they use every day. We bring energy to life – in the heat, light and power we bring to our customer's homes and businesses; in the way that we support our communities and help them to grow; and in the way we show up in the world. It is our vision to be at the heart of a clean, fair and affordable energy future.

Within the National Grid Group there are distinctly separate legal entities, each with their individual responsibilities and roles. The entities involved in the transmission of electricity at high voltage are shown in the following diagram.

In 2022, Western Power Distribution also became part of the National Grid Group of companies and is now National Grid Electricity Distribution. Each of the different entities within the National Grid Group are working to build a cleaner, fairer and more affordable energy system that serves everyone – powering the future of our homes, transport and industry.

When developing transmission network proposals, National Grid ESO and NGET, must, under the Electricity Act 1989, do that in an efficient, coordinated, and economical way, and in a way which considers people, places and the environment (the desirability of preserving amenity duty). Options to deliver additional network capability and the options we take forward are evaluated against these statutory duties.

How we will go about doing that, meeting our amenity responsibilities and involving stakeholders and communities, is outlined in our commitments when undertaking works in the UK[5]:



1. Establishing need

We only seek to build electricity lines along new routes or build new above-ground installations where existing infrastructure cannot be upgraded, where forecasted increases in demand cannot be met by other means, where customer connections are required, or where existing infrastructure has been identified for replacement.

2. Involving stakeholders and communities

We promote genuine and meaningful engagement, meeting and exceeding the statutory requirements for consultation or engagement.

3. Routeing networks and selecting sites

If we need to build new infrastructure, we seek to avoid areas which are nationally or internationally designated for their landscape, wildlife or cultural significance.

4. Minimising the effects of new infrastructure

When we are developing new infrastructure we seek to reduce the effect of our work on communities by having regard to safety, noise and construction traffic.

5. Mitigating effects of works

We carry out relevant environmental investigations and report on these when we apply for consent for new works and use best practice environmental impact assessment techniques to assess possible effects of our works and identify opportunities for mitigation measures.

6. Offsetting where mitigation is not practicable

When we cannot mitigate the impacts of our proposals, we offset these impacts in practical and sustainable ways that are developed through engagement with local stakeholders.

7. Enhancing the environment around our works

When undertaking works, we consider what practicable measures can be taken to enhance nearby and surrounding areas for the benefit of local communities and the natural and historic environment.

8. Monitoring and learning for the future

We monitor, evaluate and review our engagement processes to learn from previous experiences to improve our working practices.

9. Reviewing our commitments

We review these commitments at least every five years, and make additional revisions in response to new legislation, policy and guidance.

10. Working with others

We require other organisations working on our behalf to demonstrate these same commitments and continue to create an environment where we can share and deliver best practice.

[5] National Grid's commitments when undertaking works in the UK: Our stakeholder, community and amenity policy (National Grid, December 2019) – Available at https://www.nationalgrid.com/sites/default/files/documents/National%20Grid_s%20commitments%20when%20undertaking%20works%20in%20the%20UK.pdf

Many other organisations also have a key role to play in delivering a cleaner energy future.

Department for Energy Security & Net Zero

The Department for Energy Security and Net Zero (DESNZ) is the ministerial department with primary responsibility for energy.

In November 2020, the Prime Minister set out a Ten Point Plan for a Green Industrial Revolution[6]. This was followed by a White Paper, which sets out the Government's proposals for future law. The Energy White Paper, entitled Powering our Net Zero Future[7], sets out how, as a country, we will transform the way we produce and use energy to tackle climate change, meet net zero emissions by 2050, and build back greener. The White Paper focuses on the Government's ambitions to increase energy generation from offshore wind and increase interconnector capacity, as well as hydrogen, carbon capture utilisation and storage (CCUS), heat and transport decarbonisation. Building on the White Paper, Government also published the British Energy Security Strategy in April 2022, increasing the 2030 ambition for offshore wind from 40 GW to 50 GW. In Powering up Britain[8], Government explains that the grid needs to be expanded at an unprecedented scale and pace to deliver more clean power and increase our energy security.

DESNZ, working with input from National Grid ESO, is also conducting a review of how offshore wind is connected, with the aim of removing barriers to achieving Government ambitions for offshore wind[9].

The Secretary of State for DESNZ is also the ultimate decision maker for new electricity transmission network proposals under The Planning Act 2008 (as amended)[10].

Planning Inspectorate

The Planning Inspectorate is the Government agency responsible for examining proposals for Nationally Significant Infrastructure Projects (NSIPs). In energy terms, those include offshore wind farms, new nuclear power stations and new overhead lines greater than 2 km in length. The overhead line infrastructure that we are proposing to build for the North Humber to High Marnham reinforcement would meet the threshold to be an NSIP.

ofgem

Ofgem (the Office of Gas and Electricity Markets) is the government regulator for gas and electricity markets in Great Britain. Ofgem is a non-ministerial government department and an independent National Regulatory Authority, whose role is to protect consumers as a greener, fairer, energy system is delivered. Ofgem works with Government, industry and consumer groups to help deliver net zero from an energy perspective at the lowest cost possible to consumers.

nationalgridESO

National Grid ESO is the Electricity System Operator for the whole of Great Britain. National Grid ESO ensures electricity is always where it is needed and the network remains stable and secure in its operation.

Generators apply to National Grid ESO when they wish to connect to the network and National Grid ESO leads the work to consider how the network may need to evolve to deliver a cleaner, greener future.

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[6] The Ten Point Plan for a Green Industrial Revolution, HM Government, November 2020 - gov.uk/government/publications/the-ten-point-plan-for-a-green-industrial-revolution

[7] Energy White Paper, Powering our Net Zero Future, HM Government, December 2020 - gov.uk/government/publications/energy-white-paper-powering-our-net-zero-future

[8] Powering up Britain, Department for Energy Security and Net Zero, March 2023 assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1147340/powering-up-britain-joint-overview.pdf

[9] Offshore Transmission Network Review terms of reference, Department for Business, Energy & Industrial Strategy, updated 24 August 2020 - gov.uk/government/publications/offshore-transmission-network-review

[10] The Planning Act 2008 - legislation.gov.uk/ukpga/2008/29/contents

Moving towards net zero

The world we live in is changing, and the UK is at a turning point as we embrace the enormous opportunities a cleaner, greener future brings.

The UK has set a world-leading target to tackle climate change, which is to achieve net zero by 2050. Put simply, this means that we will remove the same amount of greenhouse gases from the atmosphere as we produce.

As a country, we are already making progress. The UK has the largest offshore wind capacity in the world, with some 13.6 GW in operation.

Recent years have been record-breaking for renewables on the GB transmission network. Summer 2020 saw the longest run since the industrial revolution without burning coal, stretching almost 68 days. Solar power set new records with 10.1 GW of power being produced in April 2023. In January 2023, wind power generated more than it ever has with 21.6 GW contributing to meeting our energy needs.

The way we generate electricity in the UK is therefore changing rapidly. We are transitioning to cleaner technologies like new offshore windfarms. That means we need to make changes to the grid so the whole country has access to the clean electricity from these new renewable sources.

Decarbonising the energy system means replacing – as far as it is possible to do so – fossil fuels with clean and low carbon energy technologies such as from wind turbines and nuclear power for electricity production.

Growth in energy generated from offshore wind is a key part of achieving net zero. The Government's Energy White Paper set an ambition to deliver 40 GW of offshore wind connected to the network by 2030 – enough to power every home in the UK.

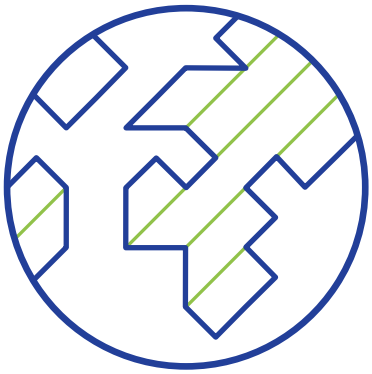
The Government raised that ambition to 50 GW of offshore wind by 2030 in the British Energy Security Strategy[11]. Growth in offshore wind also offers significant opportunities for economic growth and job creation.

There are up to 60,000 jobs expected to be created in the offshore wind sector alone in this decade. Up to 250,000 jobs are also expected to be created by 2030 across the proposals in the Prime Minister's Ten Point Plan for a Green Industrial Revolution.

The Committee on Climate Change anticipate that electricity demand will at least double by 2050 as we shift to clean energy to drive electric vehicles, heat our homes and power our industry[12].

The Committee's Sixth Carbon Budget[13] published in December 2020 recommends deployment of renewables at scale, including 40 GW of offshore wind by 2030 and sustaining that build rate to support deployment up to 140 GW of offshore wind by 2050, raising further opportunity for growth and job creation. By 2050, our own analysis indicates that the energy sector needs to fill around 400,000 jobs to build the Net zero energy workforce[14].

Our North Humber to High Marnham proposals will help the transition to clean energy, making sure the grid is ready. This reinforcement is part of The Great Grid Upgrade, the largest overhaul of the grid in generations. It involves making changes and improvements to the existing lines, pylons, cables and other infrastructure that makes up the national grid, so we can make the most of its capability, as well as building some new infrastructure where it's needed.



2050
UK Net Zero target

250,000 by 2030

jobs created building back greener

50 GW by 2030
all homes powered by offshore wind

[11] British Energy Security Strategy, HM Government, April 2022
gov.uk/government/publications/british-energy-security-strategy/british-energy-security-strategy
[12] Net Zero – The UK's contribution to stopping global warming, Committee on Climate Change, May 2019
theccc.org.uk/publication/net-zero-the-uks-contribution-to-stopping-global-warming/
[13] The Sixth Carbon Budget – The UK's path to Net Zero, Committee on Climate Change, December 2020
theccc.org.uk/publication/sixth-carbon-budget/
[14] Building the Net Zero energy workforce, National Grid, January 2020
nationalgrid.com/document/126256/download

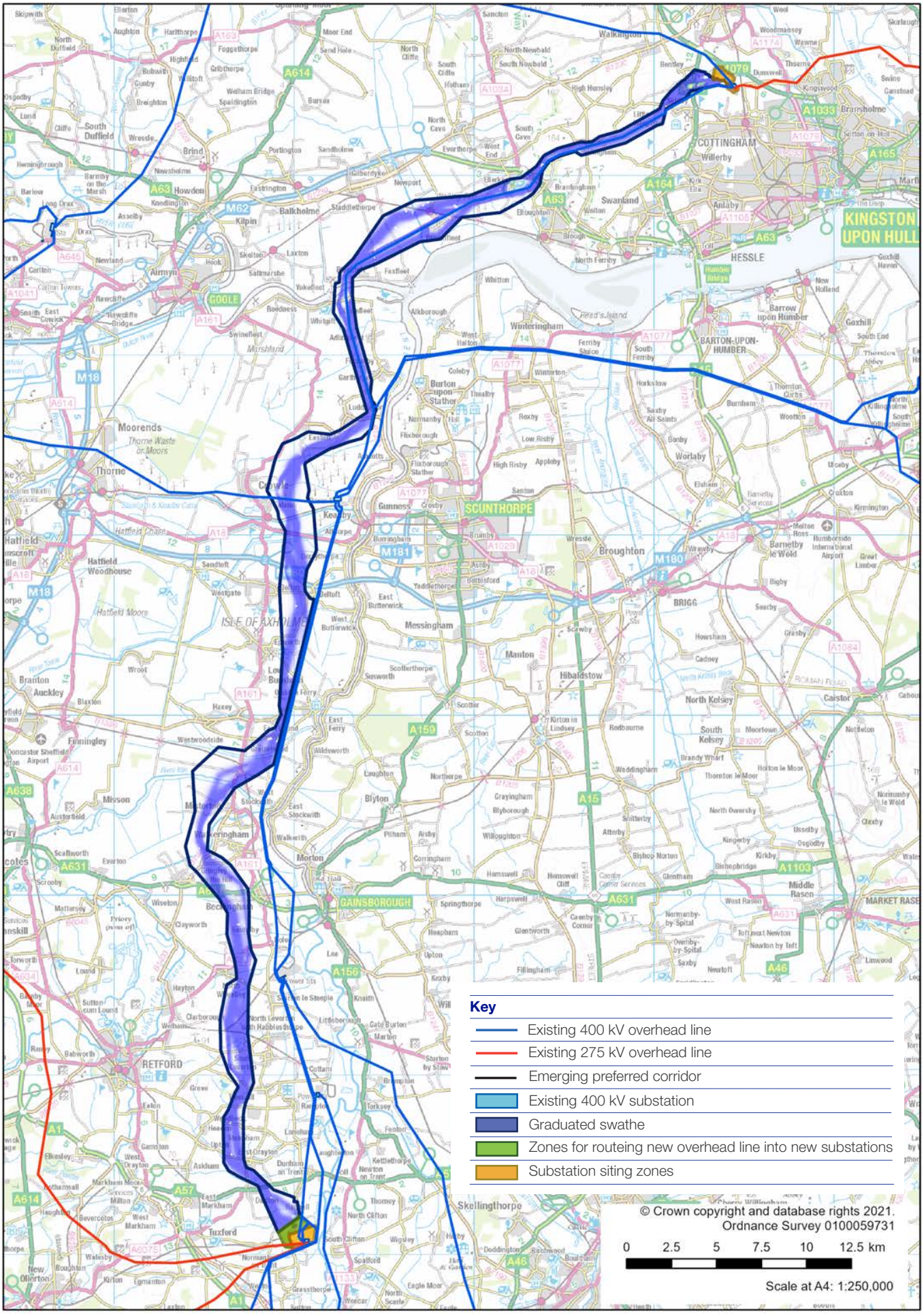


Figure 1 Map showing the North Humber to High Marnham proposals

The project

National Grid Electricity Transmission is proposing to upgrade the electricity transmission network between a new substation to the north of Hull and a new substation at High Marnham in Nottinghamshire.

The North Humber to High Marnham reinforcement will increase the capability of the network to carry clean green energy from the north of England to the Midlands. It is also required to carry power from offshore wind farms and interconnectors that are planned to connect network north of Hull.

Proposed new overhead line

The proposed reinforcement would involve the construction and operation of approximately 90 km of new 400,000 volt (400 kV) overhead electricity transmission line. It currently has an anticipated earliest operational date of 2031.

As outlined in the latest Network Options Assessment (NOA), this reinforcement is one of a number of network upgrades that need to be accelerated to help meet increased Government targets for offshore wind. More details on the NOA can be found on page 17 of this document.

New pylons and conductors (electrical wires) would be located along the overhead line route. At this early stage of consultation, we have not decided on exactly what type of pylon we will use. This will be considered in more detail as we develop our proposals further. As a starting position, we are considering the use of traditional 400 kV lattice steel pylons. These are typically around 50 metres in height, with approximately three per kilometre on a straight section of the route, slightly more on occasions. In some locations, specific constraints such as navigable river crossings, can require considerably taller pylons to ensure safe electrical clearance from the electrical conductors (wires).

Proposed new substations

Two new 400 kV substations need to be in place before North Humber to High Marnham is built to connect new customers and ensure the network meets the relevant technical standards. They are therefore being developed as separate planning applications.

- One substation, to be located in the vicinity of the existing Creyke Beck substation north of Hull, needs to be in place to connect a proposed new interconnector with Norway and another interconnector with Iceland. It is also needed to connect a proposed offshore wind farm.

- One substation, located at High Marnham in Nottinghamshire, is needed as part of a separate proposal to upgrade an existing 275 kV overhead line between Brinsworth and Chesterfield to High Marnham.

We have included initial search areas for these substations as part of this consultation. Consultation on the new substation near Creyke Beck is likely to take place in summer 2023. Consultation about the new substation near High Marnham is likely to take place early in 2024. We will include more detailed information about the proposed substations in our next stage of public consultation in 2024.

Other requirements

Additional land will also be required to build and reduce the potential impacts of the proposed reinforcement. These include, but are not limited to, the following:

- temporary land for construction activities including working areas for construction equipment and machinery, site offices, welfare, storage and access; and
- land required for mitigation, compensation and enhancement of the environment as a result of the environmental assessment process and delivering Biodiversity Net Gain.

Where the proposed new line would interact with existing lower voltage electricity distribution lines, there will most likely need to be localised diversions and/or short sections of undergrounding of those lower voltage lines. The scope of those is not known at this stage but will be considered in detail as we further develop more detailed proposals.

You can find out more about pylon types in our Corridor Preliminary Routeing and Siting Study report.

How the need for network reinforcement is identified

Every year National Grid ESO looks at how much energy needs to be carried on the network in the future and where network capability needs to be improved to accommodate that.

1. That starts with the System Operator identifying a range of Future Energy Scenarios which are discussed with stakeholders and published each summer. **Future Energy Scenarios**[15] represent different credible scenarios for how quickly we might make the transition to a cleaner greener energy future as we strive towards net zero by 2050.

2. The Future Energy Scenarios inform the analysis in the **Electricity Ten Year Statement**[16] which is published each November, setting out National Grid ESO's view of future transmission requirements and where the capability of the transmission network might need to be addressed over the next decade.

3. Transmission Owners, which for England and Wales is NGET, then respond with solutions to address the requirements identified in the Electricity Ten Year Statement. We work with energy consumers in mind, making sure we focus on transmission system proposals that offer the best value and can be delivered in an efficient and coordinated way. National Grid ESO assesses and publishes its recommendations as to which proposals should proceed in a Network Options Assessment report (NOA) each year. Last year, a refreshed **NOA**[17] was published in summer alongside the System Operator's **Pathway to 2030 Holistic Network Design (HND)**[18], setting out a blueprint for the connection of the offshore wind needed to meet the Government's 2030 targets.

In planning and operating the network, transmission licence holders – onshore and offshore – are required by their licence to comply with the National Electricity Transmission **Security and Quality of Supply Standard**[19]. These set out criteria and methodologies for planning and operating the network in Great Britain – in essence, minimum requirements designed to ensure secure and stable electricity supplies.

What is the Network Options Assessment (NOA) and what does it mean for this project?

The NOA 2021/22 Refresh was published in July 2022, which presented an annual report from National Grid ESO which outlines their recommendations for which network reinforcement projects need to be taken forward and when. The report also recommends the most economically suitable investment strategy for these reinforcements and outlines the pathway to 2030 and beyond.

This project, along with others, is a priority because, the Midlands, South and East of England – which covers areas spanning from the Humber in the North to East Anglia and the Thames Estuary in the south – have been identified as areas in need of network reinforcement to enable the connection of more offshore wind on the East Coast.

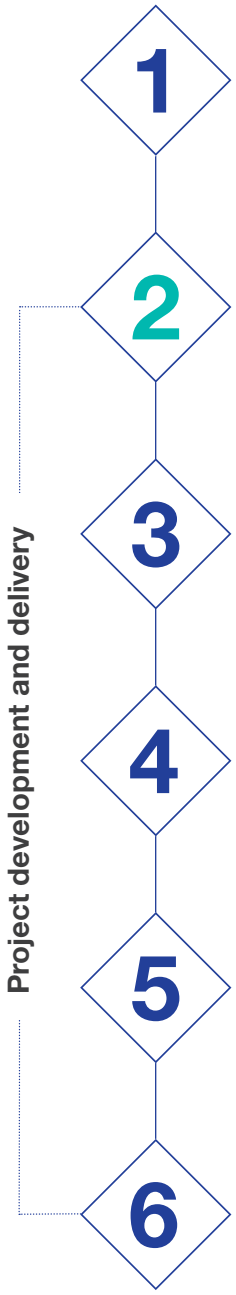
The System Operator has identified this and other reinforcements in **NOA** as 'HND essential' to deliver the **Pathway to 2030 Holistic Network Design** - connecting offshore wind needed to meet the Government's 2030 target. The System Operator also advises in NOA that the reinforcement needs to be accelerated to help meet Government's 2030 offshore wind target.

North Humber to High Marnham therefore forms an important part of our plans for this region – helping increase power flows from the North to the Midlands and facilitating the connection of offshore wind and interconnectors.

[15] Future Energy Scenarios 2022, National Grid ESO, July 2022 nationalgrideso.com/document/263951/download
[16] Electricity Ten Year Statement 2022, National Grid ESO, November 2022 nationalgrideso.com/document/275611/download
[17] Network Options Assessment Refresh 2021/22, National Grid ESO, July 2022 nationalgrideso.com/document/262981/download
[18] Pathway to 2030 Holistic Network Design, National Grid ESO, July 2022 nationalgrideso.com/future-energy/the-pathway-2030-holistic-network-design
[19] Security and Quality of Supply Standard, National Grid ESO nationalgrideso.com/industry-information/codes/security-and-quality-supply-standards/code-documents

How we develop projects

Our approach to developing new electricity transmission proposals includes the following key stages:



Strategic Proposal

Identify network options to meet need case, undertake strategic options appraisal and select Strategic Proposal.

Options Identification and Selection

Identify and appraise project options, engage stakeholders and seek consultees' feedback to shape the development of the project.

Defined Proposal and Statutory Consultation

Develop project design in response to feedback, identify preliminary environmental information and undertake statutory consultation on the proposal.

Assessment and Land Rights

Refine project design in response to feedback, assess the project impacts and seek voluntary land rights. Prepare the application documents.

Application, Examination and Decision

Submit application, respond to Examining Authority's questions and support through examination hearings.

Construction

Discharge Requirements, deliver project, implement reinstatement, mitigation and post construction monitoring.

The Strategic Proposal stage involves identifying potential options that will meet the need to reinforce the network that has been identified by the System Operator. Thereafter, at the Options Identification and Selection stage, we look at potential corridors where the proposed new infrastructure might be most appropriately located. This is the stage that we are currently at.

We have identified a strategic option and an emerging preferred corridor that meets the network reinforcement requirement. We are sharing information about those early, so that we can consider everyone's feedback as we further develop our proposals. You can read more about how we develop our proposals at the project development and delivery stage in **Our Approach to Consenting**[20].

The sections that follow give an overview of the need for network reinforcement in the region; the work we have undertaken to identify a strategic option; our emerging preferred corridor; information about this first stage of consultation; how to you can give us your feedback and next steps.

[20] Our Approach to Consenting, National Grid Electricity Transmission, April 2022 nationalgrid.com/electricity transmission/document/142336/download

The need for network reinforcement in the region

The electricity transmission network today in the region

Like much of the high voltage electricity transmission network across the country, the network between the North and the Midlands was largely built in the 1960s, carrying electricity down from Scotland and the North, connecting coal fired generation in the Aire and Trent valleys with the main centres of population.

The extent of the existing electricity transmission network in the region, the blue 400 kV lines and the red 275 kV lines, is shown on the map below

In the area north of the Humber, the network was initially developed to supply demand in and around Hull and the wider area. Two 400 kV overhead lines, each carrying two electrical circuits, connect Creyke Beck, near Cottingham, north of Hull. Creyke Beck and Salt End North are grid supply points where the local distribution network operator, Northern Powergrid, steps down the voltage to take electricity on, via their lower voltage distribution network, to homes and businesses.

In the late 1990s, gas fired generation at Salt End, east of Hull, was connected back to the transmission network at our Creyke Beck substation, via a new 275 kV overhead line from Salt End South substation. Creyke Beck and Hedon are also connection locations for existing offshore wind farms. In the Trent Valley, the electricity transmission network was built to connect major coal fired generation at Keadby, Cottam, Staythorpe, West Burton and High Marnham, carrying electricity on toward major population centres. Electricity still flows primarily from the North to the Midlands through the region today.

How power is transported throughout the network

The high voltage electricity transmission network in England and Wales operates largely at 400 kV and 275 kV. It connects separately owned generators, interconnectors, large demand users fed directly from the transmission system and the lower voltage distribution networks.

Most lines of pylons on the network carry two electrical circuits. The network is planned and operated under a set of standards designed to ensure there are no widespread electricity supply interruptions, even if two circuits are out of service.

For example, if one circuit is switched out for planned maintenance and another is impacted by a fault at the same time, the Security and Quality of Supply Standard is designed to ensure:

- electricity system frequency is maintained within statutory limits;
- no part of the network is overloaded beyond its capability;
- voltage performance stays within acceptable statutory limits; and
- the system remains electrically stable.

National Grid ESO oversees the standards, however, they are approved by a Security and Quality of Supply Standard panel and Ofgem.

Why does the network in the region need reinforcing?

With growing offshore wind and interconnectors, an anticipated tripling of wind generation connected across the Scottish networks by 2030 and Government's increased ambition to connect 50 GW of offshore wind by 2030, north-south power flows are set to increase. National Grid ESO in the Electricity Ten Year Statement anticipate that the network between the North and Midlands needs to transfer as much as 29 GW of electricity by 2033, compared to 11.6 GW that it can transfer today while remaining compliant with the standards the network is operated to.

Increasing network boundary capability

Where power flows from one part of the network to another exceed the capability of the network across what we call 'transmission boundaries', one of two things need to happen.

Firstly, the System Operator might pay generators to reduce the energy they produce in one part of the country while paying others elsewhere to generate. These payments are called 'constraint payments'. Balancing the network in this way can temporarily manage power flows where network capability is insufficient, but increases operation costs, as more expensive generation is brought on. This can be an economic way to manage the network up to a point, if constraint costs are not disproportionate.
Where constraint costs are substantial, the network becomes uneconomic to operate. It then becomes necessary to invest in increasing network capability.

Transmission boundary B8 runs east to west, separating the northern generation zones including Scotland, Northern England and North Wales from the Midlands and southern demand centres.

Existing network capacity and demand in the Creyke Beck area

The existing network serving the Creyke Beck area can export just under 7 GW of electricity whilst remaining compliant with the Security and Quality of Supply Standards that the network is operated to.

Whilst this has been sufficient until today, it is not sufficient to meet the power carrying capability that is required by the end of this decade and beyond.

Peak demand for electricity in the region in 2022 was 526.7 MW[22]. Toward the end of the decade, electricity demand in the region is forecast to be higher than it is today, at around 585.7 MW in 2030 and 636.6 MW by 2032.

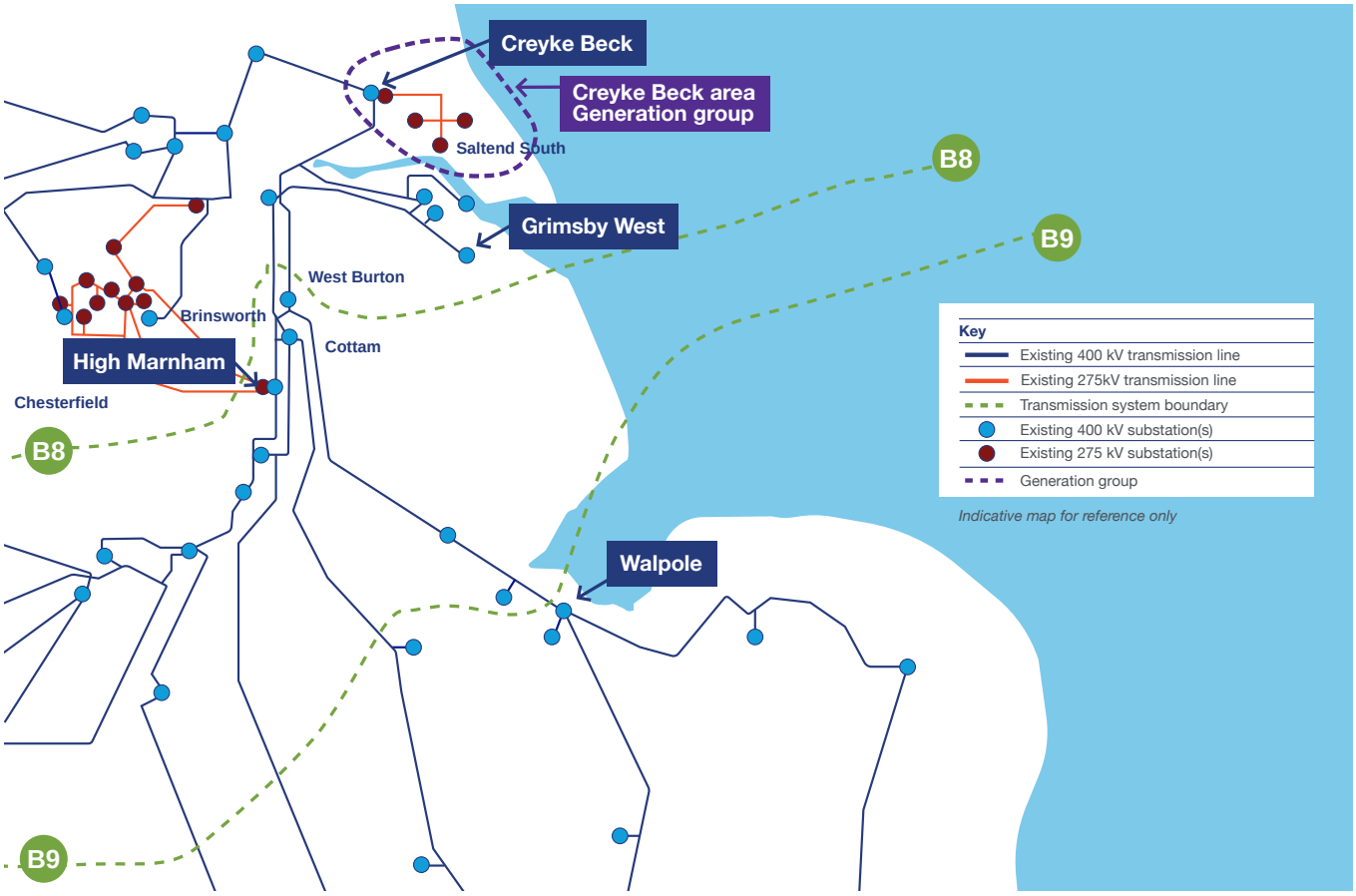


Figure 2 Map showing the B8 and B9 transmission boundaries

[21] Electricity Ten Year Statement, North of England boundaries, 2022 nationalgrideso.com/research-publications/etys/electricity-transmission-network-requirements/north-england-boundaries

[22] Forecast peak demand by National Grid ESO from the Future Energy Scenarios 2022, for the Leading the Way scenario for the area that receives electricity supplies via Creyke Beck and Salt End substations.

Future generation in the Creyke Beck area

As shown in Table 1 below, there are a number of new sources of clean green energy contracted to connect in the Creyke Beck area in the next decade[23]. Should all these be built, this would amount to just over 13 GW of generation capacity by the early 2030s.

Table 1: Existing and proposed connections in the Creyke Beck area

Project name	Type of generation	Capacity (MW)	Connection year
Saltend	Combined cycle gas turbine	1100 MW	Existing
Humber Gateway	Offshore wind	220 MW	Existing
Westernmost Rough	Offshore wind	206.5 MW	Existing
Pillswood BESS Phase 1	Energy storage	49.9 MW	Existing
Pillswood BESS Phase 2	Energy storage	49.9 MW	Existing
Dogger Bank Project A	Offshore wind	1200 MW	Existing
Dogger Bank Project B	Offshore wind	1200 MW	2024
Hornsea Power Station 4 - Stage 1	Offshore wind	1500 MW	2027
Continental Link	Interconnector	1800 MW	2027
Atlantic	Interconnector	1000 MW	2027
Hornsea Power Station 4 - Stage 2	Offshore wind	1100 MW	2028
Clean Air – Creyke Beck	Energy storage	500 MW	2033
North Sea (RWE Dogger Bank South)	Offshore wind	1500 MW	2033
North Sea B (RWE Dogger Bank South)	Offshore wind	1500 MW	2033
Saltend North BESS	Energy storage	100 MW	2037
Total		**13026.3 MW**	

With up to around 13 GW of contracted generation and interconnector capacity by the early 2030s, the network as it is today, notwithstanding local demand, would not have the capacity needed to export all that electricity out of the area across the B8 boundary. We therefore need to reinforce our network to prevent wider system failures and circuit overloads from happening.

Wider reinforcements on the B8 boundary

Work to derive more capability out of the existing network across transmission boundary B8 is planned in the next decade, including:

- reconductoring Keadby to Cottam[24];
- thermally uprating Keadby to West Burton[25];
- installing new power control devices along Keadby to West Burton[26];
- uprating the existing line from 275 kV to 400 kV from Brinsworth to Chesterfield to High Marnham[27]; and
- reconductoring West Burton to Ratcliffe-on-Soar[28].

When replacing the wires (conductors) on overhead lines, it is sometimes possible to do that with new ones that can carry more power and sometimes with wires that can be operated at a higher temperature allowing more power to be transported. That is what we are doing with the first two schemes. Power control devices are equipment that allow more power to be directed to flow along parts of the network that have some additional capacity.

While those works will increase the boundary transfer capability across boundary B8 to around 14 GW, they will not be sufficient to accommodate the north south power flows that are expected on the network. Up to around 29 GW of boundary transfer capability is needed by 2033 across the B8 boundary with increasing offshore wind and interconnectors.

[23] Connection registers, National Grid ESO nationalgrideso.com/industry-information/connections/reports-and-registers

[24] Keadby to Cottam reconductoring is referred to as KCRE in NOA and received a 'proceed' recommendation in NOA 2021/22 and NOA 2021/22 Refresh.

[25] Keadby to West Burton thermal uprating is referred to as KWHW in NOA and received a 'proceed' recommendation in NOA 2021/22 and NOA 2021/22 Refresh. Connection registers, National Grid ESO nationalgrideso.com/industry-information/connections/reports-and-registers

[26] Installing power control devices along Keadby to West Burton is referred to as KWPC I NOA and received a 'proceed' recommendation in NOA 2021/22 and NOA 2021/22 Refresh.

[27] Uprating Brinsworth to Chesterfield to High Marnham from 275 kV to 400 kV is referred to as EDEU in NOA and received a 'proceed' recommendation in NOA 2021/22 Refresh.

[28] Reconductoring West Burton to Ratcliffe on Soar is referred to as WRRE in NOA and received a 'proceed' recommendation in NOA 2021/22 Refresh.

Identifying the strategic proposal for North Humber to High Marnham

Our Strategic Options Report explains in detail how we have considered a range of technical, environmental, socio-economic and cost factors in determining the most suitable strategic option to take forward.

Network requirements and technology options considered

We are bound by Government policy, legislation, regulation and industry rules which inform the balance that we need to strike when developing proposals and ultimately will determine whether individual proposals should proceed. This applies to all grid upgrades across the country.

To meet our obligations, NGET is required to reinforce the transmission system across the B8 boundary, whilst ensuring that customers are also able to connect to our system in the Creyke Beck area. This is particularly relevant for the B8 boundary, which allows the transmission of power from the North to the Midlands.

Currently, the B8 boundary, across the entire country, has capacity to transmit 11.6 GW of electricity between the North and the Midlands. As explained in 'The need for network reinforcement in the region' section, work will be carried out in the next decade to derive more capability from the existing network. Those works only increase the B8 boundary transfer capability to around 14 GW. With as much as 29 GW of transfer capability required by 2033 across the whole of the B8 boundary, new lines are needed.

In the Creyke Beck area, the amount of electricity connected to the network from existing and proposed sources, is expected to reach just over 13 GW by the early 2030s.

The electricity transmission network connecting the area today is only capable of transporting just under 7 GW out of the Creyke Beck area, whilst remaining compliant with the Security and Quality of Supply Standards (SQSS) that the network is operated to. There is therefore a shortfall of around 6 GW of additional network capability needed out of the Creyke Beck area and across the B8 boundary.

There are different ways to transmit electricity – by onshore overhead lines and pylons, by underground cables, or through offshore subsea cables under the seabed which connect to onshore overhead lines. In looking at how we might best meet the need to carry more power across the B8 boundary and out of the Creyke Beck area, we have considered different types of technology. Each has different features that affect how, when and where it may or may not be appropriate to be used:

- **onshore** 400,000 volt (400 kV) alternating current (AC) overhead lines and 400 kV AC underground cables;
- **offshore**, including high voltage direct current (HVDC) cables; and
- **onshore** HVDC cables.

Identifying the preferred strategic option

As part of the strategic optioneering process, we have considered a range of factors, including:

- Technology options available for each strategic option, including the feasibility of how it could be delivered;
- Environmental and socio-economic constraints relevant to each option;
- Initial capital costs of each strategic options, along with lifetime costs (calculated over a 40-year period); and
- System benefits which each strategic option would provide.
- carry more power across the B8 boundary and out of the Creyke Beck area, we have considered different types of technology. Each has different features that affect how, when and where it may or may not be appropriate to be used:
- onshore 400,000 volt (400 kV) alternating current (AC) overhead lines and 400 kV AC underground cables;
- offshore, including high voltage direct current (HVDC) cables; and
- onshore HVDC cables.

Geographic scope

The geographic scope of each strategic option is also a significant factor. Shorter proposals are generally more efficient options. Shorter reinforcements are also usually associated with lower levels of environmental effects, lower capital and lifetime costs, and are, in general terms, more compliant with relevant policy guidance. As explained earlier, we have duties under the Electricity Act 1989, to develop proposals that are efficient, coordinated, and economical, and which have regard to people, places and the environment (the desirability of preserving amenity duty).

Strategic options considered

To facilitate the 6 GW increase in power flows across the B8 boundary and generation connections to Creyke Beck by 2031, five strategic options have been considered, including four onshore options and one subsea option.

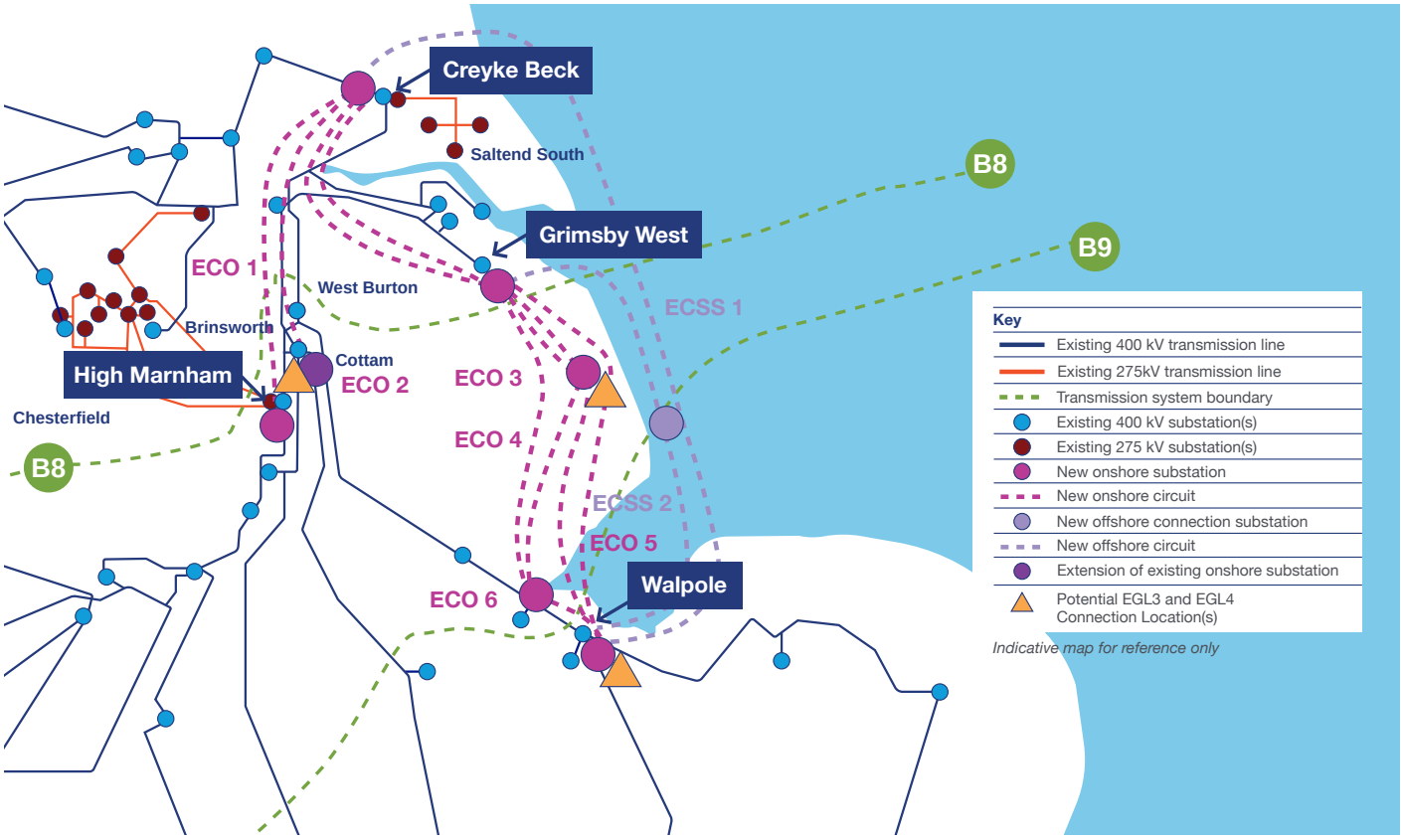


Figure 3 Map showing the strategic options considered

Due to the number of proposed new generators and interconnectors connecting in the Creyke Beck area (11.4 GW contracted to connect at Creyke Beck and Salt End), all options must start from this location. A new double circuit electricity transmission reinforcement is required to maintain compliance with the SQSS.

Preferred strategic option

Of the five strategic options considered, a new 400 kV overhead electricity transmission line between a new substation near Creyke Beck and a new substation at High Marnham, approximately 90 km in length, is our emerging preference. It is this option that has therefore been taken forward for route corridor identification. This option is preferred because:

- **Value to consumers**

  We are required to strike a balance and make efficient, coordinated and economical ßinvestments that also have regard to the desirability of preserving amenity. Investing cost effectively benefits consumers as we try to bring forward proposals that are as affordable as possible to bill payers. The capital cost estimate for the new transmission circuits, including the overhead line and two required substations, is the lowest overall and the lifetime cost is substantially lower than the subsea option and lower than two of the three other onshore connection options.

  The use of AC overhead line technology, as opposed to underground cables, gas insulated lines and a HVDC underground connection, would also be the most cost-effective solution.

- **Environment and socio-economic**

  Each of the options appraised have their relative advantages and disadvantages. One of the key differentiators between options relates to overall route length which can impact the extent of environmental and socio-economic effects. Creyke Beck to High Marnham is the second shortest option.

- **Distance and system benefits**

  While this option would be approximately 10 km longer than the alternative option to Cottam, routeing the circuit to a new substation at High Marnham, would support future reinforcements and allow system efficiencies, including the proposed circuit upgrade from Brinsworth to Chesterfield to High Marnham. In comparing between onshore and subsea options, we have also discounted the latter from an economic and technological perspective, with the subsea HVDC solution resulting in a total distance approximately 110 km greater than our preferred onshore option.

For more information about strategic options considered, please see our Strategic Options Report, which is available on our website (nationalgrid.com/nh-hm).

Additional wider network reinforcement across the B8 and B9 boundaries

While our North Humber to High Marnham proposals will provide an additional 6 GW of capacity across the B8 boundary, this alone is not sufficient to provide all the capacity the country needs to move more clean energy from the North to the Midlands. Additional connection and B8 and B9 boundary requirements on the east coast are also explained in our Strategic Options Report. Additional network proposals to address those requirements do not form part of North Humber to High Marnham. Those proposals, a new electricity transmission line between Grimsby and the Walpole area and two subsea HVDC links from Scotland, will be developed and consulted on separately.

Route corridor options identification and selection process

As explained earlier in the 'How we develop projects' section, we have considered where the proposed new line could potentially be located between the Creyke Beck area and High Marnham. Our work is set out in full in our Corridor Preliminary Routeing and Siting Study (CPRSS) report.

Define the study area

For each section of our route, we defined a study area informed by factors including:

- the connection end points identified in the Strategic Proposal
- the location of large towns and other built-up areas
- the location of physical features such as estuaries, or protected sites like Areas of Outstanding Natural Beauty, National Parks or nature conservation areas
- opportunities to utilise established electricity transmission corridors.

Constraint mapping

We then map out key features in the landscape that we want to avoid or minimise contact with. These have been informed by planning policy and our professional judgement. These include the built-up areas where people live and other features that may be sensitive in terms of ecology, heritage or landscape, as well as features that may represent planning or technical constraints. The full list is in the CPRSS.

Option identification, appraisal and selection

Considering the constraints and opportunities available, using a combination of computer modelling and expert professional judgement, we devise and refine various routes from one connection end to another. These seek to represent different high-level options for making the connection avoiding the identified constraints, for example, routeing on one side of a town or the other.

Developing a graduated swathe

Following the selection of a preferred option corridor, we produce a graduated swathe which indicates where the overhead line alignment could be routed. This shaded area is darker where an alignment is more likely, when considering environmental factors and identified constraints, and is lighter where it is less likely. This swathe remains indicative until more detailed assessment work is done.

We have now got to this stage and are presenting a preferred option corridor, within which we have developed a graduated swathe.

We will continue to consider feedback from public consultation and further information from surveys and stakeholder engagement as we develop a firm proposal for the alignment. We will then bring forward more detailed proposals for further public consultation, which we anticipate will be in 2024.

Technology Options

Example of a 400 kV steel lattice pylon

Overhead lines

In line with our statutory duties and existing and emerging Government policy, as set out in the National Policy Statements[29], our starting assumption when we need to add a new route to the network, is to look for a corridor for a new overhead line.

Overhead electricity transmission lines, typically involve building new steel lattice pylons to support the wires (conductors). The size, height and spacing of pylons are determined by safety, topographical, operational and environmental considerations. A typical 400 kV pylon is around 50 metres tall.

The main impact of overhead lines is generally considered to be visual, with effects on landscape and views.

Constructing underground cable

Underground cables

In line with the National Policy Statements, we may propose using underground cables in sensitive areas, such as National parks or Areas of Outstanding Natural Beauty (AONB), to reduce visual impact.

For installing cables underground a large cable swathe is required. This is typically between 65 and 120 metres wide depending on the number and size of cables to be installed, with additional working areas beyond this. Once the cables have been installed, the construction swathe will be reinstated and normal agricultural practices can be resumed. Trenchless crossing techniques, such as horizontal directional drilling, are sometimes used to install cables under constraints such as rivers or major roads. Should these techniques be required, larger working areas may be necessary.

Joint bays would also be needed at intervals of approximately 500 metres to 1,000 metres to allow for the individual sections of cable to be joined together. In these areas a wider corridor swathe may be needed. The work required to bury cables would likely affect archaeology, vegetation and wildlife along the construction corridor.

Cable sealing end compound

Cable sealing end compounds

Cable sealing end compounds would be required where underground cables join to an overhead line. These sealing end compounds are generally around 30 x 80 metres, dependant on design requirements.

The Holford and Horlock Rules

National Grid employs two sets of rules and guidelines for the routeing and siting of new energy transmission infrastructure:

The Holford Rules provide guidelines for the routeing of high voltage overhead transmission lines. These are important guidelines during the development of a preferred alignment and considerations of whether certain sections should be undergrounded.

The Horlock Rules provide guidelines for the design and siting of substations (in addition to cable sealing end compounds and line entries).

When considering new electricity infrastructure, National Grid has regard to the degree to which options comply or deviate from these rules.

[29] Overarching National Policy Statement for Energy (EN-1) and National Policy Statement for Electricity Networks Infrastructure (EN-5) - Available at gov.uk/government/publications/national-policy-statements-for-energy-infrastructure


PUBLIC
FOOTPATH

Identifying our emerging proposals

Our Corridor Preliminary Routeing and Siting Study (CPRSS) report outlines how we have carried out detailed environmental and technical assessments to identify areas that may be more or less sensitive to the introduction of new infrastructure, including a 400,000 volt (400 kV) overhead line and other electrical infrastructure.

We have identified an emerging preferred corridor which, in overview:

- broadly follows the route of the existing overhead electricity transmission line from the Creyke Beck area north of Cottingham, to a location near Luddington in Lincolnshire, which includes crossing the River Ouse alongside the existing overhead line river crossing;
- then continues from Luddington to near Beltoft, looping west around Keadby Windfarm to pass east of Ealand and then parallel or close parallel to the two existing 400 kV overhead lines south to near the crossing of the Warping Drain, south-east of Haxey; and
- onward from there, the emerging preferred corridor loops west, to pass west of Misterton, then south, passing west of the line of villages along the edge of the Trent valley (Wallingham, Beckingham, Sturton le Steeple, North and South Leverton, Treswell and Woodbeck) to pass west of East Drayton then approach High Marnham from the north-west.

The emerging preferred corridor has been identified because:

- It takes the opportunity to follow established electricity transmission line corridors, except where it has been more appropriate not to, for technical and environmental reasons, such as in the Keadby and Trent Valley area south of the Isle of Axholme. In this way, the spread of electricity transmission infrastructure across the wider landscape has been minimised.
- The emerging preferred corridor represents one of the shortest, reducing the number of pylons that would be required.
- It avoids main settlements and wherever possible, avoids most environmentally sensitive sites and features within the study area.
- It avoids the provisional candidate area identified by Natural England for the potential Yorkshire Wolds Area of Outstanding Natural Beauty.

Following the selection of the emerging preferred corridor, we considered where it might be more, or less, appropriate to site the new overhead line within the corridor. We took account of factors such as sensitive local sites and features, including residential properties, larger woodlands and existing infrastructure.

The outcome of this early-stage work is shown by a blue shaded 'graduated swathe', which indicates where, at this stage, we believe the proposed transmission line might best be located. Darker blue areas of shading represent where it may be more appropriate to route the new line.

Lighter blue or unshaded areas, represent where we believe it would be less appropriate. The broader areas of shading represent areas where we believe there are fewer constraints and greater flexibility for routeing. Where the shading is more focussed, there is considered to be less flexibility to locate the new electricity transmission line. Individual properties where we do not envisage routeing an overhead line, have also been omitted from the graduated swathe.

Where a proposed new transmission line is routed close to another, it must maintain sufficient separation to allow for safe construction and maintenance. This is therefore reflected in the graduated swathe included in our emerging preferred corridor.

In some sections of the corridor, the swathe forms two or more distinct paths through the emerging preferred corridor, to take account of local sites and features. We welcome your views about options where there are alternative paths within the emerging preferred corridor.

The graduated swathe is only an early indication of where the new overhead line and infrastructure could potentially be located and represents our initial thinking. Your feedback, together with the ongoing design, survey, and consenting work, will be important in helping to refine this.

Should consultation feedback indicate that other areas within, or outside the emerging preferred corridor, should be given further consideration, we will consider that, and other feedback, before bringing forward more detailed proposals at the next stage of public consultation.

We welcome your views about where the line might best be routed as part of our consultation.

For more information about the emerging preferred corridor, the graduated swathe and alternative corridors considered, please see our CPRSS.

Our proposals for public consultation

Our emerging preferred corridor has been split into 11 sections to make it easier for people to give feedback about any particular areas that they may wish to comment on. At each end of the corridor, we are also presenting a substation zone; one at the northern end where a new substation would be located north of Creyke Beck, and one at the southern end around the former High Marnham power station site.

- **Section 1:** Creyke Beck – Skidby
- **Section 2:** Skidby – A63 dual carriageway
- **Section 3:** A63 dual carriageway – River Ouse crossing
- **Section 4:** River Ouse crossing
- **Section 5:** River Ouse crossing – Luddington
- **Section 6:** Luddington – M180 motorway
- **Section 7:** M180 motorway – Graizelound
- **Section 8:** Graizelound – Chesterfield Canal
- **Section 9:** Chesterfield Canal – A620 east of North Wheatley
- **Section 10:** A620 east of North Wheatley – Fledborough
- **Section 11:** Fledborough - High Marnham

Substation zones

While, our plans for North Humber to High Marnham do not include the new substations, we are presenting the general search areas for these to show the start and end points for the proposed electricity transmission line.

The graduated swathe also does not cover the substation routeing zones, because the likely position of the new overhead line (for North Humber to High Marnham) cannot be determined at this stage, until the substations' positions are fixed.

Interpreting our graduated swathe

Within our graduated swathe, as shown in our CPRSS report, we are showing the following:

- Existing overhead lines, shown as dark blue lines.
- The areas for potential line swap overs (where the route of the proposed new line could swap from one side of the existing line to the other), shown as the pink hatching.
- An area where a short section of existing overhead electricity transmission line (east of Ealand and Crowle) may be placed below ground, shown as the purple hatching.
- Indicative zones for new substations in the Creyke Beck and High Marnham areas, shown by the orange areas.
- Indicative zone for routeing the overhead line into the new substation at High Marnham, shown by the green area.

For completeness, we have also included a potential zone for a separate and unrelated extension of the existing Creyke Beck substation, also shown in orange.

Providing feedback on our plans

Your feedback is important to us in helping to refine our plans. We welcome comments on all aspects of our proposals, including the areas important and relevant to you. We have provided below, a summary of each section of the graduated swathe, including the key issues and constraints.

For more information, there are detailed overviews for each section in the Corridor Preliminary Routeing and Siting Study report, which can be accessed on our project website (nationalgrid.com/nh-hm).

You can also use our online interactive map on our project website **(nationalgrid.com/nh-hm)** to input your postcode to determine the nearest sections to you. A series of "sheets" (or maps) have been produced for each section, which provide more detail at a local level. These are also available on our project website.

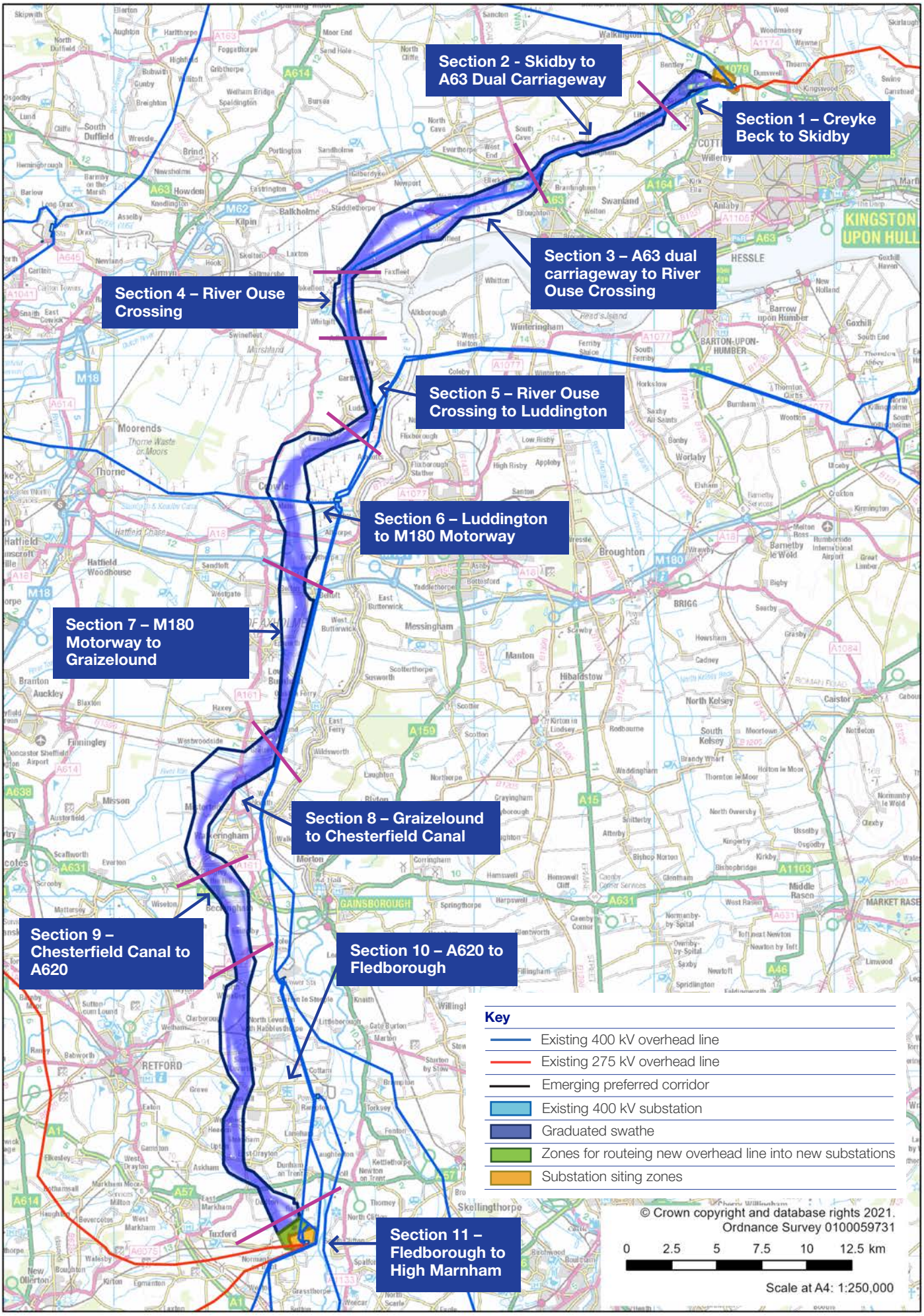


Figure 4 Map showing the 11 sections of the emerging preferred corridor

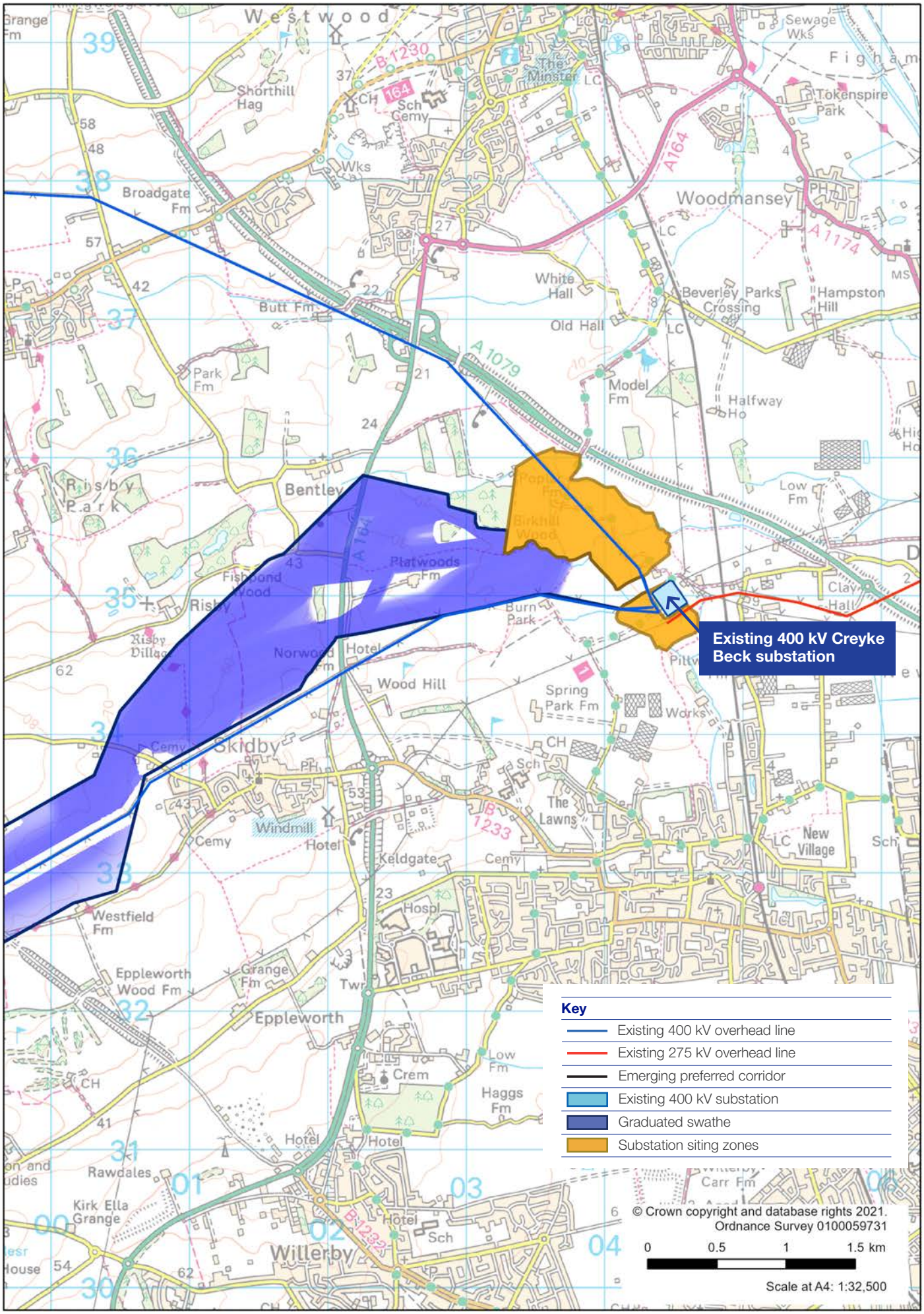


Figure 5 Map showing section 1 of the emerging preferred corridor

Section 1 – Creyke Beck to Skidby

This section of the emerging preferred corridor runs from the new substation near Creyke Beck (where the new overhead line would connect into) to a point immediate north of the village of Skidby. As shown in Figure 5, the graduated swathe starts from the edge of the substation search area. The path of the overhead line in the substation search area will be influenced by the final location of the new substation.

We are expecting to route the new overhead line to the north of the existing overhead line to avoid settlements and to the east of the A164.

We would like your feedback on this section of the route. Please see question 3b on our feedback form.

Figure 6 Map showing section 2 of the emerging preferred corridor

Section 2 – Skidby to A63 dual carriageway

This section runs from the north of Skidby to the A63 dual carriageway, which is located on the western edge of the Yorkshire Wolds. In this section, we are looking at two different alignments; to the north and south of Skidby.

To the north of Skidby, we think there is merit in routeing the new overhead line close together with the existing overhead line, to help reduce the landscape and visual impacts. Further west in this section, the distance between the new and existing line may increase in areas to help avoid impacts on individual properties and Brantingham Dale SSSI.

Southwest of Skidby two paths have been considered – one north of the existing overhead line and one south of the existing line. The southern path would require two line swap overs for a distance of approximately 5 km. A line swap over is where the proposed new line would cross from one side of the existing overhead line to the other. While line swap overs provide the opportunity to route further away from villages such as Ellerker and environmentally sensitive areas like the Blacktoft Sands RSPB reserve in Section 3, repeatedly swapping back and forth to different sides of the existing overhead line would be technically more complex and costly.

Before crossing the A63, the swathe follows two discrete paths; one to the north of Ellerker and the other to the south. The southern option would require a swap over of the new and existing overhead line.

We would like your feedback on this section of the route. Please see question 3c on our feedback form.

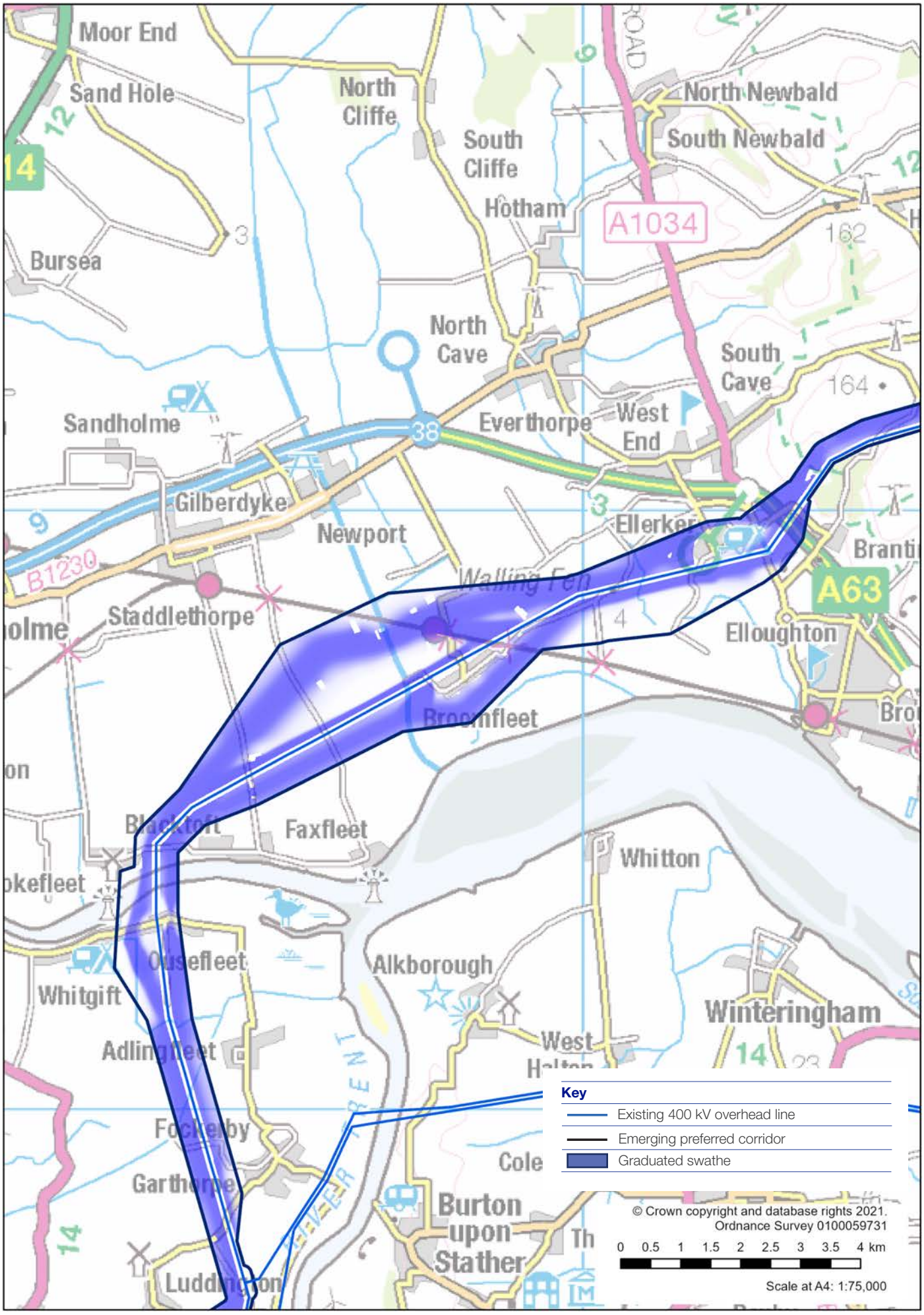


Figure 7 Map showing section 3 of the emerging preferred corridor

Section 3 – A63 dual carriageway to River Ouse Crossing

This section runs from the A63 dual carriageway, on the western edge of the Yorkshire Wolds to Blacktoft Lane, a road in close proximity to the northern bank of the River Ouse.

When routeing the graduated swathe in this area, we have considered a number of features and potential impacts, including but not limited to, the presence of the existing 400 kV overhead line, and location of the two villages of Ellerker and Broomfleet and the tileworks. We have also considered the impact on bird species using the nearby Humber Estuary internationally designated sites.

We are considering three paths within this swathe where the new overhead line could be routed; a northern, central and southern path. There are opportunities to combine different paths within this section, which we will look at when we design the project in more detail. All routes would cross both the Selby-Hull railway line and the Market Weighton Canal. The northern and central paths would lead into a crossing of the River Ouse to the west of the existing 400 kV overhead line and following the southern path would lead to a crossing to the east.

We would like to know if you have any preference for the line to go north or south of Ellerker or Broomfleet, in addition to any other feedback you may have on this section of the route. Please see questions 3d to 3h on our feedback form.

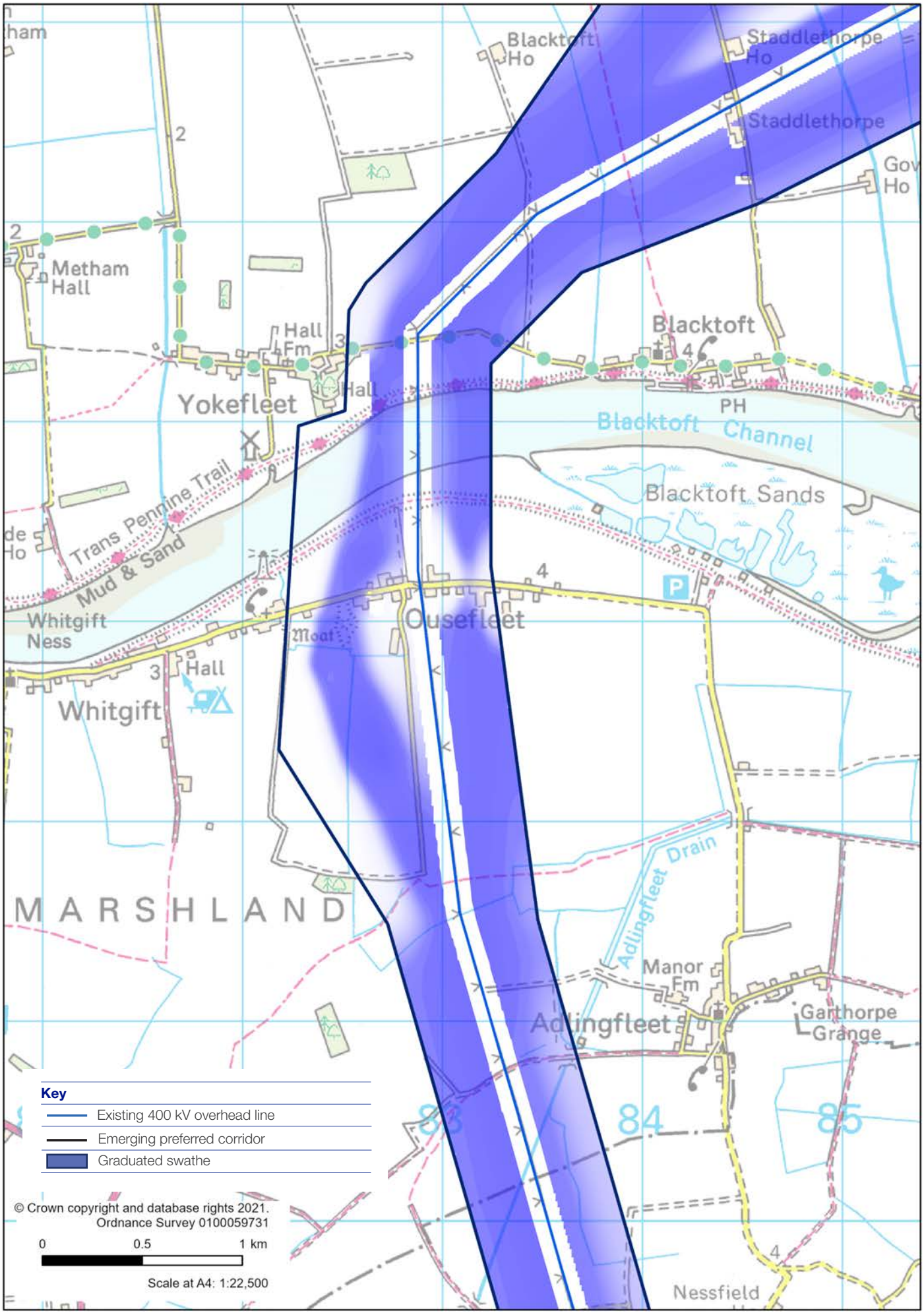


Figure 8 Map showing section 4 of the emerging preferred corridor

Section 4 – River Ouse crossing

This is a short 2.5 km section of the preferred corridor that crosses the River Ouse and directly interacts with the Humber Estuary internationally designated sites. The corridor extends to the east and west of the existing overhead line that crosses the western-most extent of the RSPB's Blacktoft Sands Nature Reserve.

It is anticipated that no permanent structures would need to be constructed within the international designated sites, reducing the likelihood of permanent habitat loss within the sites. This section of our swathe contains two alternative paths; one to the east and one to the west of the existing overhead line.

The distance between any new overhead line and the existing overhead line would need to be greater across the River Ouse in comparison with other sections of the emerging preferred corridor. Taller pylons would be required to ensure that the conductor wires do not interfere with the passage of vessels along the river.

The eastern path of the swathe would run closely in line with the existing overhead line crossing the river, offering opportunities to closely match the profile and heights of the existing line over the river. The western path runs broadly parallel to the existing line and deviates slightly westwards at Ousefleet, offering opportunities to avoid any new overhead line oversailing residential properties.

The decision about whether to cross the River Ouse overhead is one which will be informed by feedback and engagement with stakeholders such as Natural England, the RSPB and other nature conservation organisations, as well as by the results of extensive site surveys. An underground cable crossing, if geologically and technically viable, would result in very significant increases in cost and potentially delay the completion date for the project.

We would like to know if there are any factors you think we should take account of when considering options to cross the River Ouse at Ousefleet, in addition to any other feedback you may have on this section of the route. Please see questions 3i to 3j on our feedback form.

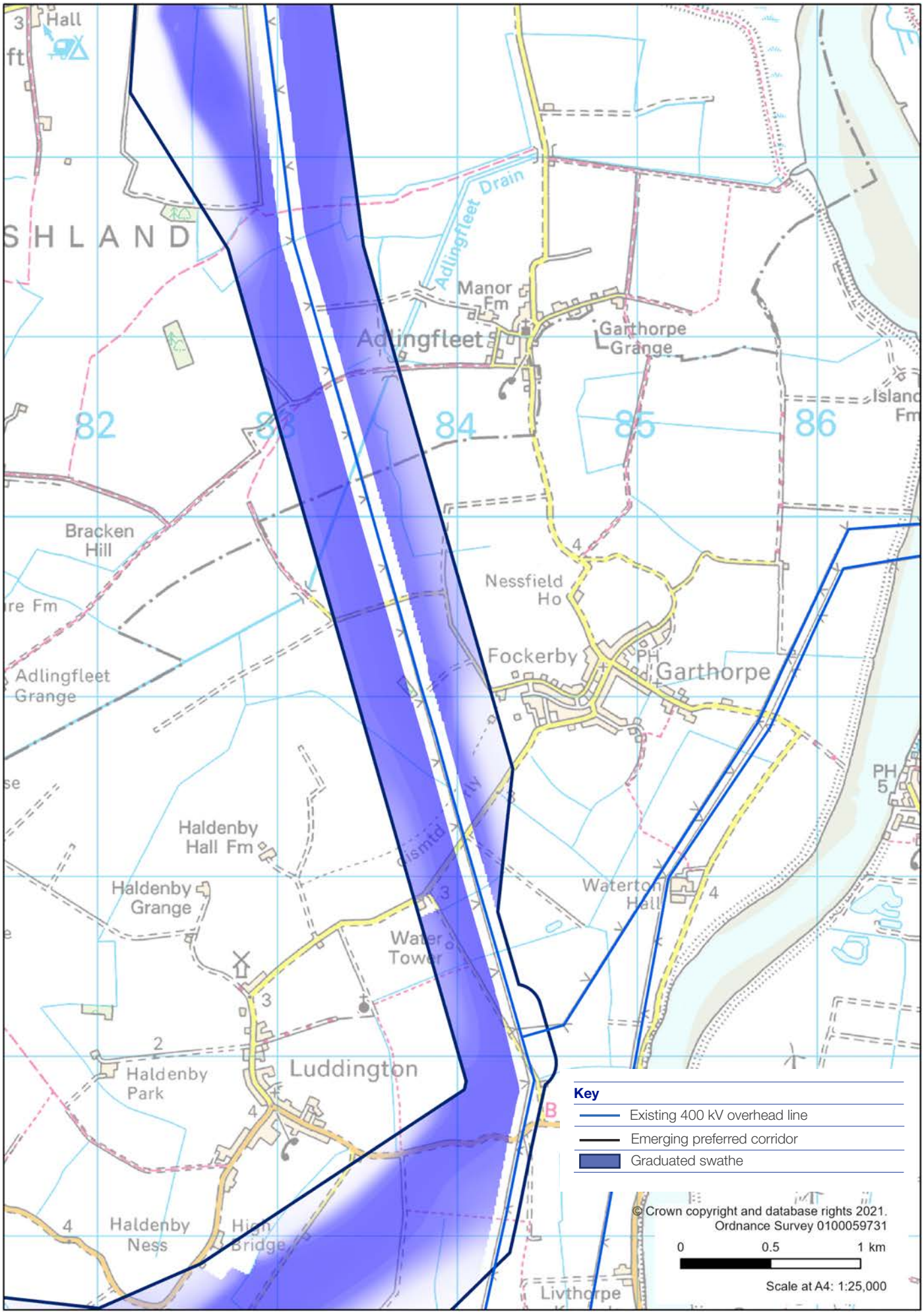


Figure 9 Map showing section 5 of the emerging preferred corridor

Section 5 – River Ouse crossing to Luddington

This section extends south from the north of Adlingfleet to the B1392 Meredyke Lane, which runs between the village of Luddington and the River Trent. The graduated swathe extends either side of the existing overhead line in this area, as far as a point east of the village of Luddington, where the existing line connects with a second overhead line from the east (referred to as 'Garthorpe Tee').

We are considering an eastern and a western path in this section. The eastern path would bring the new overhead line slightly closer to the villages of Adlingfleet, Fockerby and Garthorpe to the east. The western path would bring the new line closely parallel to the existing overhead line, which would limit landscape and visual impacts and would be a preference for a technical and constraint perspective.

Line swap overs may be required in this section, depending on whether the new line follows a western, or eastern, crossing of the river Ouse and depending on whether we there would be line swap overs in earlier sections of the route.

We would like to know if there are any factors you think we should take account of when considering these options. Please see question 3k and 3l on our feedback form.

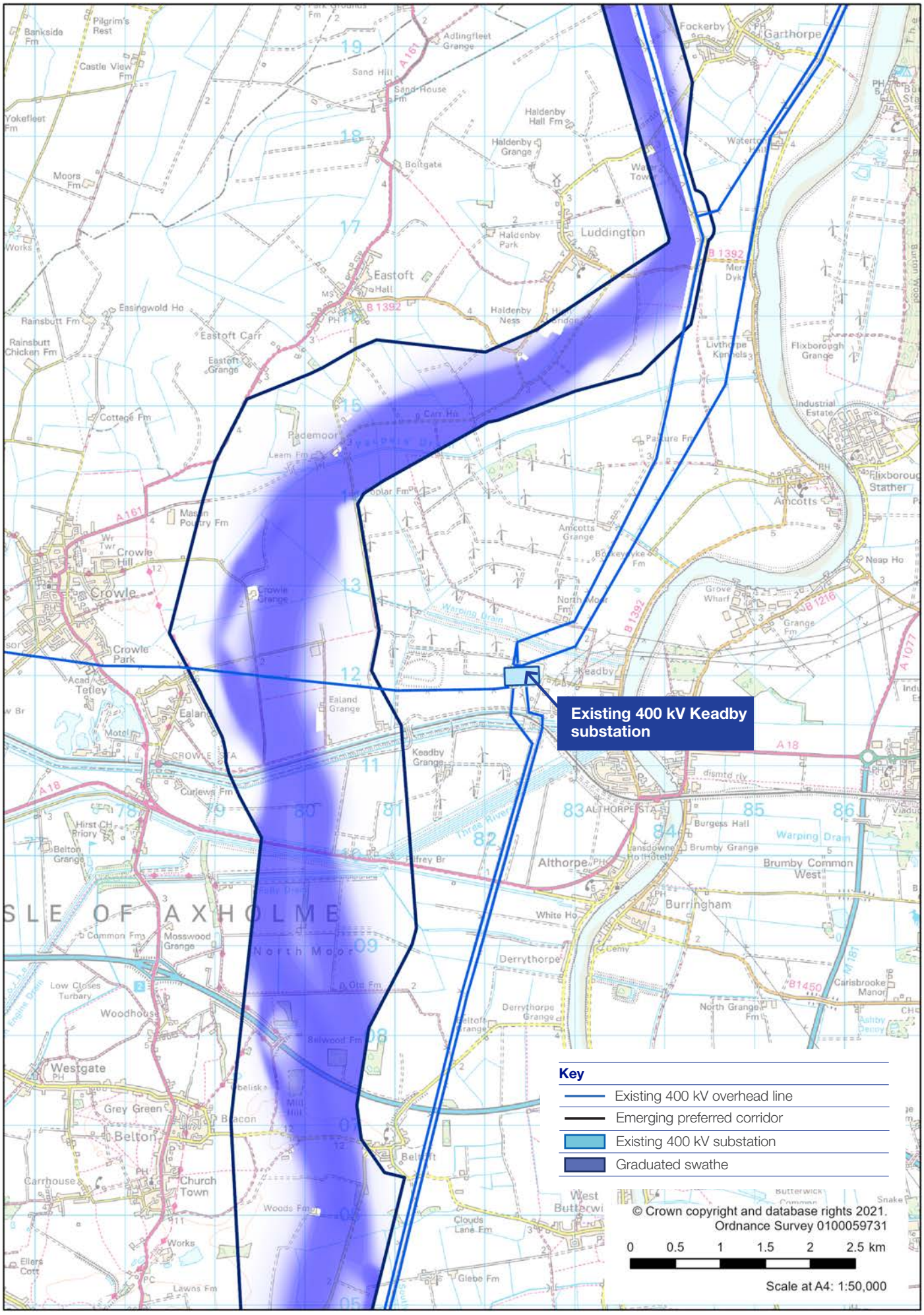


Figure 10 Map showing section 6 of the emerging preferred corridor

Section 6 – Luddington to M180 motorway

This section runs between the B1392 Meredyke Lane and the M180 motorway. The graduated swathe moves away from the route of the existing overhead lines to the east of Luddington, and then is located to the north and west of the operational Keadby Wind Farm.

Our graduated swathe is approximately 1 km in width in the area, which indicates that a more direct route can be taken, with more flexibility in allowing us to route the new overhead line. The swathe breaks into discrete eastern and western paths in places where local constraints have been identified, including Crowle Grange and Ealand Grange.

Approximately 1 km south of Crowle Grange, the preferred corridor intersects the route of the existing 400 kV overhead line from Keadby Substation. At least one span of the existing line would need to be replaced with underground cables in this area to allow the new and existing transmission routes to cross. Two cable sealing end compounds would be required for the transition between underground cable and overhead line. Temporary diversions of the existing overhead line may be required to ensure continuity of supply, along with the permanent diversion of a short section of the existing overhead line.

We would like your feedback on this section of the route. Please see question 3m on our feedback form.

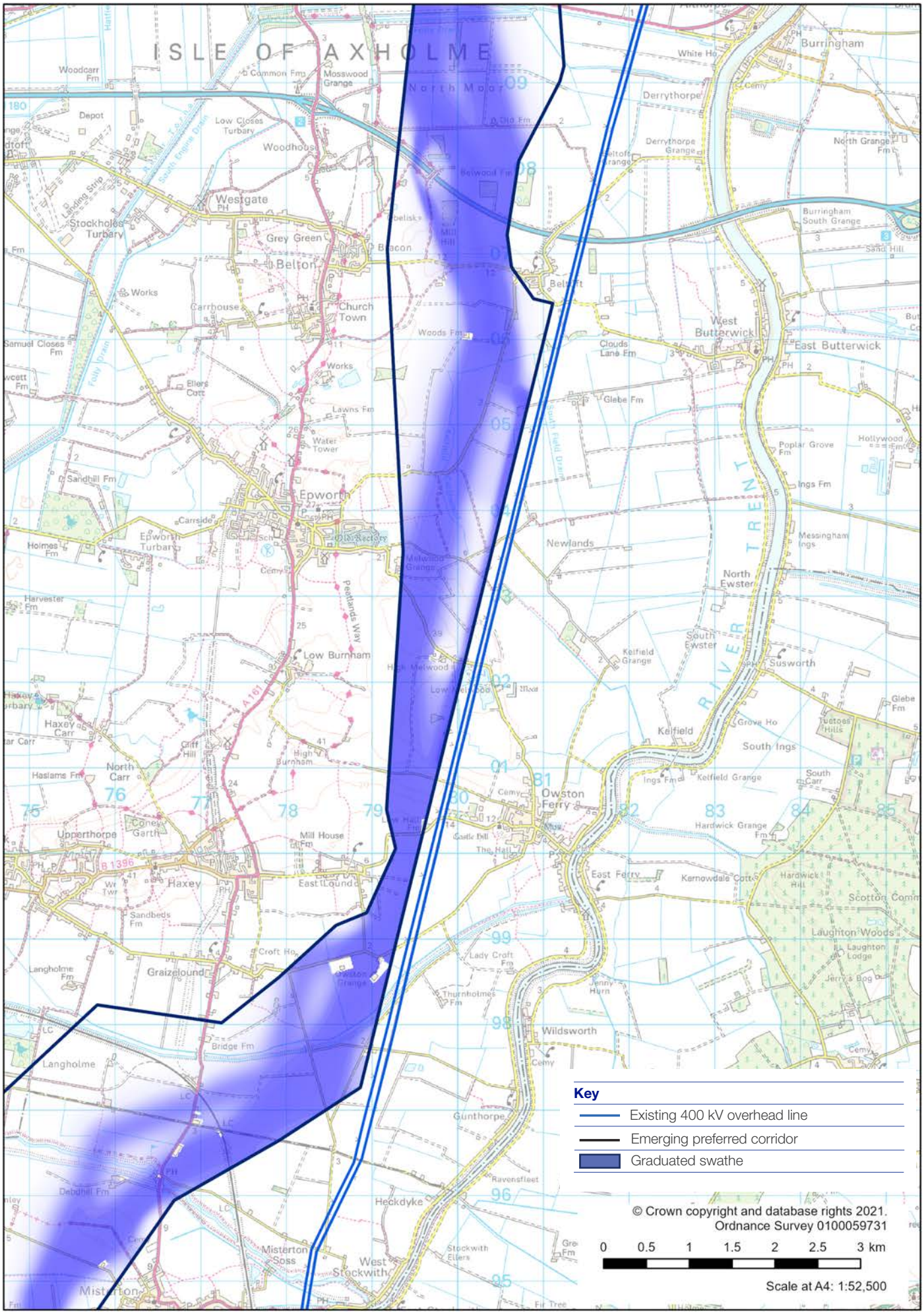


Figure 11 Map showing section 7 of the emerging preferred corridor

Section 7 – M180 motorway to Graizelound

The section runs between the M180 motorway to the north and Stockwith Road/Owston Road between the villages of Graizelound and West Stockwith. The corridor would span across areas of high ground within the Isle of Axholme area.

An eastern and a western path, to the south of Beltoft, are being considered in this section. The eastern path would route the new overhead line close to, and parallel with, the existing lines and the same side of existing properties. The alternative western route is located on slightly higher ground, which could increase distance from residential properties but would be more visible in the wider landscape and closer to the eastern edge of the village of Epworth.

We would like your feedback on this section of the route. Please see question 3n on our feedback form.

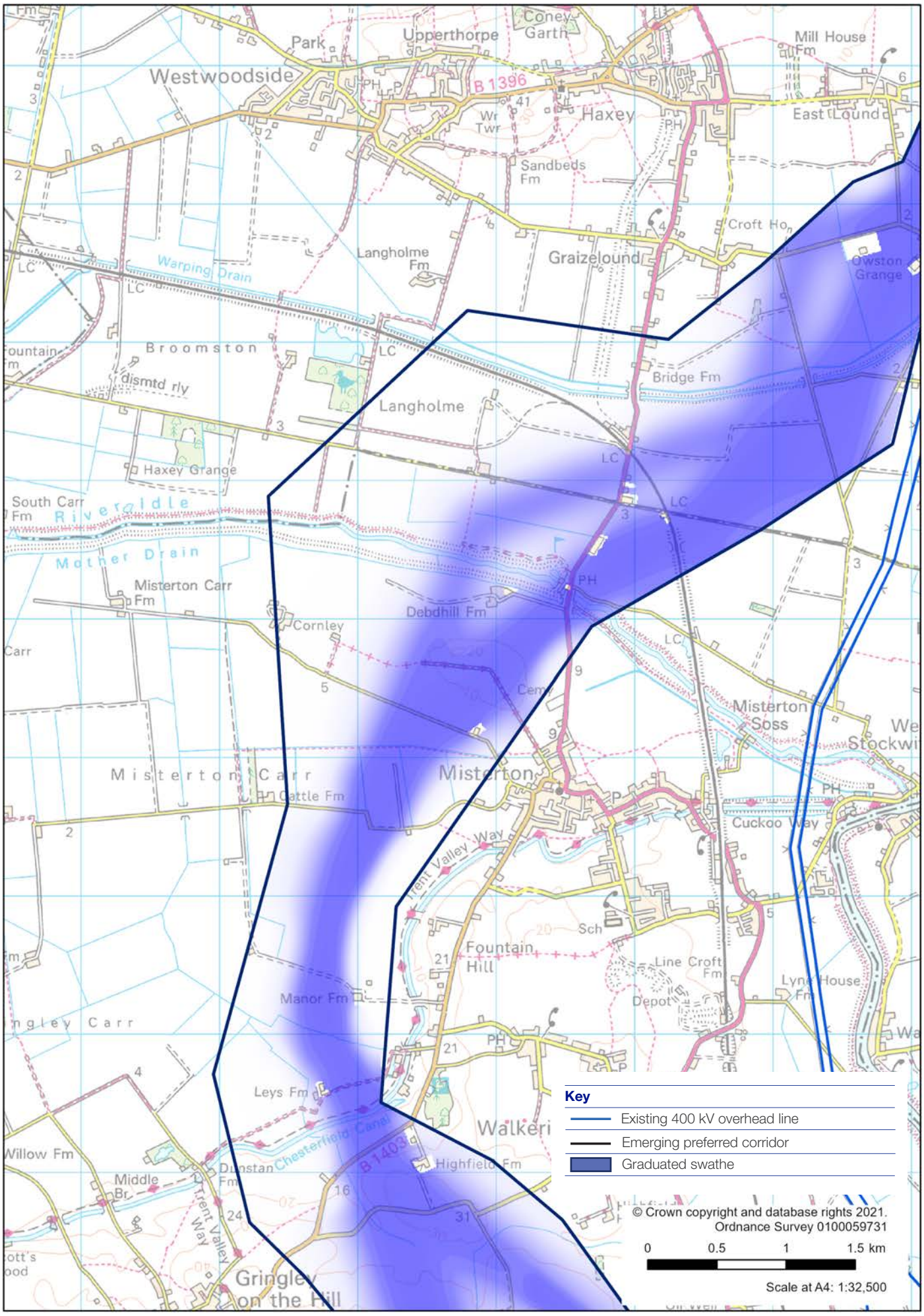


Figure 12 Map showing section 8 of the emerging preferred corridor

Section 8 – Graizelound to Chesterfield Canal

This section runs between Stockwith Road/Owston Road and Chesterfield Canal to the south. This section of the preferred corridor is generally wider than other areas, following an easterly path and avoiding the settlement of Misterton.

The swathe splits into alternative north-westerly and south-easterly paths, with the former crossing more remote farmland and the latter offering a more direct route, but closer to leisure businesses at Haxey Quays and Haxey Gate. The swathe also crosses the Chesterfield Canal SSSI, avoiding isolated properties to the east and west.

The corridor crosses the Spalding to Doncaster rail line and the River Idle in this section.

We would like your feedback on this section of the route. Please see question 3o on our feedback form.

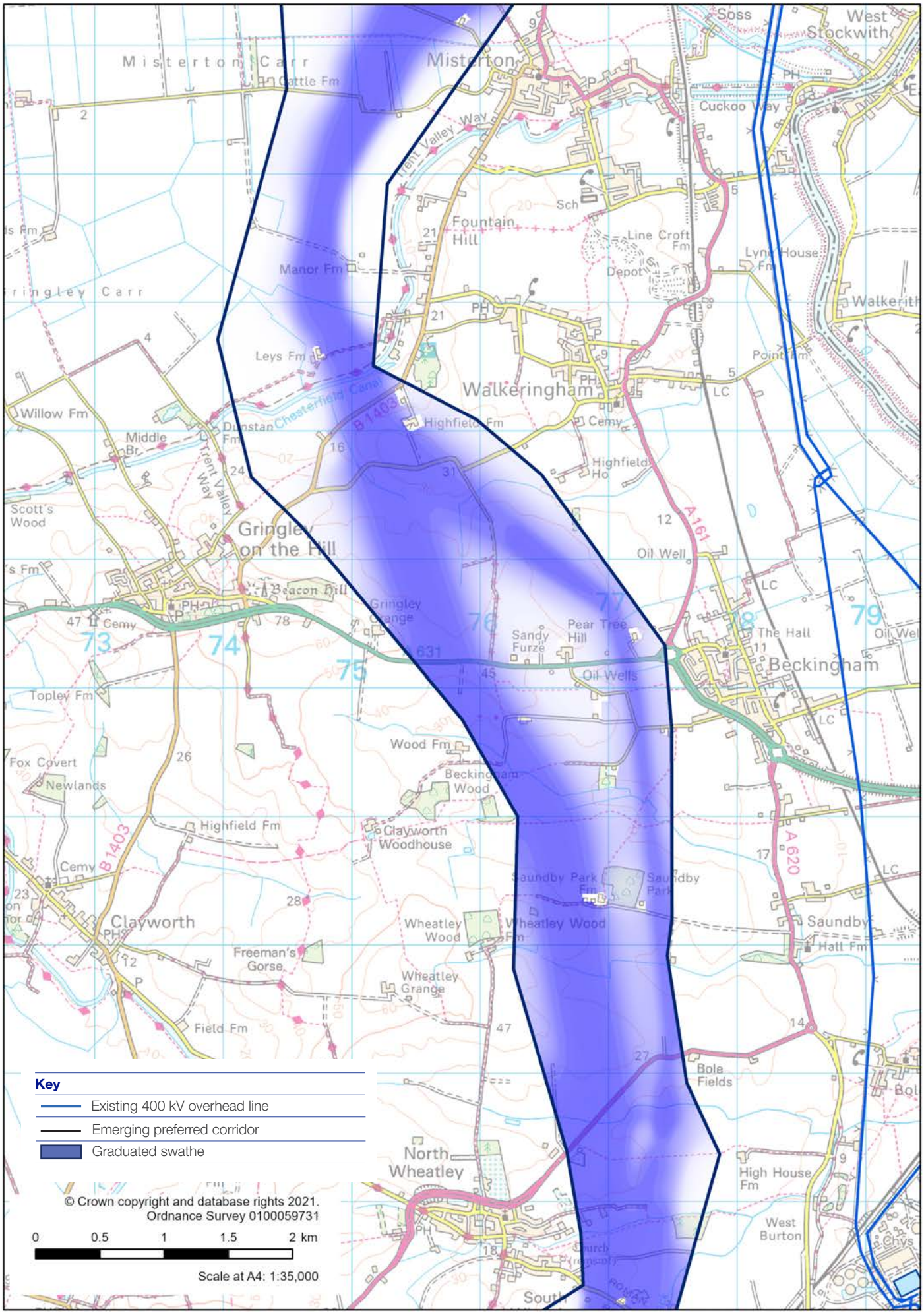


Figure 13 Map showing section 9 of the emerging preferred corridor

Section 9 – Chesterfield Canal to A620

This section runs between Chesterfield Canal and the A620 Gainsborough Road, northeast of the village of North Wheatley. The swathe splits into alternative western and eastern paths, with the western route located on slightly higher ground and closer to the village of Gringley on the Hill and the eastern route passing slightly closer to the village of Beckingham.

We would like to hear your preference and feedback on whether the new overhead line should be routed to the east or west of the existing overhead line. Please see questions 3p and 3q on our feedback form.

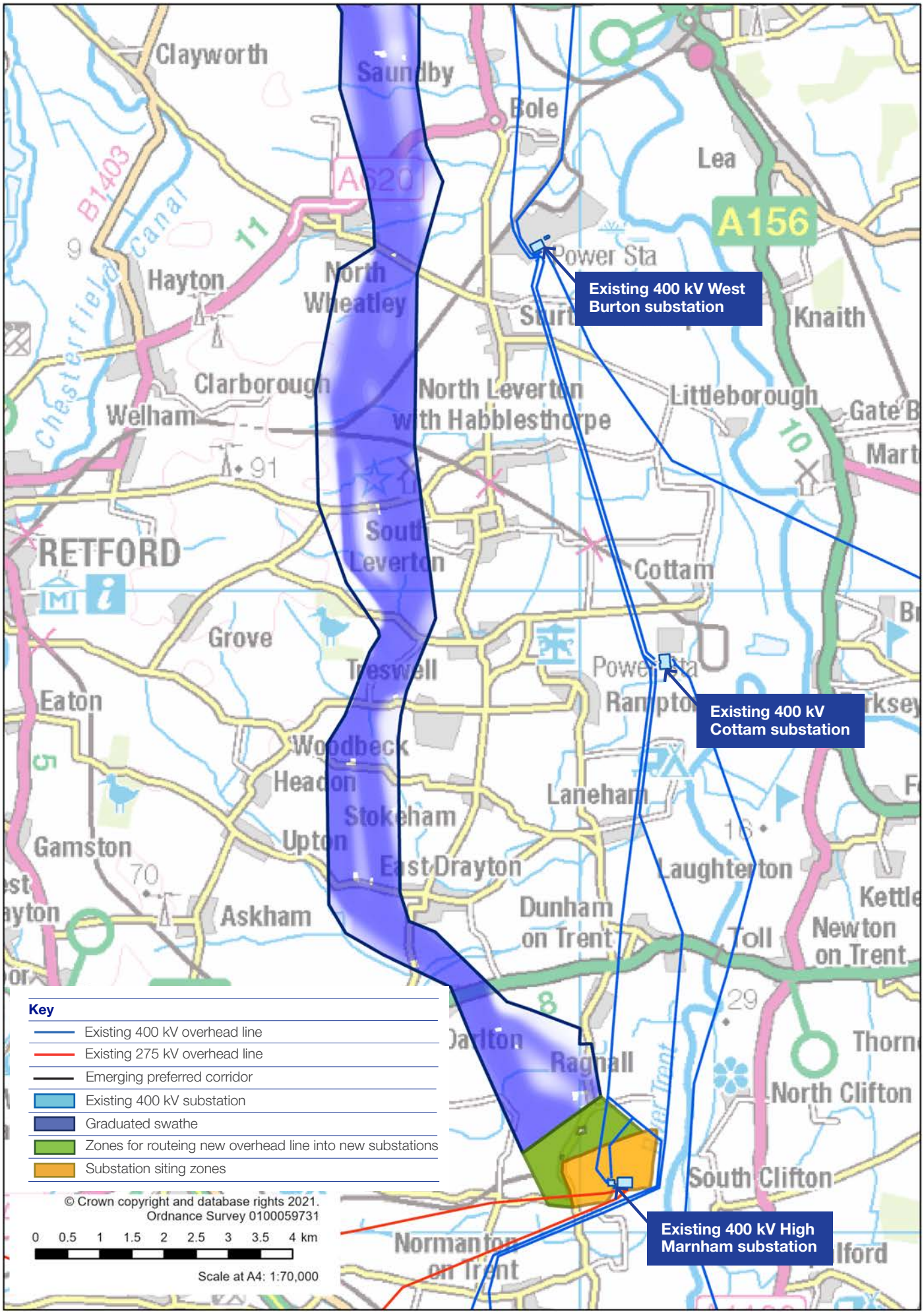


Figure 14 Map showing section 10 of the emerging preferred corridor

Section 10 – A620 to Fledborough

The section runs from the A620 south to a point approximately 1 km from the existing High Marnham 400 kV substation. In this section the graduated swathe is routed to avoid the villages of North and South Wheatley, Sturton le Steeple, North Leverton and South Leverton and Treswell to the north, and the settlements of Woodbeck, East Drayton and Darlton further to the south.

The swathe splits into alternative eastern and western paths in two locations; between South Wheatley and Treswell, avoiding properties and farm buildings, and to the south of Woodbeck, avoiding a small number of properties on Main Street and Retford Road, East Drayton.

The route crosses a 132 kV overhead electricity distribution line in this section and the Sheffield to Lincoln rail line.

We would like your feedback on this section of the route. Please see question 3r on our feedback form.

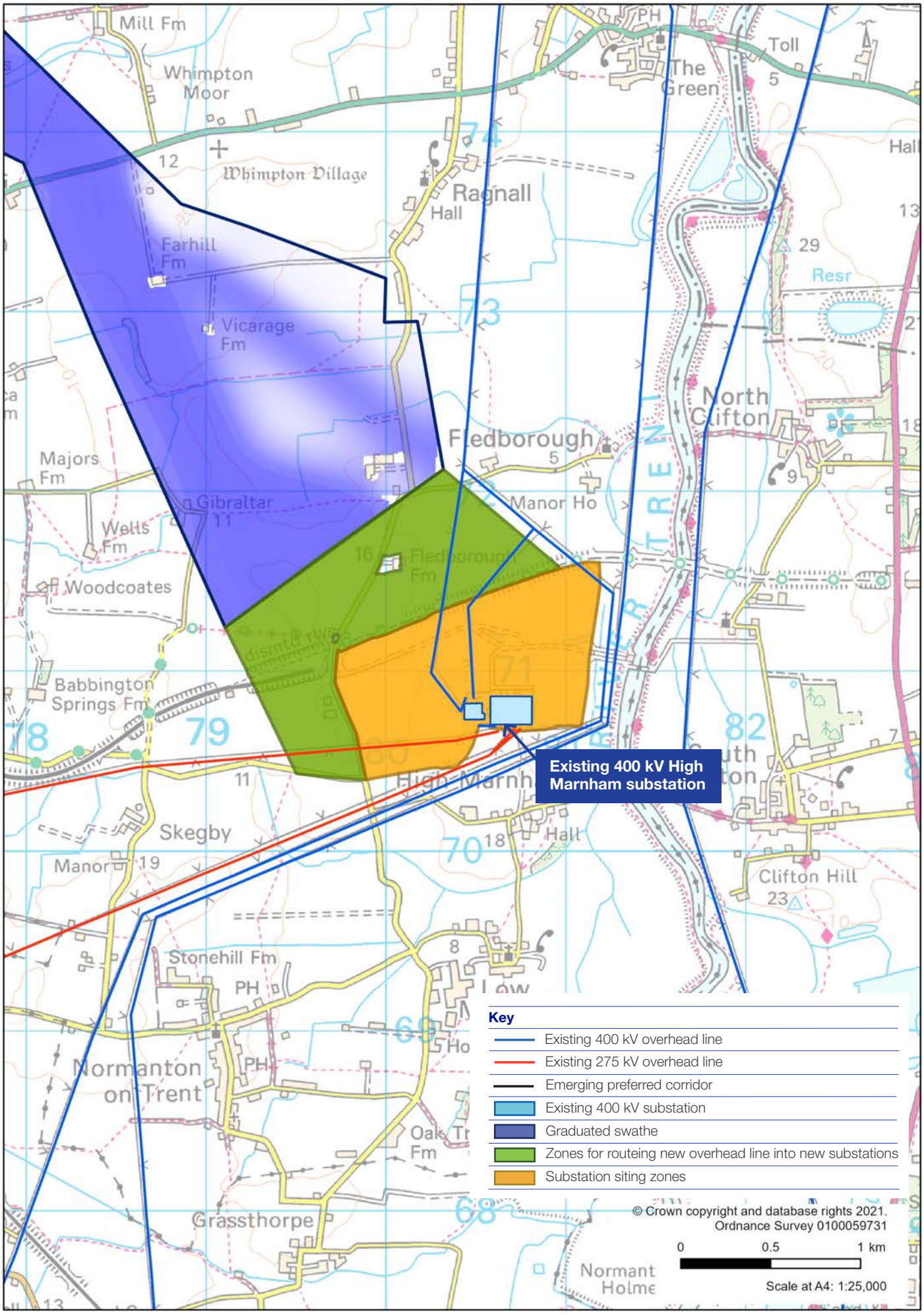


Figure 15 Map showing section 11 of the emerging preferred corridor

Section 11 – Fledborough to High Marnham

The final section of the corridor begins approximately 1 km northwest of the existing High Marnham substation and indicates where the new substation could be located. Work is ongoing to identify the most appropriate location for the new substation within this zone and this will influence the final route of the new overhead line.

A separate planning application is being developed for this substation and will be submitted to Bassetlaw District Council.

We would like your feedback on this section of the route. Please see question 3s on our feedback form.

Have your say

Who are we consulting and how?

Our consultation is open to anyone who may have an interest in our proposals – residents, communities, landowners, local businesses and interest groups, as well as elected representatives and prescribed consultees such as the Environment Agency, Natural England and Historic England.

We are committed to ensuring that our consultation is accessible and inclusive for everyone, with information and opportunities to meet the project team and ask questions, available online and offline.

What information is available?

We have published a number of materials as part of this consultation, as listed in Table 2 below.

Table 2: Information available as part of the consultation

Document	Description	Availability
Project Background Document	Providing a summary of our proposals and information on how to get involved.	Can be downloaded for free on the project website and in hard copy at local information events or by request.
Strategic Options Report	Explaining the strategic options considered to deliver the necessary network upgrade.	Can be downloaded for free on the project website or sent on request from the project team.
Corridor Preliminary Routeing and Siting Study	Providing more technical information on the project and the need for the project, the options considered, the routeing and siting options assessed and our preferred options.	Can be downloaded for free on the project website or sent on request from the project team.
Overview map and individual route section maps	Showing the location of the preferred route and the graduated swathe.	Can be downloaded for free on the project website, with further detail at the local information events. **An interactive map showing the project is also available on our website. This allows you to search for areas of interest and select individual section plans**.
Consultation newsletter	Summarising details of the Project and public consultation.	Can be downloaded for free on the project website, in hard copy at the local information events and for collection at the information points (located along the route)
Feedback form	To gather comments and feedback from the public consultation.	Online form available on the project website, in hard copy at the local information events and for collection at the information points (located along the route). Can be requested from the project team.
Project website	Hosting all project information, including downloadable versions of all the above documents.	Access at: **nationalgrid.com/nh-hm**

We are committed to making project information accessible to all users. If you need any information or documents in an alternative format such as large print, braille, or audio tape, or if you would like a paper copy of any of our consultation or technical documents, please get in touch using the contact details on page 67 of this document.

Please note there may be a charge for supplying printed copies of technical documents.

What we are asking for feedback on

Throughout this document we have explained the need case for our North Humber to High Marnham proposals, the strategic options considered, our approach to routeing and siting and our emerging preferred corridor. We have described our proposals for each section of the emerging preferred corridor and we would value your feedback on these areas.

We want to know your views on our approach and our emerging preferred corridor and graduated swathe. We also value your comments on local features and impacts that are important to you, including any relevant mitigation you would like to see.

We are asking for your local knowledge on the most appropriate location within the swathe to route the pylons and associated infrastructure and if there is anything we should consider as we develop our proposals further.

The feedback received through this first consultation stage will inform how we further develop our plans for the proposed reinforcement.

Consultation events

We welcome you to visit our face-to-face public information events, which are being held at the following locations across the proposed route. You will have the opportunity to find out more about our proposals, view and take away printed materials and speak to experts within the team.

Table 3: Consultation events

Date and time	Venue	Date and time	Venue
Tuesday 6 June 2023, 12pm to 7pm	Dunham on Trent Centre, Low Street, Dunham, Newark, Nottinghamshire NG22 0FJ	**Monday 26 June 2023, 1pm to 7pm**	Gringley on the Hill Community Centre, West Wells Lane, Gringley on the Hill, Doncaster DN10 4QY
Saturday 10 June 2023, 10am to 4pm	North and South Wheatley Village Hall, Sturton Rd, South Wheatley, Retford, Nottinghamshire DN22 9DL	**Thursday 29 June 2023, 10am to 4pm**	Gilberdyke War Memorial Hall, 11 Clementhorpe Road, Gilberdyke, East Yorkshire HU15 2UB
Tuesday 13 June 2023, 10am to 4pm	Crowle Community Hall, Woodland Ave, Crowle, Scunthorpe, North Lincolnshire DN17 4LL	**Tuesday 4 July 2023, 12pm to 6pm**	Garthorpe Village Hall, Shore Road, Garthorpe, Scunthorpe, North Lincolnshire DN17 4AF
Monday 19 June 2023, 12pm to 7pm	Haxey Memorial Hall, 3 High Street, Haxey, Doncaster DN9 2HH	**Saturday 8 July 2023, 11:30am to 5pm**	Cottingham Civic Hall, 1 Market Green, Cottingham HU16 5QG
Friday 23 June 2023, 12pm to 6:30pm	All Saints Community Centre, Church Hill, South Cave, Brough HU15 2EU		

Webinars

We welcome you to attend one of our one-hour long online webinar sessions, where we will present details of our proposals followed by an open question and answer (Q&A) session. We are holding a series general overview and location themed webinars and invite you attend the webinar most relevant to you.

A recording of a general overview presentation will also be available to view on our website. Details on how to sign-up for a webinar (using the software 'Air-meet') are available on the website or by contacting the community relations team by phone on **0800 051 4430** or by email at **contact@nh-hm.nationalgrid.com**.

Table 4: Consultation webinars

Webinar session	Date	Start time
Introduction to North Humber to High Marnham project proposals – general overview	Monday 5 June 2023	2pm
Our proposals in Sections 1 (Creyke Beck to Skidby), 2 (Skidby to A63 dual carriageway) and 3 (A63 dual carriageway to River Ouse crossing)	Thursday 8 June 2023	10am
Our proposals in Sections 1 (Creyke Beck to Skidby), 2 (Skidby to A63 dual carriageway) and 3 (A63 dual carriageway to River Ouse crossing)	Thursday 15 June 2023	7pm
Our proposals in Sections 4 (River Ouse crossing), 5 (River Ouse crossing to Luddington), 6 (Luddington to M180 motorway) and 7 (M180 motorway to Graizelound)	Monday 10 July 2023	2pm
Our proposals in Sections 4 (River Ouse crossing), 5 (River Ouse crossing to Luddington), 6 (Luddington to M180 motorway) and 7 (M180 motorway to Graizelound)	Thursday 13 July 2023	2pm
Our proposals in Sections 8 (Graizelound to Chesterfield Canal), 9 (Chesterfield Canal to A620), 10 (A620 to Fledborough) and 11 (Fledborough to High Marnham)	Saturday 15 July 2023	10am
Our proposals in Sections 8 (Graizelound to Chesterfield Canal), 9 (Chesterfield Canal to A620), 10 (A620 to Fledborough) and 11 (Fledborough to High Marnham)	Tuesday 18 July 2023	7pm
Introduction to North Humber to High Marnham project proposals – general overview	Wednesday 19 July 2023	2pm

Local information points

Paper copies of the consultation newsletter and feedback form are available to collect from one of the following local information points. These are located within or in close proximity to the preferred corridor and can be collected from the start of and throughout the consultation period.

For the most up to date opening hours, please check with the relevant venue. Reference copies of the Strategic Options Report, Corridor Preliminary Routeing and Siting Study and Project Background Document are also available in these locations.

Please get in touch with the project team if you would like any additional printed information.

Table 5: Public information points

Public information point	Opening times
East Riding of Yorkshire	
Beverley Library, Champney Road, Beverley HU17 8HE	9:30am to 5pm (Monday, Wednesday and Friday), 9:30am to 8pm (Tuesday and Thursday), 9:00am to 4pm (Saturday)
South Cave Library, 97 Church Street, South Cave HU15 2EP	2pm to 5pm (Tuesday), 2pm to 7pm (Thursday) and 10am to 12pm (Saturday)
Goole Library, Carlisle Street, Goole DN14 5DS	9:30am to 7pm (Monday and Wednesday), 9:30am to 5pm (Tuesday, Thursday and Friday), and 9am to 4pm (Saturday)
Cottingham Library and Customer Service Centre, Market Green, Cottingham HU16 5QG	9:30am to 4:30pm (Monday and Tuesday), 9:30am to 6:30pm (Thursday), 9:30am to 1pm (Friday), and 9:30am to 12:30pm (Saturday)
North Lincolnshire	
Crowle Library, Crowle Community Hub, The Market Hall, Market Place, Crowle, North Lincolnshire DN17 4LA	9:00am to 12:30pm and 1pm to 5pm (Monday to Friday), and 9am to 12pm (Saturday)
Epworth Library, Chapel Street, Epworth, Doncaster DN9 1HQ	1pm to 5pm (Monday), 9am to 12:30pm and 1pm to 5pm (Wednesday), 9am to 2pm (Friday) and 9am to 12pm (Saturday)
Haxey Library, The Memorial Hall, Haxey, Doncaster DN9 2HH	14:00 to 17:00 (Monday), 9:00 to 12:00 (Tuesday and Friday), and 10:00 to 13:00 (Saturday)
Bassetlaw	
Misterton Library, High Street, Misterton, Doncaster, South Yorkshire DN10 4BU	2pm to 5pm (Tuesday to Thursday) and 9:30am to 12:30pm (Saturday)
Retford Library, Churchgate, Retford DN22 6PE	9am to 6pm (Monday to Friday) and 9:30am to 3:30pm (Saturday)
Bassetlaw District Council (Retford office), 17B The Square, Retford DN22 6DB	9am to 5pm (Monday to Friday)

How to provide your feedback

You can provide your feedback in the following ways:

Complete a feedback form

We have produced a feedback form for you to fill in and submit. Paper copies are available to pick up from our face-to-face consultation events and the information points listed oon the previous page of this document.

You can also download and print a copy of the feedback form from our website and return to us for free by post; alternatively, please get in touch and we will post one to you.

We encourage you to view our proposals online, where you can access our interactive map, view the locations of interest to you and link through to our feedback form, where you can submit your comments digitally.

Send us a letter

You can send a letter/or completed feedback form to **Freepost NH TO HM** (no stamp or further address details are required).

Email us

If you prefer to send us your comments via email, you can send them to us at **contact@nh-hm.nationalgrid.com**

Call us

If you have any questions about the project, or require any assistance with providing feedback, please give us a call on **0800 051 4430**. Lines are open Monday to Friday 9am-5:30pm, with an answerphone facility taking messages outside of these hours.

Other information

If you would prefer to receive any information relating to the consultation through the post, or you need it in another format, please get in touch.

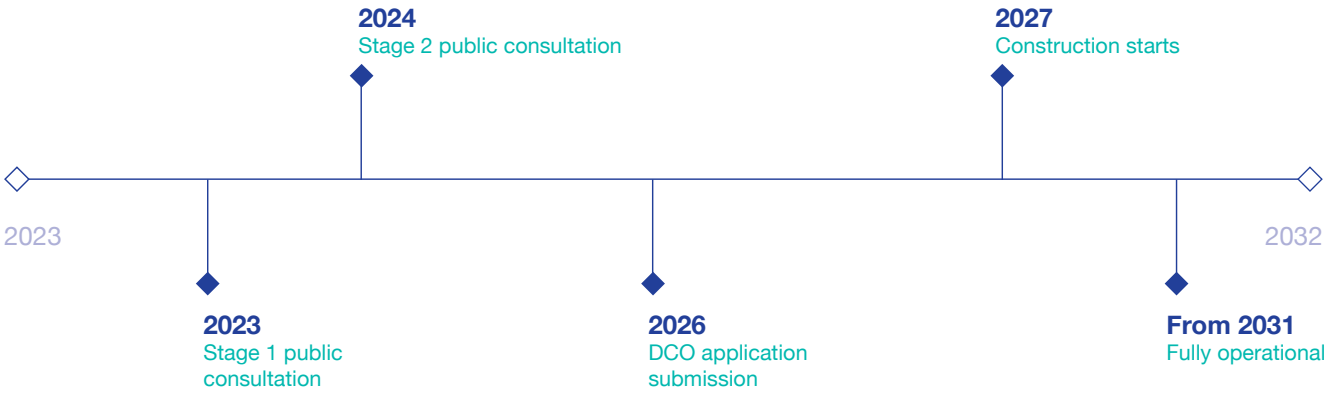
If you have difficulty writing down your feedback, a member of the Community Relations team will be able to take comments over the phone.

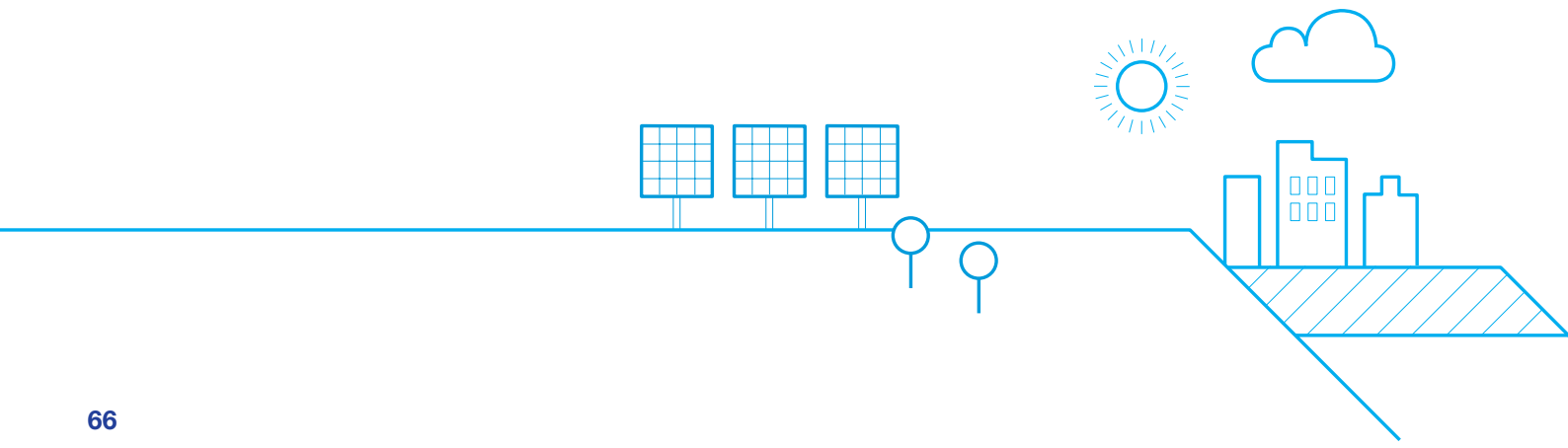
Next steps

The feedback received throughout the first stage of consultation will inform how our plans for North Humber to High Marnham are developed further and will influence the next stage in the design of the project.

Following this consultation, we will commence the Defined Proposals and Statutory Consultation Stage where our next stage of public consultation will be undertaken, including on preliminary environmental information. Feedback from that stage will inform any further work on our proposals prior to submission of the application for a DCO.

Indicative timeline





To raise awareness of this consultation, we have:

- sent a copy of our consultation newsletter to all addresses within a 1 km radius of our preferred route corridor;
- placed advertisements in the local media, including locally circulating newspapers, online and on social media;
- contact a number of local interest and environmental groups.

During this consultation and over the coming months we will be:

- continuing our discussions with landowners and people with an interest in land which interacts with the project;
- briefing local elected representatives;
- continuing to refine our proposals in response to your feedback;
- carrying out environmental impact assessment work and undertaking surveys along the route;
- providing updates to the local community and to those who have asked to be kept updated on our proposals via a community newsletter; and
- continuing to refine our proposals in response to your feedback and presenting our updated plans for the project during our next stage of consultation, planned for 2024.

Following further development and finalisation of detailed proposals, we will submit our DCO application to the Planning Inspectorate, who will examine our proposals and make a recommendation on the application to the Secretary of State for DESNZ, who will make the final decision on whether or not to grant consent. We will be preparing a Consultation Report alongside our application, which will show how we have taken your views into consideration.

Contact us

Please get in touch if you have any questions about our proposals for North Humber to High Marnham.

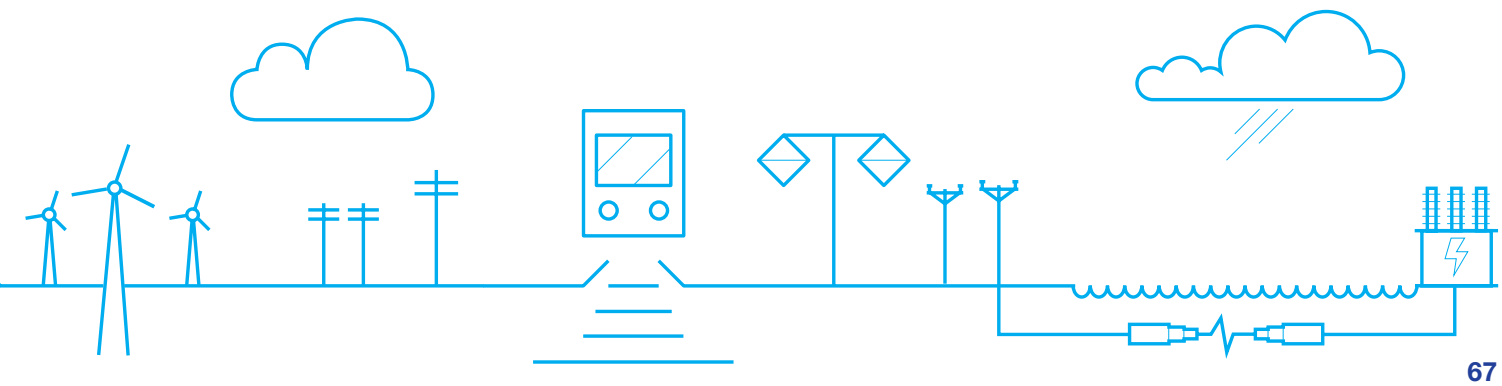
Call our Community Helpline: **0800 051 4430** (Lines are open Monday to Friday 9:00am – 5:30pm)

Email us: **contact@nh-hm.nationalgrid.com**

Write to us: **Freepost NH TO HM** (No stamp or further address details are required)

If you feel your land may be affected by these proposals, please contact the North Humber to High Marnham Land Team at Dalcour Maclaren by calling **01270 904929** or by emailing **NH-HM@dalcourmaclaren.com**.

Alternatively, you can write to North Humber to High Marnham Lands Team at Dalcour Maclaren, Unit 1, Staplehurst Farm, Weston on the Green, OX25 3QU.



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National Grid plc
1-3 Strand
Charing Cross
London
WC2N 5EH
United Kingdom

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