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National Grid Electricity Transmission (NGET)
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SUBMITTED ELECTRONICALLY:
H2East@planninginspectorate.gov.uk

13 April 2026

Dear Sir/Madam

RE: APPLICATION BY Cadent Gas Limited (THE APPLICANT) FOR AN ORDER GRANTING DEVELOPMENT CONSENT FOR THE H2East Pipeline: Humber to Nottinghamshire (THE PROPOSED DEVELOPMENT)

SCOPING CONSULTATION RESPONSE

We refer to your letter dated 6th March 2026 in relation to the above proposed application. This is a response on behalf of National Grid Electricity Transmission PLC (NGET).

Having reviewed the scoping report, I would like to make the following comments regarding NGET existing or future infrastructure in close proximity to the current red line boundary.

NGET has high voltage electricity substations and overhead transmission lines within close proximity the scoping area. The overhead lines form an essential part of the electricity transmission network in England and Wales.

Existing Infrastructure

Substation

- South Humber Bank 400kV
- Grimsby West 132kV
- Grimsby West 400kV
- Humber Refinery 400kV
- Killingholme 400kV
- High Marnham 275kV
- High Marnham 400kV

Associated overhead and underground apparatus including cables

Overhead Lines

2AH ROUTE 400kV OHL

GRIMSBY WEST - SOUTH HUMBER BANK
KILLINGHOLME - SOUTH HUMBER BANK

4KG ROUTE 400kV OHL	KILLINGHOLME - SOUTH HUMBER BANK GRIMSBY WEST - KEADBY
2AD ROUTE 400kV OHL	KEADBY - KILLINGHOLME KILLINGHOLME - SOUTH HUMBER BANK
2AC ROUTE 400kV OHL	CREYKE BECK - HUMBER REFINERY - KEADBY CREYKE BECK - KEADBY - KILLINGHOLME
2AJ ROUTE 400kV OHL	CREYKE BECK - HUMBER REFINERY - KEADBY HUMBER REFINERY - KILLINGHOLME
2KN ROUTE 400kV OHL	CREYKE BECK - HUMBER REFINERY - KEADBY CREYKE BECK - KEADBY - KILLINGHOLME
4ZM ROUTE 400kV OHL	BICKER FEN - SPALDING NORTH - WEST BURTON BICKER FEN - WALPOLE - WEST BURTON
4VK ONSTAY ROUTE 400kV OHL	COTTAM - EATON SOCON - WYMONDLEY 2
4VE ONSTAY ROUTE (400kV)	COTTAM - GRENDON COTTAM - STAYTHORPE 2

ZDA ONSTAY ROUTE (400kV)

- ZDA ROUTE TWR (247 - 248 - 248B)
 - COTTAM - STAYTHORPE 1
- ZDA ROUTE TWR (248B - 249 - 251 & 251 - 253)
 - COTTAM - STAYTHORPE 1
 - HIGH MARNHAM - STOKE BARDOLPH
- ZDA ROUTE (248B - 248F)
 - DISC HIGH MARNHAM ROUTE
 - HIGH MARNHAM - STOKE BARDOLPH
- ZDA ROUTE TWR (247-248A-251A-252B-252A)
 - HIGH MARNHAM - WEST BURTON
- ZDA ROUTE TWR (254 - 311)
 - COTTAM - GRENDON
 - COTTAM - STAYTHORPE 2

XE ROUTE (275kV) HIGH MARNHAM - THURCROFT - WEST MELTON

4ZV ROUTE (275kV) CHESTERFIELD - HIGH MARNHAM 1
CHESTERFIELD - HIGH MARNHAM 2

ZDF ROUTE (400kV) COTTAM - STAYTHORPE 1
HIGH MARNHAM - STOKE BARDOLPH

KK ROUTE (25kV) NEWARK BR - STAYTHORPE B

We enclose plans showing the location of NGET's apparatus in the scoping area.

In addition, GIS shapefiles of approximate locations of our national electricity transmission network are freely available from here: <https://www.nationalgrid.com/electricity-transmission/network-and-infrastructure/network-route-maps>. You can also check if your works will affect our transmission network by using the Line search website: <https://lsbud.co.uk/>.

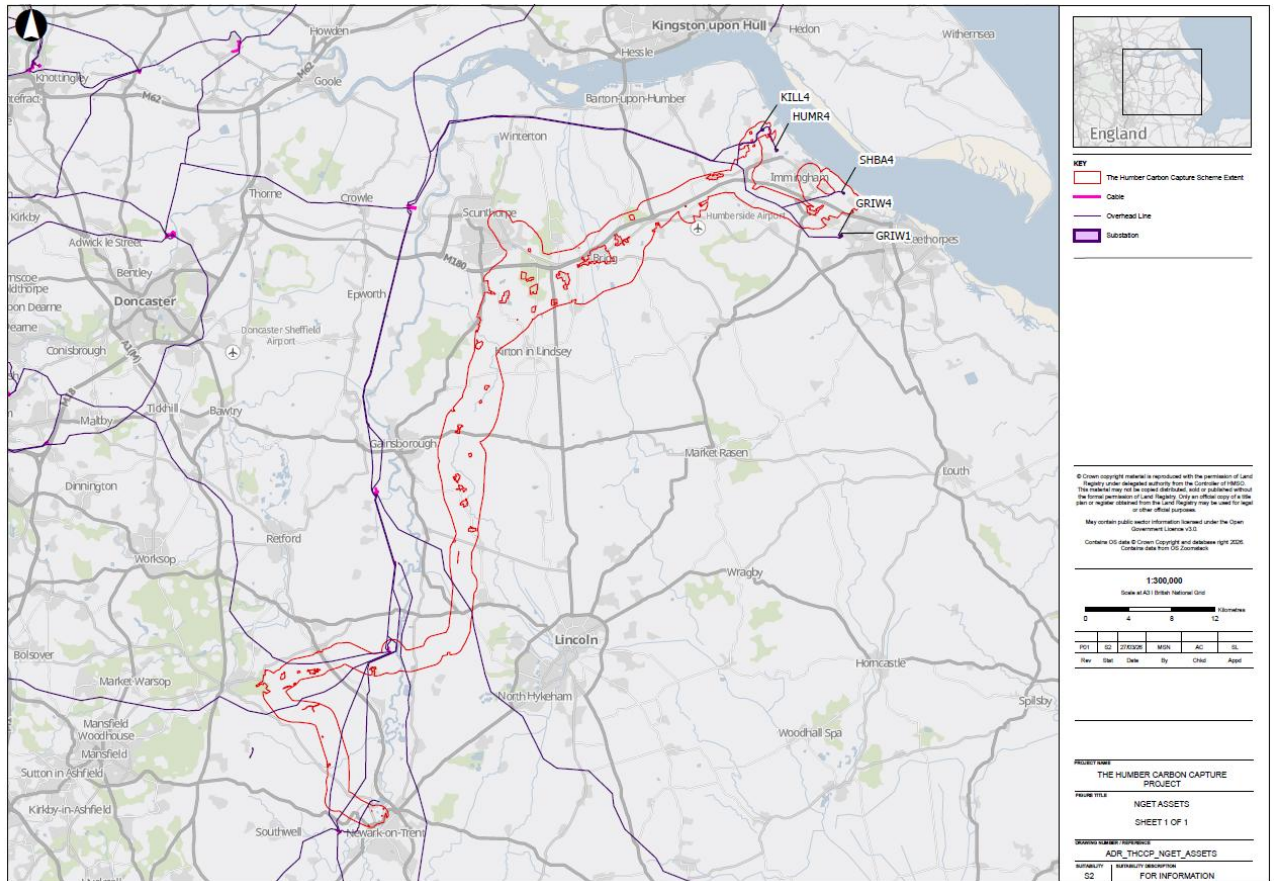


Figure 1: NGET Assets in proposed development area

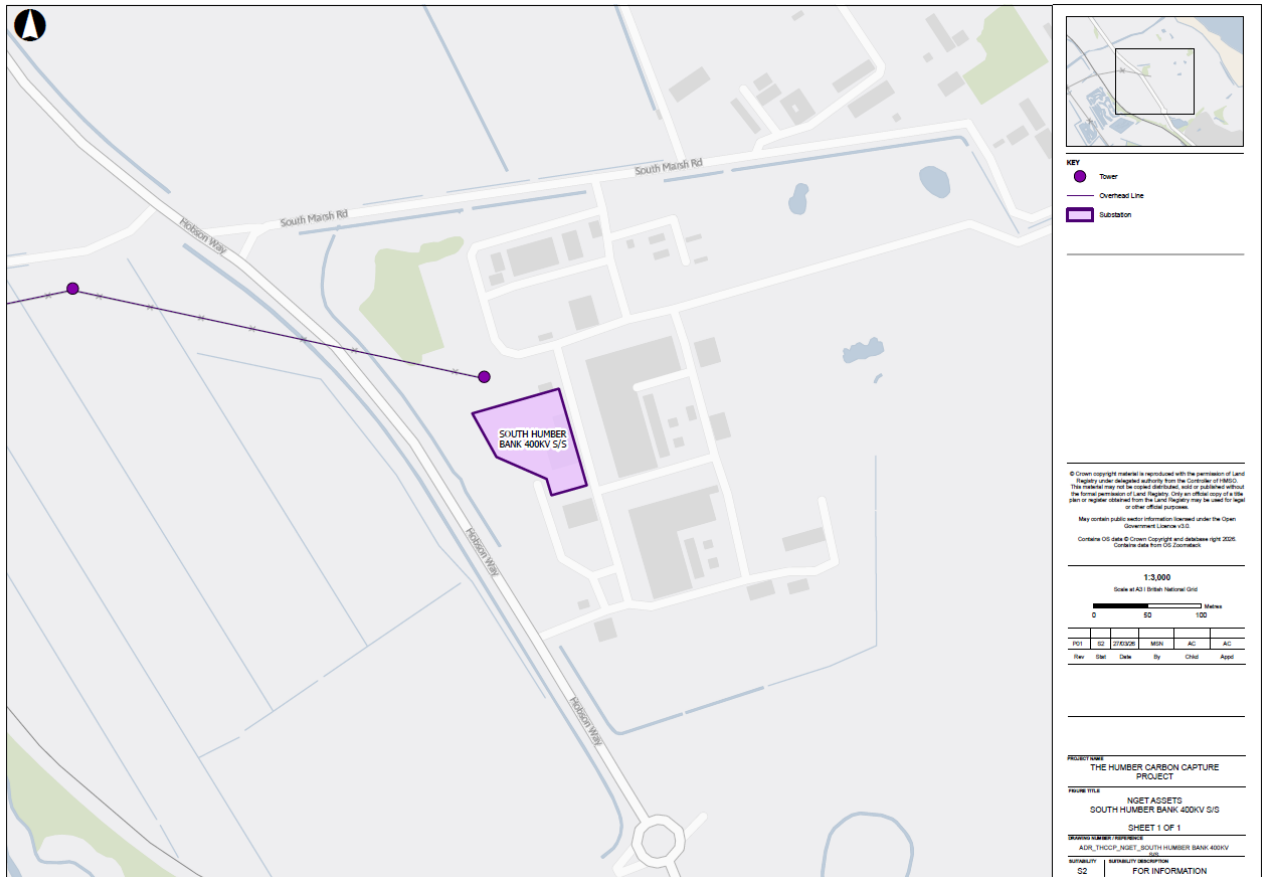


Figure 2: NGET South Humber Bank 400kV Substation

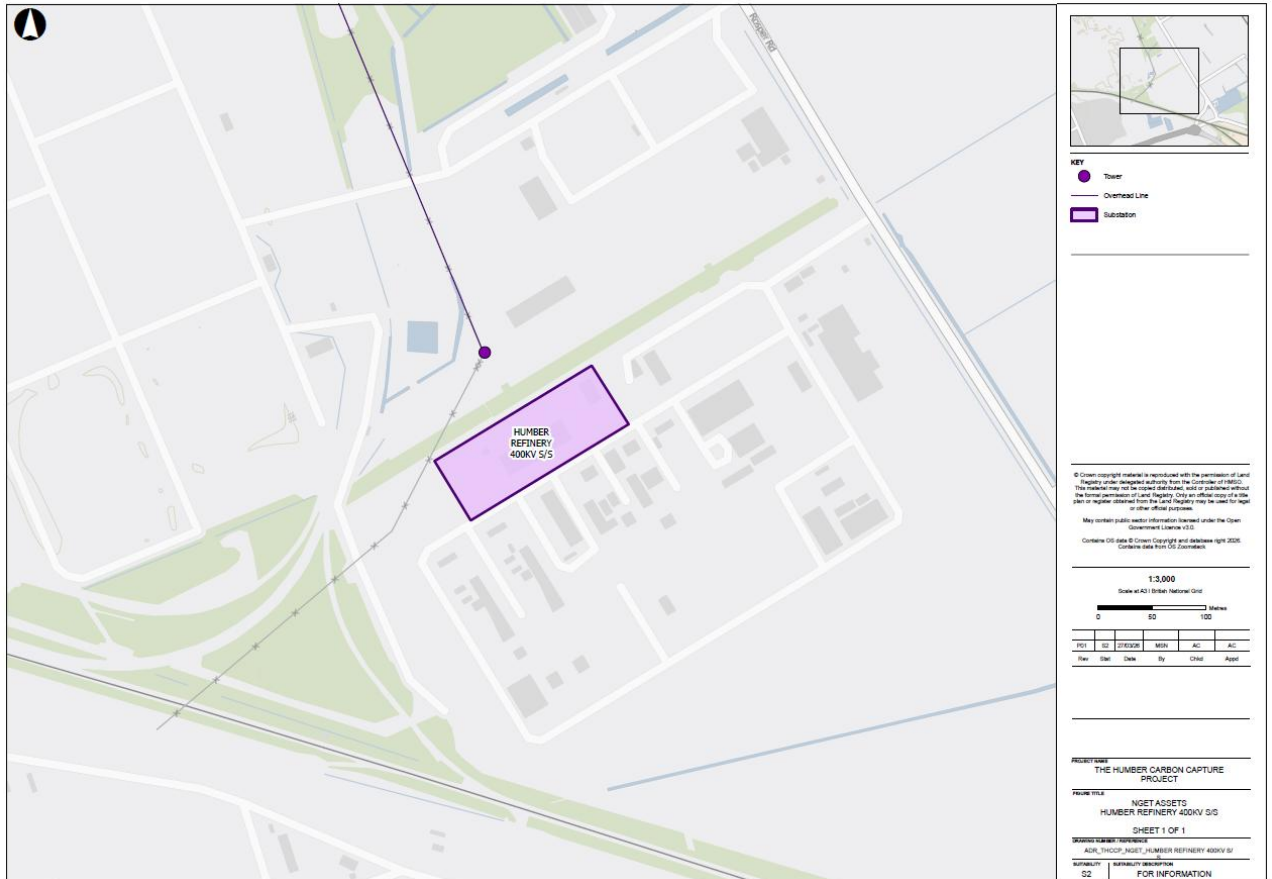


Figure 3: NGET Humber Refinery 400kV Substation



Figure 4: NGET Grimsby West 130kV and 400kV Substation

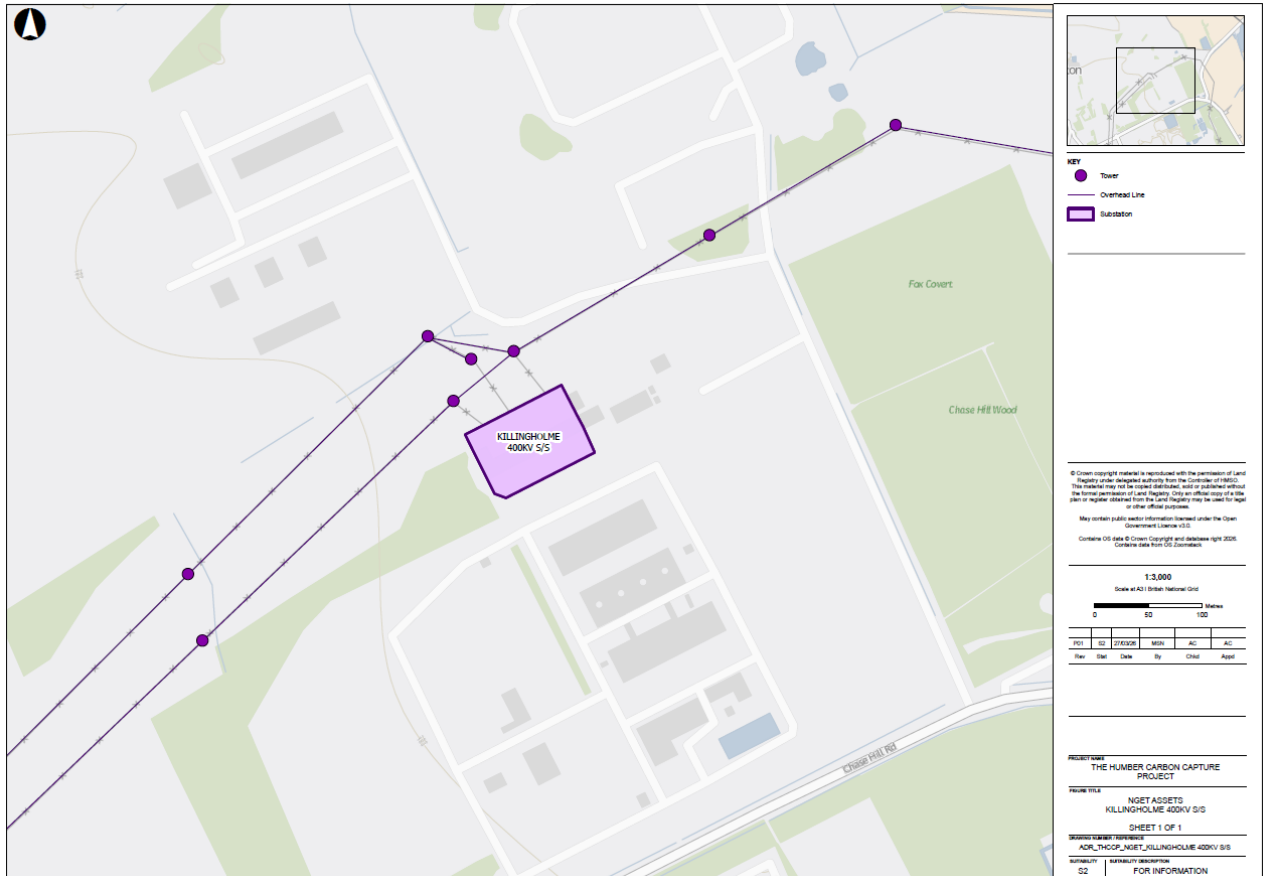


Figure 5: NGET Killingholme 400kV Substation

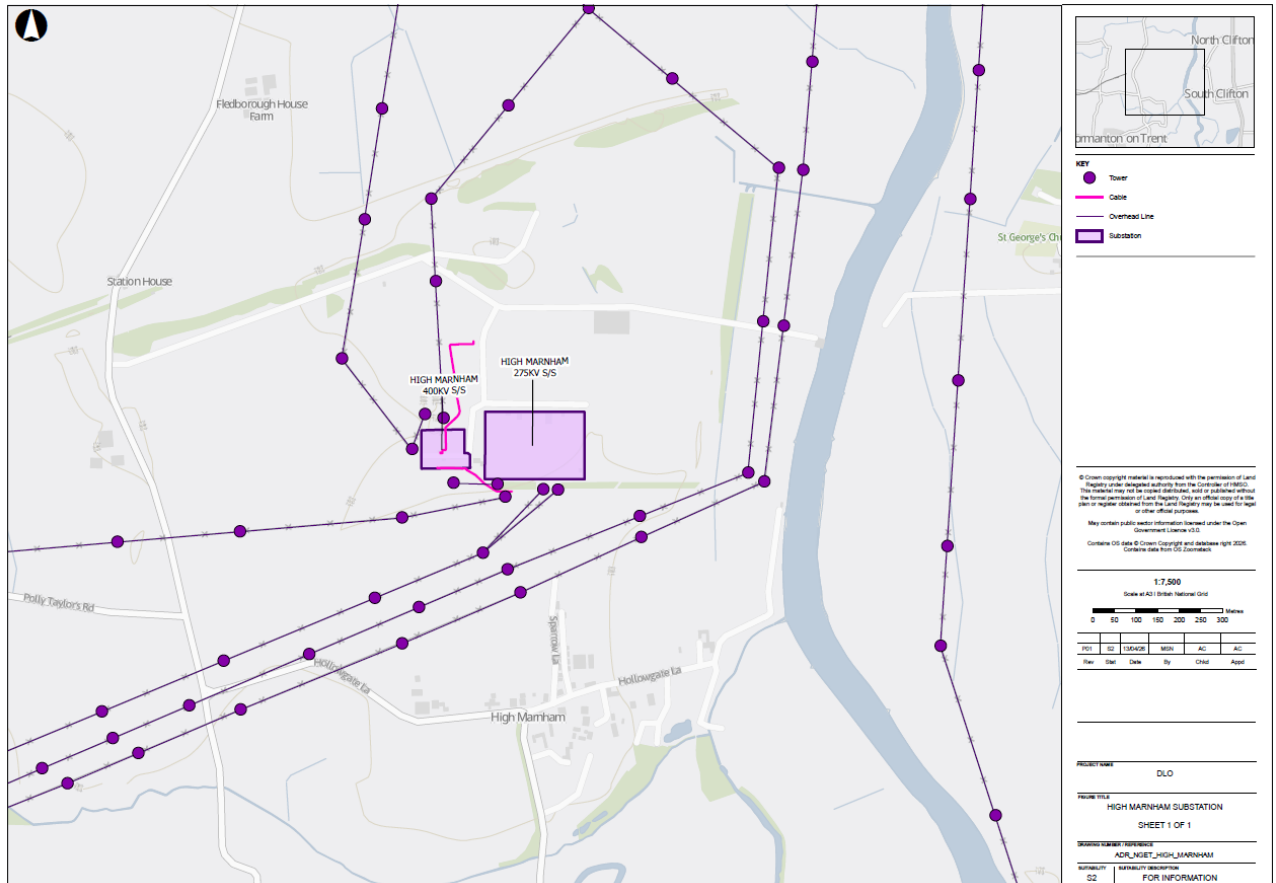


Figure 6: NGET High Marnham 275kV and 400kV Substation

New infrastructure

The National Energy System Operator (NESO) took over the electricity network planning responsibility from National Grid Electricity System Operator Limited (NGESO) on the 1st October 2024. Please consult with NESO separately from NGET where further information on the strategic need or capacity is sought.

Please refer to the Holistic Network Design (HND) and the NESO website to view the strategic vision for the UK's ever growing electricity transmission network: <https://www.neso.energy/publications/beyond-2030/holistic-network-design-offshore-wind>; and <https://www.neso.energy/publications/beyond-2030>

Onshore Infrastructure

North Humber to High Marnham (NHHM)

NGET is proposing to build a new 400kV electricity transmission line and associated works between the new Birkhill Wood Substation in East Riding of Yorkshire and a new substation to be built at High Marnham in Nottinghamshire

NHHM is a Nationally Significant Infrastructure Project (NSIP) for which development consent will be required under the Planning Act 2008. NGET have previously consulted on proposals for NHHM including a non-statutory consultation between June and July 2023, a localised non-statutory consultation between July and August 2024 and a statutory consultation between February and April 2025.

The NHHM project is at an advanced preapplication stage and is on track to submit a DCO application in September 2026. If our DCO application is successful construction is expected to take four years starting in 2028.

The preferred corridor presented in the Design Evolution Document published as part of this first round of consultation has the potential to interact with the North Humber to High Marnham Proposed Overhead line.

Section D of the preferred corridor overlaps with the NHHM draft order limits and therefore further engagement is requested to understand any potential interactions during the construction and operation phases of both projects.

More information on the North Humber to High Marnham project can be found on our website including an interactive map. Shapefiles of our order limits can be provided on request. <https://www.nationalgrid.com/the-great-grid-upgrade/north-humber-high-marnham/about-the-project>.

Chesterfield to High Marnham Reinforcement Project

The Chesterfield to High Marnham reinforcement project forms part of the National Grid 'Great Grid Upgrade', which aims to provide additional resilience within the electricity network. The Great Grid Upgrade will enable the electricity grid to carry more clean energy from renewable sources to communities, homes and businesses in every part of England and Wales, helping the UK to reach net zero. The proposals will also increase the security and resilience of the UK's electricity network.

The purpose of the Project is to uprate the existing 275kV transmission overhead lines between Chesterfield and High Marnham to operate at 400kV. The Project also includes the construction of new substations at both High Marnham (in Bassetlaw) and Chesterfield (in North East Derbyshire).

The proposed 400kV substation at High Marnham is a key component of the Chesterfield to High Marnham reinforcement project.

The planning application for the proposed new substation at High Marnham was submitted to Bassetlaw District Council in November 2025 (25/01302/FUL | Erection of a 400kV Air Insulated Switchgear (AIS) Substation with one 400/275kV Supergrid Transformer (SGT) and One 400/33kV SGT and Construction of 16 Bays, Gantries, Control and Amenities Building, Permanent Access Road, Diesel Generator, Parking, Drainage, Lighting and CCTV Landscaping and Biodiversity Enhancement and Security Fencing. | Land Adjacent To High Marnham Power Station Power Station Access Fledborough Road High Marnham Nottinghamshire). Determination of the application will be under section 70(2) of the Town and Country Planning Act 1990 (TCPA 1990) and section 38(6) of the Planning and Compulsory Purchase Act 2004 and expected in 2026.

The planning application boundary for the proposed new High Marnham substation (the Site) is approximately 36 hectares (ha) in size and is located on land intersecting with the existing 400kV and 275kV substations and adjoining the former High Marnham Power Station site, which has been decommissioned and removed. The existing layout and the boundary of the Site is shown on the Proposed Site Layout (Ref. PDD-203717- LAY-342).

Ancillary works are needed to tie the proposed substation into the existing transmission network. These comprise of short sections of new 400kV overhead lines. These overhead line works do not form part of the planning application for the substation at High Marnham. Instead, these overhead line works will be consented separately under the consenting regime provided by Section 37 of the Electricity Act 1989 for the installation of overhead lines.

We need to draw your attention to the potential future interaction needs through respective design and construction periods between the Chesterfield to High Marnham reinforcement project and the preferred route corridors of Section C – Scunthorpe to High Marnham and Section D High Marnham to Kirkton and Newark.

The Chesterfield to High Marnham reinforcement project formed part of the Brinsworth to High Marnham uprating project before the National Energy System Operator approved to separation of the uprating project into two reinforcement projects: Brinsworth to Chesterfield and Chesterfield to High Marnham. Further information can be located here: <https://www.nationalgrid.com/electricity-transmission/network-and-infrastructure/infrastructure-projects/brinsworth-high-marnham-uprating>

West Burton to Ratcliffe on Soar Refurbishment

The existing infrastructure between West Burton and Ratcliffe-on-Soar requires an upgrade to enhance network capacity and resilience between West Burton, High Marnham, Stoke Bardolph and Ratcliffe-on-

Soar. We're proposing to upgrade approximately 100 kilometres of the existing high-voltage power lines to increase how much electricity they can carry. This will provide more secure, cleaner, home-grown energy from more affordable sources and meet increasing energy demand. Our upgrade will also support a number of other important National Grid projects including the Brinsworth to High Marnham project.

It should be noted that there may be further interactions with additional new strategic infrastructure where the projects are in their early development.

NGET requests that all existing and future assets are given due consideration given their criticality to the high-voltage transmission of electricity across the UK. We remain committed to working with the promoter in a proactive manner, enabling both parties to deliver successful projects wherever reasonably possible. As such we encourage that ongoing discussion and consultation between both parties is maintained on interactions with existing or future assets, land interests, connections or consents and any other NGET interests which have the potential to be impacted prior to submission of the Proposed DCO.

The Great Grid Upgrade is the largest overhaul of the electricity grid in generations, we are in the middle of a transformation, with the energy we use increasingly coming from cleaner greener sources. Our infrastructure projects across England and Wales are helping to connect more renewable energy to homes and businesses. To find out more about our current projects please refer to our network and infrastructure webpage. <https://www.nationalgrid.com/electricity-transmission/network-and-infrastructure/infrastructure-projects>. Where it has been identified that your project interacts with or is in close proximity to one of NGET's infrastructure projects, we would welcome further discussion at the earliest opportunity.

These projects are all essential to increase the overall network capability to connect the numerous new offshore wind farms that are being developed, and transport new clean green energy to the homes and businesses where it is needed.

The following points should be taken into consideration.

Specific Comments – Electricity Infrastructure:

- NGET's Overhead Line/s is protected by a Deed of Easement/Wayleave Agreement which provides full right of access to retain, maintain, repair and inspect our asset
- Statutory electrical safety clearances must be maintained at all times. Any proposed buildings must not be closer than 5.3m to the lowest conductor. NGET recommends that no permanent structures are built directly beneath overhead lines. These distances are set out in EN 43 – 8 Technical Specification for "overhead line clearances Issue 5 (2019)".
- If any changes in ground levels are proposed either beneath or in close proximity to our existing overhead lines, then this would serve to reduce the safety clearances for such overhead lines. Safe clearances for existing overhead lines must be maintained in all circumstances.
- The relevant guidance in relation to working safely near to existing overhead lines is contained within the Health and Safety Executive's (www.hse.gov.uk) Guidance Note GS 6 "Avoidance of Danger from Overhead Electric Lines" and all relevant site staff should make sure that they are both aware of and understand this guidance.
- Plant, machinery, equipment, buildings or scaffolding should not encroach within 5.3 metres of any of our high voltage conductors. When those conductors are under their worst conditions of maximum "sag" and "swing" and overhead line profile (maximum "sag" and "swing") drawings should be obtained using the contact details above.
- If a landscaping scheme is proposed as part of the proposal, we request that only slow and low growing species of trees and shrubs are planted beneath and adjacent to the existing overhead line to reduce the risk of growth to a height which compromises statutory safety clearances.
- Drilling or excavation works should not be undertaken if they have the potential to disturb or adversely affect the foundations or "pillars of support" of any existing tower. These foundations

always extend beyond the base area of the existing tower and foundation (“pillar of support”) drawings can be obtained using the contact details above.

- NGET high voltage underground cables are protected by a Deed of Grant; Easement; Wayleave Agreement or the provisions of the New Roads and Street Works Act. These provisions provide NGET full right of access to retain, maintain, repair and inspect our assets. Hence, we require that no permanent / temporary structures are to be built over our cables or within the easement strip. Any such proposals should be discussed and agreed with NGET prior to any works taking place.
- Ground levels above our cables must not be altered in any way. Any alterations to the depth of our cables will subsequently alter the rating of the circuit and can compromise the reliability, efficiency and safety of our electricity network and requires consultation with National Grid prior to any such changes in both level and construction being implemented.

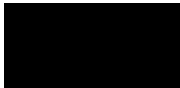
Further Advice

NGET requests to be consulted at the earliest stages to ensure that the most appropriate protective provisions are included within the DCO application to safeguard the integrity of our apparatus and to remove the requirement for objection. All consultations should be sent to the following email address: box.landandacquisitions@nationalgrid.com

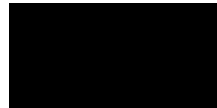
We hope the above information is useful. If you require any further information, please do not hesitate to contact the Land Development Liaison team. In the meantime, we look forward to receipt of further information and consultation relating to potential impacts on our assets.

The information in this letter is provided notwithstanding any discussions taking place in relation to connections with electricity customer services.

Yours faithfully,



Tiffany Bate
Lead Development Liaison Officer
Customer Connections Site Solutions (CCSS)
Land, Planning and External Affairs (LPEA)



Rachel Hagan
Development Liaison Support Officer
Customer Connections Site Solutions (CCSS)
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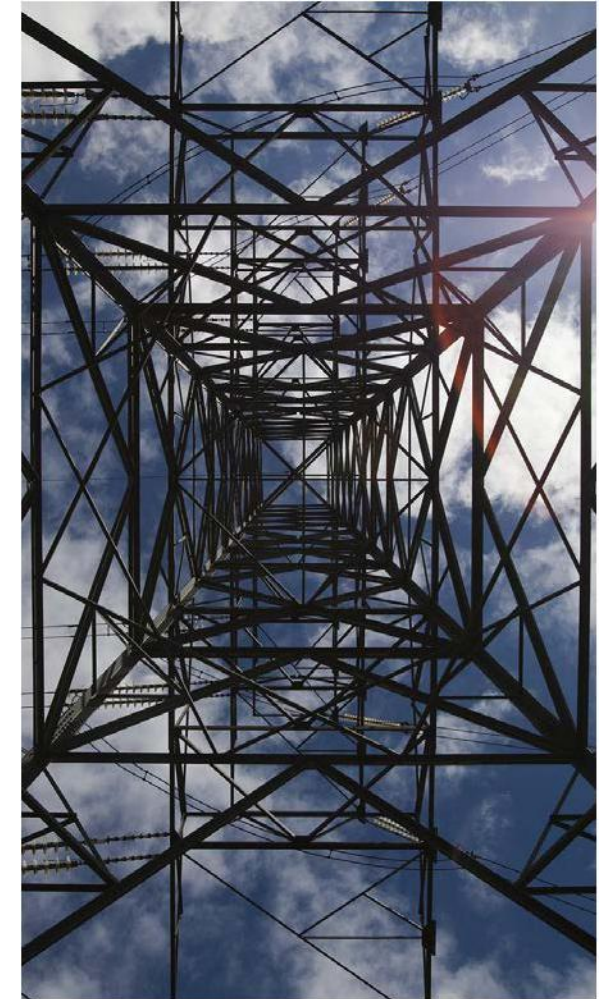
Technical Guidance Note 287

Third-party guidance for working near National Grid Electricity Transmission equipment





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Purpose and scope

The purpose of this document is to give guidance and information to third parties who are proposing, scheduling or designing developments close to National Grid Electricity Transmission assets.

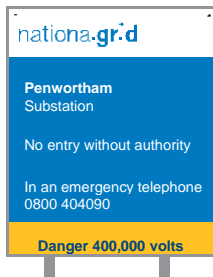
The scope of the report covers information on basic safety and the location of our assets – and also highlights key issues around particular types of development and risk areas.

In the case of electrical assets, National Grid does not authorise or agree safe systems of work with developers and contractors. However, we will advise on issues such as electrical safety clearances and the location of towers and cables. We also work with developers to minimise the impact of any National Grid assets that are nearby.

How to identify specific National Grid sites

Substations

The name of the Substation and emergency contact number will be on the site sign.



Overhead Lines

The reference number of the tower and the emergency contact number will be on this type of sign.



Contact National Grid

Plant protection

For routine enquiries regarding planned or scheduled works, contact the Asset Protection team online, by email or phone.

www.lsbud.co.uk

Email: assetprotection@nationalgrid.com

Phone: 0800 001 4282

Emergencies

In the event of occurrences such as a cable strike, coming into contact with an overhead line conductor or identifying any hazards or problems with National Grid's equipment, phone our emergency number 0800 404 090 (option 1).

If you have apparatus within 30m of a National Grid asset, please ensure that the emergency number is included in your site's emergency procedures.

Consider safety

Consider the hazards identified in this document when working near electrical equipment



Part 1

Electricity transmission infrastructure

National Grid owns and maintains the high-voltage electricity transmission network in England and Wales (Scotland has its own networks). It's responsible for balancing supply with demand on a minute-by-minute basis across the network.

Overhead lines

Overhead lines consist of two main parts – pylons (also called towers) and conductors (or wires). Pylons are typically steel lattice structures mounted on concrete foundations. A pylon's design can vary due to factors such as voltage, conductor type and the strength of structure required.

Conductors, which are the 'live' part of the overhead line, hang from pylons on insulators. Conductors come in several different designs depending on the amount of power that is transmitted on the circuit.

In addition to the two main components, some Overhead Line Routes carry a Fibre Optic cable between the towers with an final underground connection to the Substations.

In most cases, National Grid's overhead lines operate at 275kV or 400kV.

Underground cables

Underground cables are a growing feature of National Grid's network. They consist of a conducting core surrounded by layers of insulation and armour. Cables can be laid in the road, across open land or in tunnels. They operate at a range of voltages, up to 400kV.

Substations

Substations are found at points on the network where circuits come together or where a rise or fall in voltage is required. Transmission substations tend to be large facilities containing equipment such as power transformers, circuit breakers, reactors and capacitors. In addition Diesel generators and compressed air systems can be located there.

Part 2

Statutory requirements for working near high-voltage electricity

The legal framework that regulates electrical safety in the UK is *The Electricity Safety, Quality and Continuity Regulations (ESQCR) 2002*. This also details the minimum electrical safety clearances, which are used as a basis for the Energy Networks Association (ENA) TS 43-8. These standards have been agreed by CENELEC (European Committee for Electrotechnical Standardisation) and also form part of the *British Standard BS EN 50341-1:2012 Overhead Electrical Lines exceeding AC 1kV*. All electricity companies are bound by these rules, standards and technical specifications. They are required to uphold them by their operator's licence.

Electrical safety clearances

It is essential that a safe distance is kept between the exposed conductors and people and objects when working near National Grid's electrical assets. A person does not have to touch an exposed conductor to get a life-threatening

electric shock. At the voltages National Grid operates at, it is possible for electricity to jump up to several metres from an exposed conductor and kill or cause serious injury to anyone who is nearby. For this reason, there are several legal requirements and safety standards that must be met.

Any breach of legal safety clearances will be enforced in the courts. This can and has resulted in the removal of an infringement, which is normally at the cost of the developer or whoever caused it to be there. Breaching safety clearances, even temporarily, risks a serious incident that could cause serious injury or death.

National Grid will, on request, advise planning authorities, developers or third parties on any safety clearances and associated issues. We can supply detailed drawings of all our overhead line assets marked up with relevant safe areas.



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Your Responsibilities - Overhead lines

Work which takes place near overhead power lines carries a significant risk of coming into proximity with the wires. If any person, object or material gets too close to the wires, electricity could 'flashover' and be conducted to earth, causing death or serious injury. You do not need to touch the wires for this to happen. The law requires that work is carried out in close proximity to live overhead power lines only when there is no alternative, and only when the risks are acceptable and can be properly controlled. Statutory clearances exist which must be maintained, as prescribed by the Electricity Safety, Quality and Continuity Regulations 2002.

Under the Health and Safety at Work etc. Act 1974 and Management of Health and Safety at Work Regulations 1999, you are responsible for preparing a suitable and sufficient risk assessment and safe systems of work, to ensure that risks are managed properly and the safety of your workforce and others is maintained. Your risk assessment must consider and manage all of the significant risks and put in place suitable precautions/controls in order to manage the work safely. You are also responsible for ensuring that the precautions identified are properly implemented and stay in place throughout the work.

Work near overhead power lines must always be conducted in accordance with GS6, 'avoiding danger from overhead power lines', and any legislation which is relevant to the work you are completing.

What National Grid will provide

National Grid can supply profile drawings in PDF and CAD format showing tower locations and relevant clearances to assist you in the risk assessment process.

What National Grid will not provide

National Grid will not approve safe systems of work or approve design proposals

Part 3

What National Grid will do for you and your development

Provision of information

National Grid should be notified during the planning stage of any works or developments taking place near our electrical assets, ideally a minimum notification period of 8 weeks to allow National Grid to provide the following services:

Drawings

National Grid will provide relevant drawings of overhead lines or underground cables to make sure the presence and location of our services are known. Once a third party or developer has contacted us, we will supply the drawings for free.

400kV

The maximum nominal voltage of the underground cables in National Grid's network

Risk or impact identification

National Grid can help identify any hazards or risks that the presence of our assets might bring to any works or developments. This includes both the risk to safety from high-voltage electricity and longer-term issues, such as induced currents, noise and maintenance access that may affect the outcome of the development. National Grid will not authorise specific working procedures, but we can provide advice on best practice.





Risks or hazards to be aware of

This section includes a brief description of some of the hazards and issues that a third party or developer might face when working or developing close to our electrical infrastructure.

Land and access

National Grid has land rights in place with landowners and occupiers, which cover our existing overhead lines and underground cable network. These agreements, together with legislation set out under the *Electricity Act 1989*, allow us to access our assets to maintain, repair and renew them. The agreements also lay down restrictions and covenants to protect the integrity of our assets and meet safety regulations. Anyone proposing a development close to our assets should carefully examine these agreements.

Our agreements often affect land both inside and outside the immediate vicinity of an asset. Rights will include the provision of access, along with restrictions that ban the development of land through building, changing levels, planting and other operations. Anyone looking to develop close to our assets must consult with National Grid first.

For further information, contact Asset Protection:

Email: assetprotection@nationalgrid.com
Phone: 0800 001 4282

Electrical clearance from overhead lines

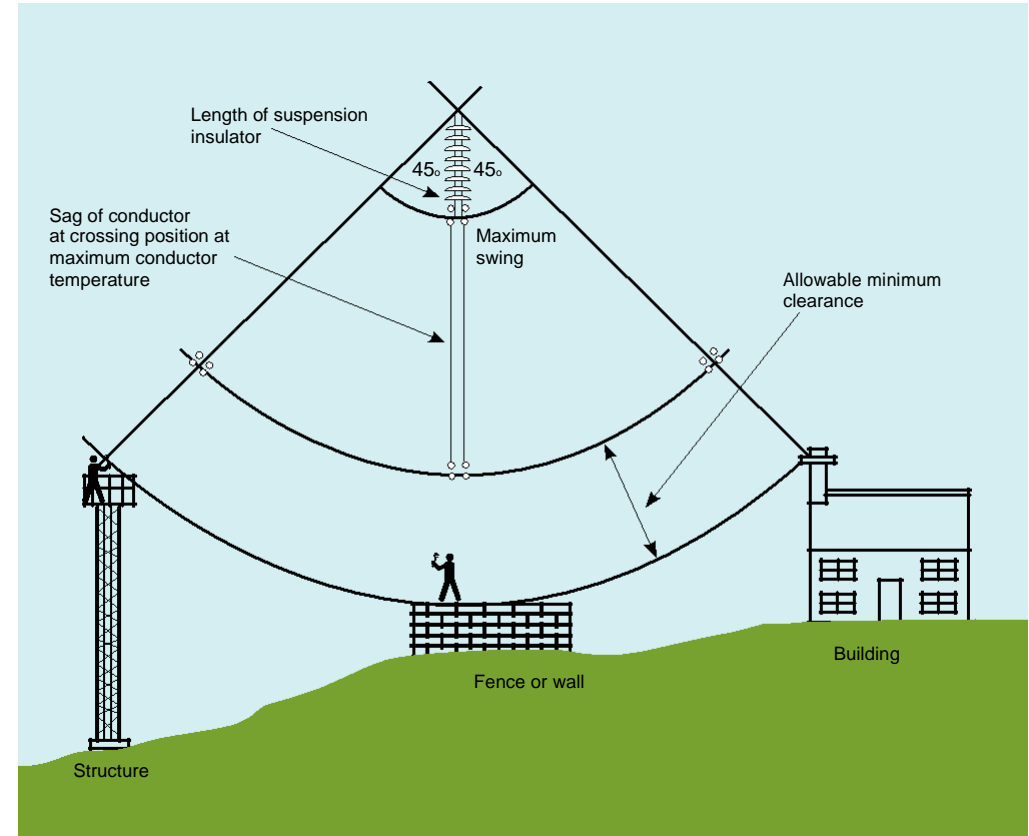
The clearance distances referred to in this section are specific to 400kV overhead lines. National Grid can advise on the distances required around different voltages i.e. 132kV and 275kV.

As we explained earlier, *Electrical Networks Association TS 43-8* details the legal clearances to our overhead lines. The minimum clearance between the conductors of an overhead line and the ground is 7.3m at maximum sag. The sag is the vertical distance between the wire's highest and lowest point. Certain conditions, such as power flow, wind speed and air temperature can cause conductors to move and allowances should be made for this.

The required clearance from the point where a person can stand to the conductors is 5.3m. To be clear, this means there should be at least 5.3m from where someone could stand on any structure (i.e. mobile and construction equipment) to the conductors. Available clearances will be assessed by National Grid on an individual basis.

National Grid expects third parties to implement a safe system of work whenever they are near Overhead Lines.

Diagram not to scale



There should be at least 5.3m between the conductors and any structure someone could stand on

We recommend that guidance such as *HSE Guidance Note GS6 (Avoiding Danger from Overhead Power Lines)* is followed, which provides advice on how to avoid danger from all overhead lines, at all voltages. If you are carrying out work near overhead lines you must contact National Grid, who will provide the relevant profile drawings.

7.3m

The required minimum clearance between the conductors of an overhead line, at maximum sag, and the ground

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The undergrounding of electricity cables at Ross-on-Wye

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Underground cables Underground cables operating at up to 400kV are a significant part of the National Grid Electricity Transmission network. When your works will involve any ground disturbance it is expected that a safe system of work is put in place and that you follow guidance such as *HSG 47 (Avoiding Danger from Underground Services)*.

You must contact National Grid to find out if there are any underground cables near your proposed works. If there are, we will provide cable profiles and location drawings and, if required, on-site supervision of the works. Cables can be laid under roads or across industrial or agricultural land. They can even be layed in canal towpaths and other areas that you would not expect.

Cables crossing any National Grid high-voltage (HV) cables directly buried in the ground are required to maintain a minimum separation that will be determined by National Grid on a case-by-case basis. National Grid will need to do a rating study on the existing cable to work out if there are any adverse effects on either cable rating. We will only allow a cable to cross such an area once we know the results of the re-rating. As a result, the clearance distance may need to be increased or alternative methods of crossing found.

For other cables and services crossing the path of our HV cables, National Grid will need confirmation that published standards and clearances are met.

Impressed voltage

Any conducting materials installed near high-voltage equipment could be raised to an elevated voltage compared to the local earth, even when there is no direct contact with the high-voltage equipment. These impressed voltages are caused by inductive or capacitive coupling between the high-voltage equipment and nearby conducting materials and can occur at distances of several metres away from the

equipment. Impressed voltages may damage your equipment and could potentially injure people and animals, depending on their severity. Third parties should take impressed voltages into account during the early stages and initial design of any development, ensuring that all structures and equipment are adequately earthed at all times.

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Earth potential rise

Under certain system fault conditions – and during lightning storms – a rise in the earth potential from the base of an overhead line tower or substation is possible. This is a rare phenomenon that occurs when large amounts of electricity enter the earth. This can pose a serious hazard to people or equipment that are close by.

We advise that developments and works are not carried out close to our tower bases, particularly during lightning storms.

Noise

Noise is a by-product of National Grid's operations and is carefully assessed during the planning and construction of any of our equipment. Developers should consider the noise emitted from National Grid's sites or overhead lines when planning any developments, particularly housing. Low-frequency hum from substations can, in some circumstances, be heard up to 1km or more from the site, so it is essential that developers find adequate solutions for this in their design. Further information about likely noise levels can be provided by National Grid.

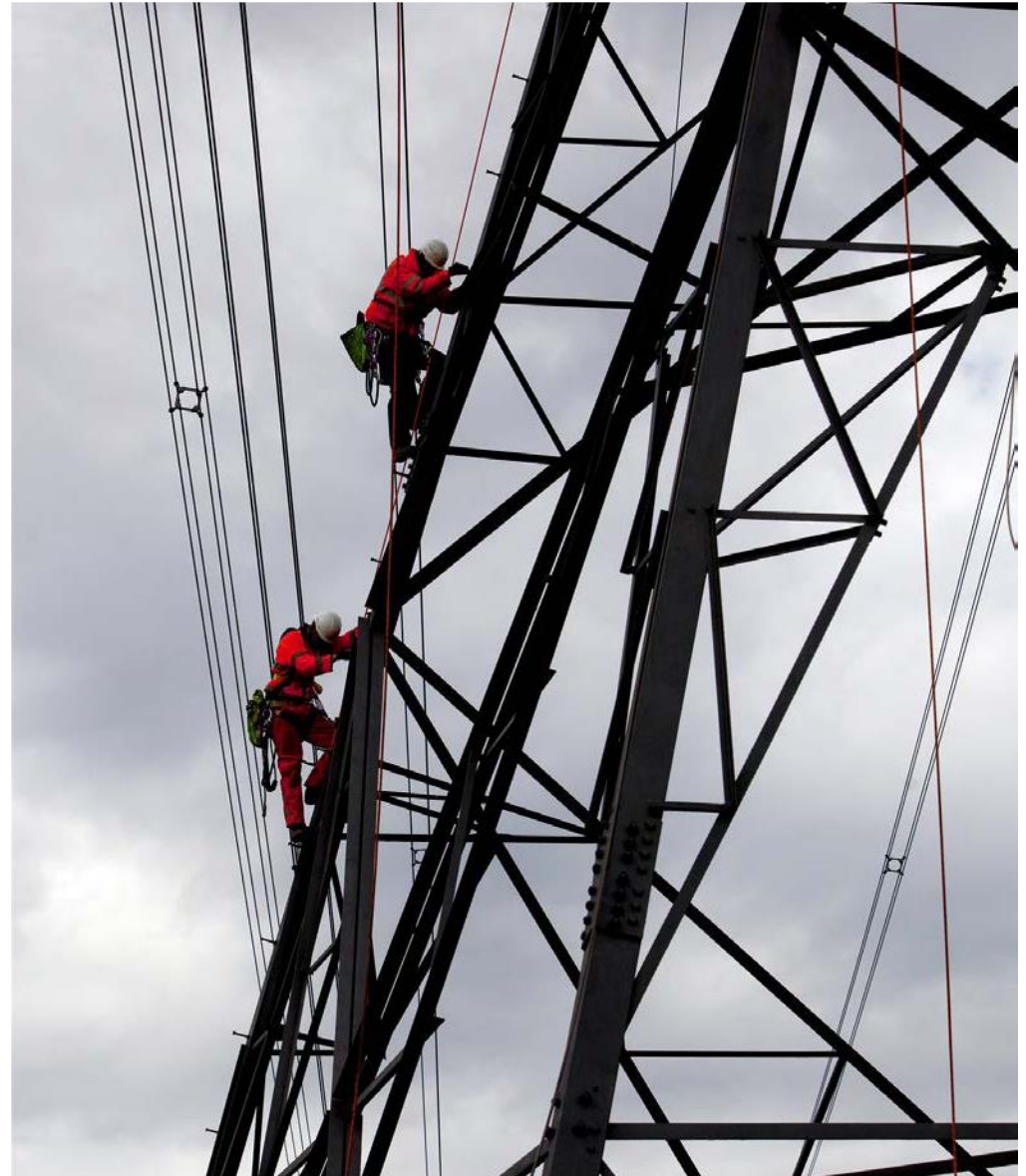
Maintenance access

National Grid needs to have safe access for vehicles around its assets and work that restricts this will not be allowed. In terms of our overhead lines, we wouldn't want to see any excavations made, or permanent structures built, that might affect the foundations of our towers. The size of the foundations around a tower base depends on the type of tower that is built there. If you wish to carry out works within 30m of the tower base, contact National Grid for more information. Our business has to maintain access routes to tower bases with land owners. For that reason, a route wide enough for an HGV must be permanently available. We may need to access our sites, towers, conductors and underground cables at short notice.

30m

If you wish to carry out work within this distance of the tower base, you must contact National Grid for more information

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Fires and firefighting

National Grid does not recommend that any type of flammable material is stored under overhead lines. Developers should be aware that in certain cases the local fire authority will not use water hoses to put out a fire if there are live, high-voltage conductors within 30m of the seat of the fire (as outlined in ENA TS 43-8).

In these situations, National Grid would have to be notified and reconfigure the system – to allow staff to switch out the overhead line – before any firefighting could take place. This could take several hours.

We recommend that any site which has a specific hazard relating to fire or flammable material should include National Grid's emergency contact details (found at the beginning and end of this document) in its fire plan information, so any incidents can be reported.

Developers should also make sure their insurance cover takes into account the challenge of putting out fires near our overhead lines.

Excavations, piling or tunnelling

You must inform National Grid of any works that have the potential to disturb the foundations of our substations or overhead line towers. This will have to be assessed by National Grid engineers before any work begins.

BS ISO 4866:2010 states that a minimum distance of 200m should be maintained when carrying out quarry blasting near our assets. However, this can be reduced with specific site surveys and changes to the maximum instantaneous charge (the amount of explosive detonated at a particular time).

All activities should observe guidance layed out in *BS 5228-2:2009*.

Microshocks

High-voltage overhead power lines produce an electric field. Any person or object inside this field that isn't earthed picks up an electrical charge. When two conducting objects – one that is grounded and one that isn't – touch, the charge can equalise and cause a small shock, known as a microshock. While they are not harmful, they can be disturbing for the person or animal that suffers the shock.

For these reasons, metal-framed and metal-clad buildings which are close to existing overhead lines should be earthed to minimise the risk of microshocks. Anything that isn't earthed, is conductive and sits close to the lines is likely to pick up a charge. Items such as deer fences, metal palisade fencing, chain-link fences and metal gates underneath overhead lines all need to be earthed.

For further information on microshocks please visit www.emfs.info.



200m

The minimum distance that should be maintained from National Grid assets when quarry blasting



Specific development guidance

Wind farms

National Grid's policy towards wind farm development is closely connected to the *Electricity Networks Association Engineering Recommendation L44 Separation between Wind Turbines and Overhead Lines, Principles of Good Practice*. The advice is based on national guidelines and global research. It may be adjusted to suit specific local applications.

There are two main criteria in the document:

(i) The turbine shall be far enough away to avoid the possibility of toppling onto the overhead line

(ii) The turbine shall be far enough away to avoid damage to the overhead line from downward wake effects, also known as turbulence

The toppling distance is the minimum horizontal distance between the worst-case pivot point of the wind turbine and the conductors hanging in still air. It is the greater of:

- the tip height of the turbine plus 10%
- or, the tip height of the turbine plus the electrical safety distance that applies to the voltage of the overhead line.

To minimise the downward wake effect on an overhead line, the wind turbine should be three times the rotor distance away from the centre of the overhead line.

Wake effects can prematurely age conductors and fittings, significantly reducing the life of the asset. For that reason, careful consideration should be taken if a wind turbine needs to be sited within the above limits. Agreement from National Grid will be required.

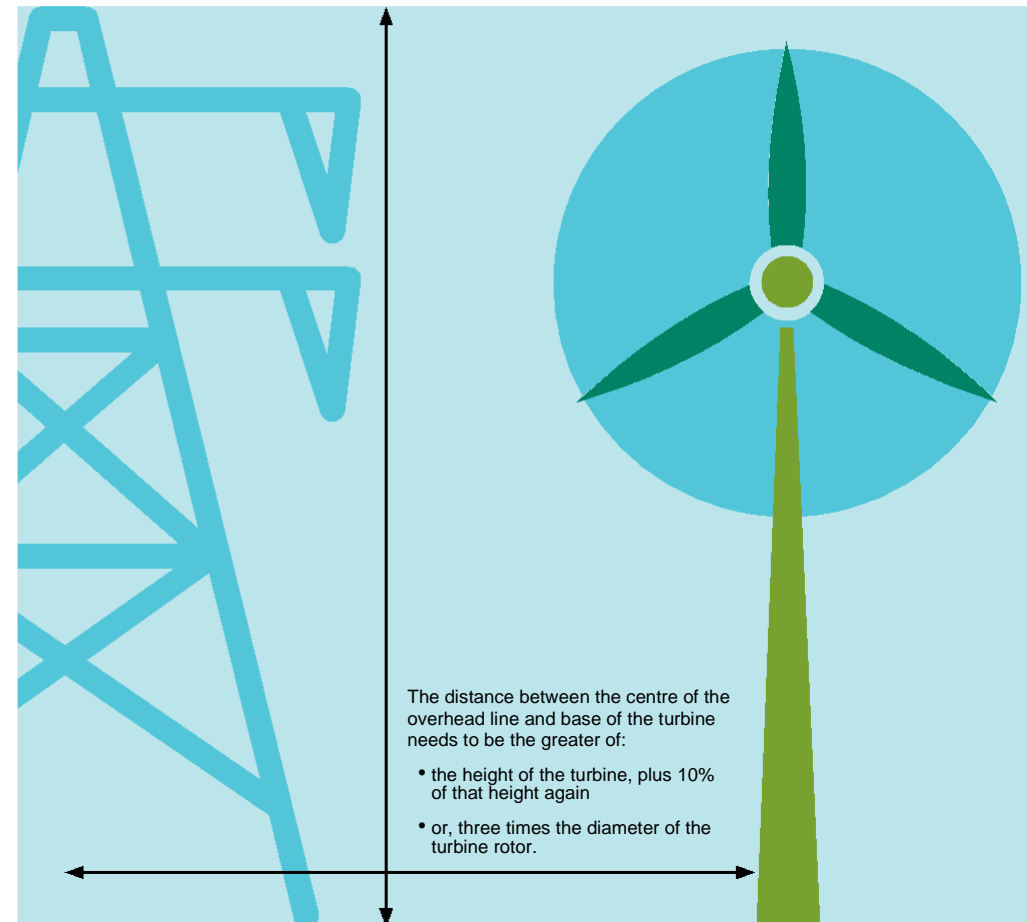
Commercial and housing developments

National Grid has developed a document called *Design guidelines for development near pylons and HVO power lines*, which gives advice to anyone involved in planning or designing large-scale developments that are crossed by, or close to, overhead lines.

The document focuses on existing 275kV and 400kV overhead lines on steel lattice towers, but can equally apply to 132kV and below. The document explains how to design large-scale developments close to high-voltage lines, while respecting clearances and the development's visual and environmental impact.

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Diagram not to scale



Turbines should be far enough away to avoid the possibility of toppling onto the overhead line



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The advice is intended for developers, designers, landowners, local authorities and communities, but is not limited to those organisations.

Overall, developers should be aware of all the hazards and issues relating to the electrical equipment that we have discussed when designing new housing.

As we explored earlier, National Grid's assets have the potential to create noise. This can be low frequency and tonal, which makes it quite noticeable. It is the responsibility of developers to take this into account during the design stage and find an appropriate solution.

Solar farms

While there is limited research and recommendations available, there are several key factors to consider when designing Solar Farms in the vicinity of Overhead Power Lines.

Developers may be looking to build on arable land close to National Grid's assets. In keeping with the safety clearance limits that we outlined earlier for solar panels directly underneath overhead line conductors, the highest point on the solar panels must be no more than 5.3m from the lowest conductors.

This means that the maximum height of any structure will need to be determined to make sure safety clearance limits aren't breached. This could be as low as 2m. National Grid will supply profile drawings to aid the planning of solar farms and determine the maximum height of panels and equipment.

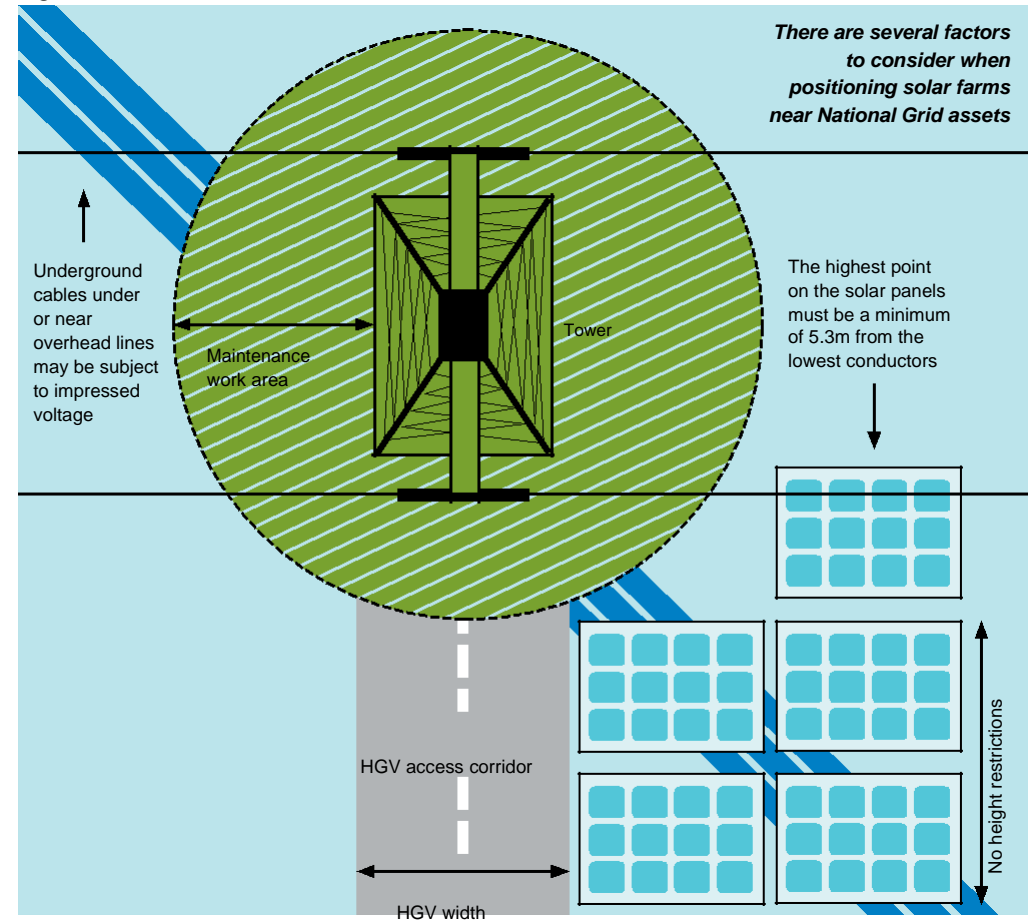
Solar panels that are directly underneath power lines risk being damaged on the rare occasion that a conductor or fitting falls to the ground. A more likely risk is ice falling from conductors or towers in winter and damaging solar panels.

There is also a risk of damage during adverse weather conditions, such as lightning storms, and system faults. As all our towers are earthed, a weather event such as lightning can cause a rise in the earth potential around the base of a tower. Solar panel support structures and supply cables should be adequately earthed and bonded together to minimise the effects of this temporary rise in earth potential.

Any metallic fencing that is located under an overhead line will pick up an electrical charge. For this reason, it will need to be adequately earthed to minimise microshocks to the public.

For normal, routine maintenance and in an emergency National Grid requires unrestricted access to its assets. So if a tower is enclosed in a solar farm compound, we will need full access for our vehicles,

Diagram not to scale



Including access through any compound gates. During maintenance – and especially re-conductoring – National Grid would need enough space near our towers for winches and cable drums. If enough space is not available, we would require solar panels to be temporarily removed.



Asset protection agreements

In some cases, where there is a risk that development will impact on National Grid's assets, we will insist on an asset protection agreement being put in place. The cost of this will be the responsibility of the developer or third party.

Contact details

Emergency situations

If you spot a potential hazard on or near an overhead electricity line, do not approach it, even at ground level. Keep as far away as possible and follow the six steps below:

- Warn anyone close by to evacuate the area
- Call our 24-hour electricity emergency number: 0800 404 090 (Option 1)¹
- Give your name and contact phone number
- Explain the nature of the issue or hazard
- Give as much information as possible so we can identify the location – i.e. the name of the town or village, numbers of nearby roads, postcode and (ONLY if it can be observed without putting you or others in danger) the tower number of an adjacent pylon
- Await further contact from a National Grid engineer

¹ It is critically important that you don't use this phone number for any other purpose. If you need to contact National Grid for another reason please use our Contact Centre at www2.nationalgrid.com/contact-us to find the appropriate information or call 0800 0014282.

Routine enquiries

Email:
assetprotection@nationalgrid.com

Call Asset Protection on:
0800 0014282

Opening hours:
Monday to Friday 08:00-16:00

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OHL Tower Stand Off & Reconducting Area

