

Lucy Metcalfe

Subject: EXT || NOTIFICATION: Cadent and National Grid Plant Enquiry Response - Your Ref: EN010032 (BK) Our Ref: XX_GE4A_3FWP_056032

Attachments: NATIONAL_GRID_XX_GE4A_3FWP_056032_1_9188.pdf; OHL NO Objection Development Project 16-11-2020 11-44-47 056032 No Objection.docx; TGN 287 _Third party guidance for working near NGET equipment.pdf; 4VM143 - 4VM144.pdf; 4VM144 - 4VM145.pdf; 4VM145 - 4VM146.pdf

From: Lad, Jay <Jay.Lad@nationalgrid.com>
Sent: 16 November 2020 12:03
To: Wilce, Eleri <eleri.wilce@rwe.com>
Subject: EXT || NOTIFICATION: Cadent and National Grid Plant Enquiry Response - Your Ref: EN010032 (BK) Our Ref: XX_GE4A_3FWP_056032

FAO Eleri Wilce

Please find the attached No Objection letter.

Please find attached OHL Profiles and the TGN 287 Document.

Kind Regards

Mrs Jay Lad

Asset Protection Assistant
Compliance & Integrity
Gas Transmission
National Grid
+44 (0)1926 65 4337 ext 7777 4337
Mobile: [REDACTED]
Email: Jay.Lad@nationalgrid.com

National Grid House, (Floor C2), Warwick Technology Park, Gallows Hill, Warwick, CV34 6DA

From: eleri.wilce@rwe.com <eleri.wilce@rwe.com>
Sent: 13 November 2020 14:31
To: Lad, Jay <Jay.Lad@nationalgrid.com>
Subject: RE: EXT || NOTIFICATION: Cadent and National Grid Plant Enquiry Response - Your Ref: EN010032 (BK) Our Ref: XX_GE4A_3FWP_056032

Dear Jay,

Apologies for the delay in responding – I can confirm that Rampion Offshore Wind farm are seeking only to formalise the diversion of Public footpath 8T in Bolney, and this work will not require the diversion of any power cables in association with this application, nor interfere with any existing overhead lines.

As discussed, the application is required to align the co-ordinates of the footpath's permanent diversion with the route of the temporary footpath which is currently in use – there is no requirement for any construction work on

the ground to do this, as the footpath is already in use, and therefore we believe that no risk will be posed to your asset.

On that basis I would ask that you withdraw your objection to the application. However if you need any further information from me, please let me know.

Kind regards

Eleri

From: Lad, Jay <Jay.Lad@nationalgrid.com>
Sent: 13 November 2020 14:23
To: Wilce, Eleri <eleri.wilce@rwe.com>
Subject: EXT || NOTIFICATION: Cadent and National Grid Plant Enquiry Response - Your Ref: EN010032 (BK) Our Ref: XX_GE4A_3FWP_056032

FAO Eleri Wilce

Please find the attached Objection letter. This is being sent as we have not yet received a response to the below enquiry.

Kind Regards

Mrs Jay Lad

Asset Protection Assistant
Compliance & Integrity
Gas Transmission
National Grid
+44 (0)1926 65 4337 ext 7777 4337
Mobile: [REDACTED]
Email: Jay.Lad@nationalgrid.com

National Grid House, (Floor C2), Warwick Technology Park, Gallows Hill, Warwick, CV34 6DA

From: Lad, Jay
Sent: 06 November 2020 10:13
To: 'Eleri.wilce@rwe.com' <Eleri.wilce@rwe.com>
Subject: EXT || NOTIFICATION: Cadent and National Grid Plant Enquiry Response - Your Ref: EN010032 (BK) Our Ref: XX_GE4A_3FWP_056032

Hello Eleri Wilce

Please can you provide us with any plans that you may hold and any other information you may have to assist us.

Kind Regards

Mrs Jay Lad

Asset Protection Assistant
Compliance & Integrity
Gas Transmission
National Grid
+44 (0)1926 65 4337 ext 7777 4337
Mobile: [REDACTED]
Email: Jay.Lad@nationalgrid.com

National Grid House, (Floor C2), Warwick Technology Park, Gallows Hill, Warwick, CV34 6DA

From: Cadent EAGLES System <noreply.eagles@dnvgl.com>
Sent: 22 October 2020 13:53
To: .box.assetprotection <assetprotection@nationalgrid.com>
Subject: EXT || NOTIFICATION: Cadent and National Grid Plant Enquiry Response - Your Ref: EN010032 (BK) Our Ref: XX_GE4A_3FWP_056032

NOTIFICATION: Formal Enquiry - Ref: XX_GE4A_3FWP_056032; Your Ref: EN010032 (BK)

This is a notification about an enquiry received by the Plant Protection team on 21/10/2020.

Reason for Notification:

This Notification has been triggered by proposed imminent activities which may require Asset Protection Consultation. See below for details.

Details:

Formal Enquiry Requiring Asset Protection Consultation (Overhead Line Affected)

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You may report the matter by contacting us via our [UK Contacts Page](#) or our [US Contacts Page](#) (accessed by clicking on the appropriate link)

Please ensure you have adequate virus protection before you open or detach any documents from this transmission. National Grid plc and its affiliates do not accept any liability for viruses. An e-mail reply to this address may be subject to monitoring for operational reasons or lawful business practices.

For the registered information on the UK operating companies within the National Grid group please use the attached link: <https://www.nationalgrid.com/group/about-us/corporate-registrations>

Eleri Wilce

Rampion Offshore Wind Ltd
Greenwood House, Westwood Way, Coventry, CV4 8PB

Jay Lad
Asset Protection Assistant
Business & Operation Support
Gas Transmission Asset Management
National Grid
Warwick
Direct Tel:
Email: Jay.lad@nationalgrid.com

Planning Work?

Contact us on 0800 688 588*

Mon-Fri 8am-4pm

(*Calls may be recorded and monitored)

E-mail: Plantprotection@nationalgrid.com

Electricity Emergency Number:

0800 40 40 90*

National Gas Emergency Number:

0800 111 999*

*Available 24 hours, 7 days/week.

Calls may be recorded and monitored.

www.nationalgrid.com

Date : 11/16/2020

Our Reference: XX_GE4A_3FWP_056032

Your Reference: EN010032 (BK)

Dear Eleri Wilce/Rampion Offshore Wind Ltd

Ref: Rampion Wind Farm , Bob Lane, North Lodge, Twineham

National Grid has No Objections to the above proposal which is in close proximity to a High Voltage Transmission Overhead Line –Overhead Electricity Line.

I have enclosed a location map to show the location of National Grid's Overhead Lines within the vicinity of your proposal and associated information below.

Yours sincerely

Jay Lad

Asset Protection Assistant

EAGLES (Electricity **A**nd **G**as Location **E**nquiry **S**ystem)

Is now available to use simply click on the link to register www.beforeyoudig.nationalgrid.com, submit details of your proposed works and receive instant guidance and if appropriate maps showing the location of National Grid gas and electric apparatus.

PLEASE READ CAREFULLY

- National Grid'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.
- National Grid requires 3D drawings to be provided at the earliest opportunity (DWG, DGN or DXF)
- Statutory electrical safety clearances must be maintained at all times. National Grid recommends that no permanent structures are built directly beneath our overhead lines. These distances are set out in EN 43 – 8 Technical Specification for “overhead line clearances Issue 3 (2004) To view EN 43 – 8 Technical Specification for “overhead line clearances Issue 3 (2004).
http://www.nationalgrid.com/uk/LandandDevelopment/DDC/devnearohl_final/appendixIII/appIII-part2
- The statutory minimum safety clearance is 7.6 metres to ground and 8.1 metres to a normal road surface. Further detailed information can be obtained from the Energy Networks Association's (www.energynetworks.org.uk) Technical Specification E-43-8 for “Overhead Line Clearances”, Issue 3 (2004)
- Any changes in ground levels which are proposed either beneath or in close proximity to our existing overhead lines would serve to reduce safety clearances. Safety clearances to existing overhead lines must be maintained in all circumstances.
- To view the Development Near Overhead Lines Document.
<http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=23713>
- To view the National Grid Policy's for our Sense of Place Document.
<http://www2.nationalgrid.com/UK/Services/Land-and-Development/A-sense-of-place/>
- 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.”
- Plant, machinery, equipment, buildings or scaffolding should not encroach within 5.3 metres of any of our high voltage conductors at the point where the conductors are under their maximum ‘sag’ or ‘swing’ conditions. Overhead Line profile drawings should be obtained using the above contact details.
- 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 our towers. These foundations extend beyond the base are of the tower. Pillar of Support drawings should be obtained using the contact details above.
- Due to the scale, bulk and cost of the transmission equipment required to operate at 275kV or 400kV we only support proposals for the relocation of existing high voltage overhead lines where such proposals directly facilitate a major development or infrastructure project of national importance which has been identified as such by government.
- To promote the successful development of sites crossed by existing overhead lines, and the creation of well-designed places, National Grid has produced ‘A Sense of Place’ guidelines, which look at how to create high quality development near overhead lines and offer practical solutions which can assist in avoiding the unnecessary sterilisation of land in the vicinity of high voltage overhead lines.
- Further information regarding our undergrounding policy and development near transmission overhead lines is available on our website at: <http://www.nationalgrid.com/uk/LandandDevelopment>

National Grid Overhead Line Profiles

Profile Description:
This profile is derived from the use of LIDAR data and shows the position and status of the power line at the time of survey. Please note that ground levels may have changed since the survey date.

As the amount of power increases in the lines the conductors heat up and become longer, creating greater sag. A computer model has been applied to show the conductor at the maximum rated temperature. Please note that on an average day the conductors may not be at rated temperature and their height above ground is likely to change.

The profile states the lines current voltage. Any construction under the lines should allow for the likely possibility of upgrading of the line from 132kV to 275kV or 275kV to 400kV. Any permanent structures should adhere to the increased clearances.

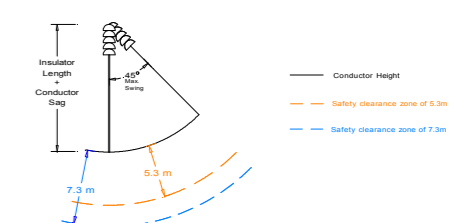
It remains the responsibility of the third party to ensure the safety clearances are met by their proposed operations by using the bottom conductor attachment points as reference benchmarks.

Drawing Key:
The following clearances are derived from the Energy Networks Association Technical Specification 43-8.

- Feature Description**
- Tower Base
 - Ground / Model Key Points
 - Parallel Power Lines
 - River Navigable
 - Lake Navigable
 - Pond Non-Navigable
 - Swimming Pool
 - Stream Non-Navigable
 - Roads
 - Bridges
 - Footpath/Sidewalk/Track
 - Motorways
 - Railways
 - Fence
 - Wall
 - Building
 - Vegetation
 - Power Line Crossings Wires
 - Street Furniture
 - Power Line Crossing Structures
 - Leisure Area
 - Processing Plant / Industrial Substation
 - Temporary Object
 - Interpolated Ground Points

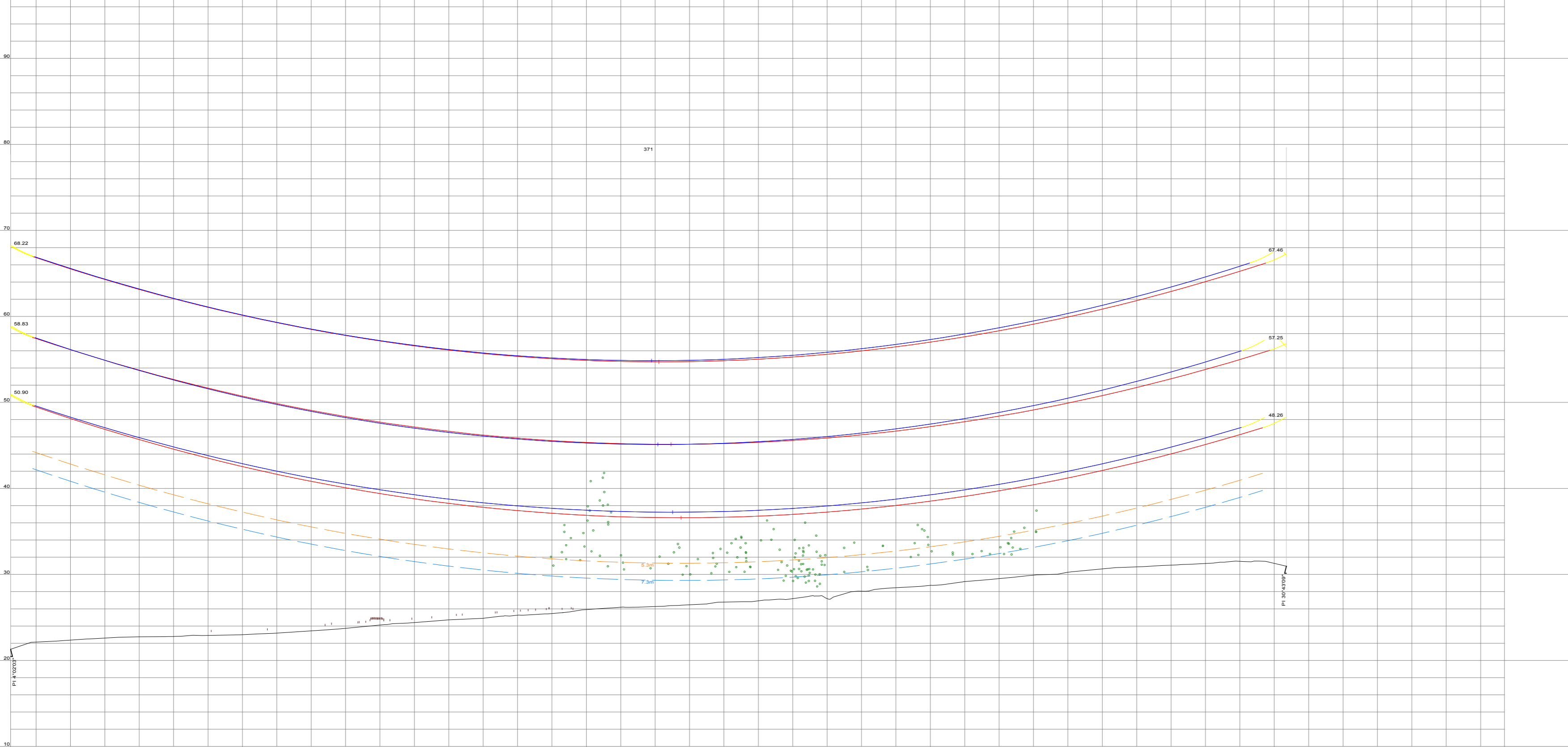
Item	Description of Clearance	Minimum Clearance (metres) at 400kV
1	To Ground	7.3
2	To Normal Road Surface	8.1
3	To road surface of designated "6.1 metres high load" routes	9.2
4	To motorway or other road surface where "skybridge" can be used	10.5
5	To motorway road surface where scaffolding is to be used on: (i) Normal 3 lane motorways (ii) Elevated 2 lane motorways	16.3
6	To any object/building on which a person may stand, including ladders, access platform, etc.	5.3
7	To any object to which access is not required AND on which a person cannot stand or lean a ladder	3.1
8	To trees under or adjacent to line and: (i) Unable to support ladder/climber (ii) Capable of supporting ladder/climber (iii) Trees falling towards line with line conductors hanging vertically only	3.1 5.3 3.1
9	To trees in orchards and hop gardens	5.3
10	To irrigators, slurry guns and high pressure hoses	30.0
11	To street lighting standards with: (i) Standard in normal upright position (ii) Standard falling towards line with line conductors hanging vertically only (iii) Standard falling towards line	4.0 4.0 1.8

Swing Clearances:
The conductors may swing (blow-out) to a maximum of 45 Degrees during very strong winds, clearances need to be maintained for this situation.



X=524235.95
Y=121089.20
L6 BICC D30 E307

X=524155.39
Y=121105.02
L6 BICC DJT M107



4VM145 - 4VM146, 400kV, 400mm² ACSR - Zebra, bundle of 4, Displayed Rated Temp 75 Creep FE
 4VM145 - 4VM146, 400kV, 400mm² ACSR - Zebra, bundle of 4, Displayed Rated Temp 75 Creep FE
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ISSUE	A																			
DRAWN	JK	27/05/16																		
CHECKED	GP	06/06/16																		
APPROVED																				
	As Surveyed																			



5.0 m
Horiz. Scale

2.0 m
Vert. Scale

National Grid plc UK Transmission
 Warwick Technology Park, Galloway Hill, Warwick, CV34 8DA

Site: **4VM Ninefield - Bolney**
 Towers **4VM145 to 4VM146**
 Chainage **51033 to 51404**
 Left - **A731** Right - **A732**

Site: **Bolney - Ninfield** A0
 Originator Drawing Number: **4VM001-147_08516_08816_A** CAD
 NG Drawing Number: **28_NG_0192_1** Sheet No. **18** No. of Sheets **19** ISSUE **A**

SCALE: NG Project No. **28/03/216**
 Plotted **08/09/2017 10:52:01**

National Grid Overhead Line Profiles

Profile Description:

This profile is derived from the use of LIDAR data and shows the position and status of the power line at the time of survey. Please note that ground levels may have changed since the survey date.

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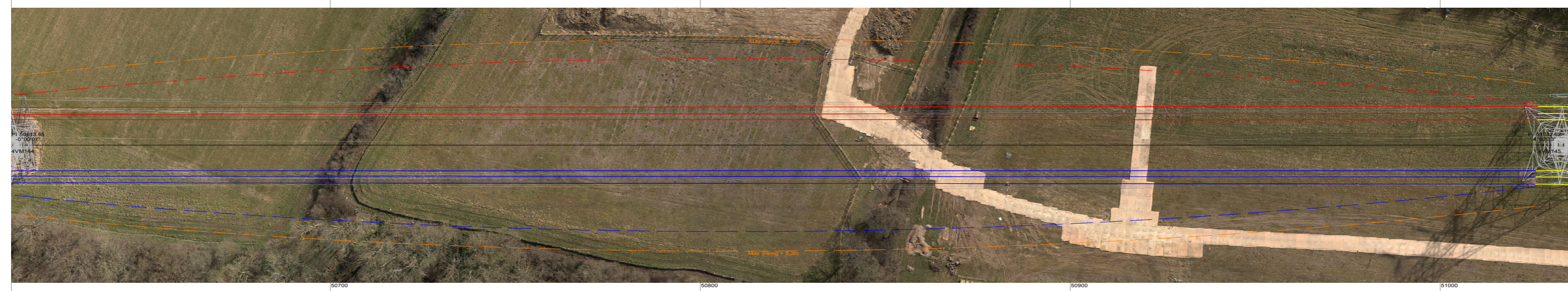
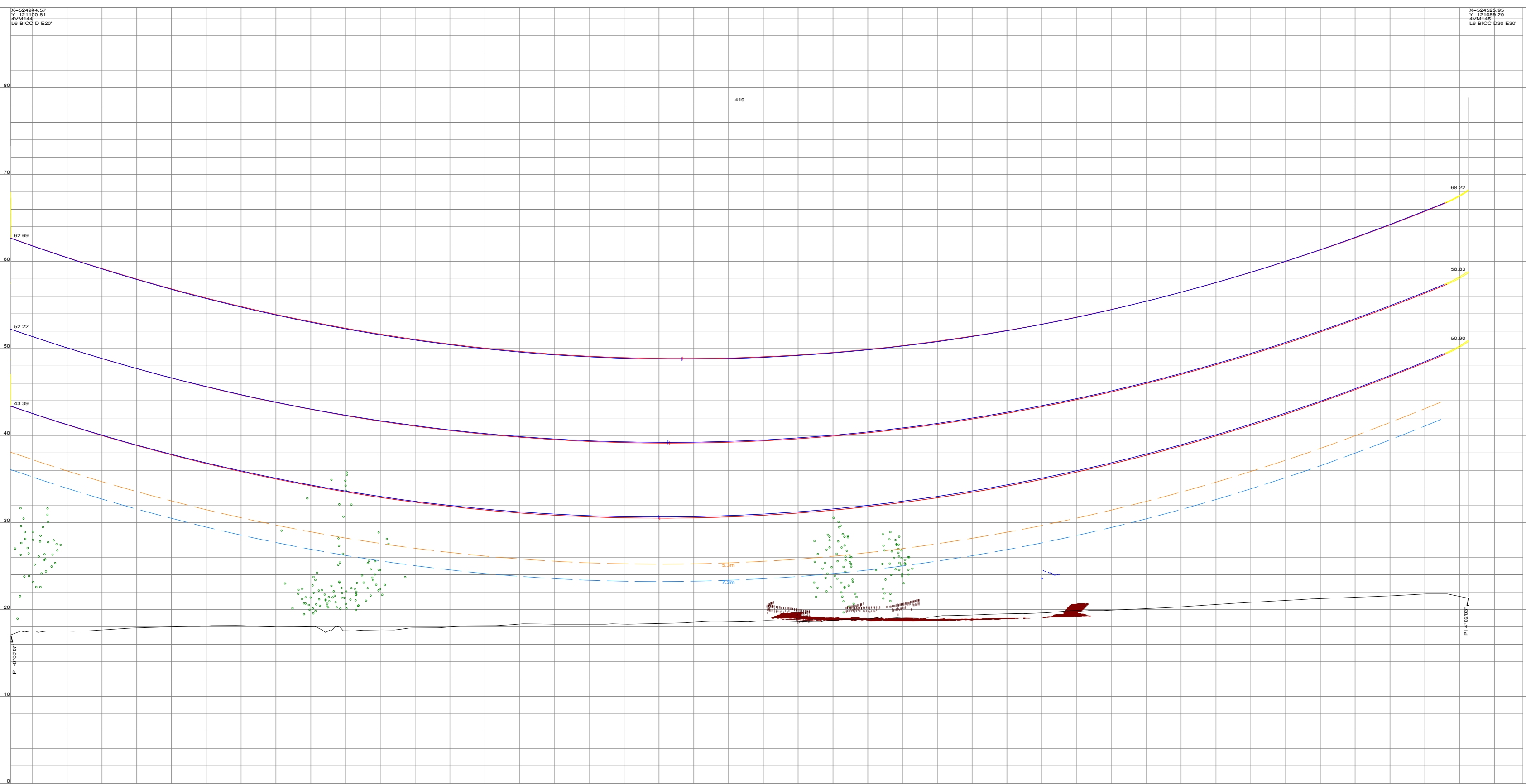
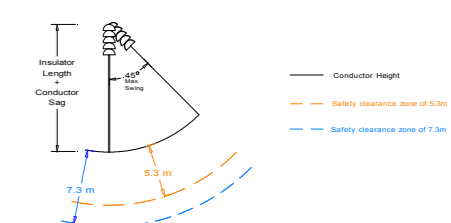
Feature Description

- ✗ Tower Base
- Ground / Model Key Points
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- Roads
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- Building
- Vegetation
- Power Line Crossings Wires
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Swing Clearances:

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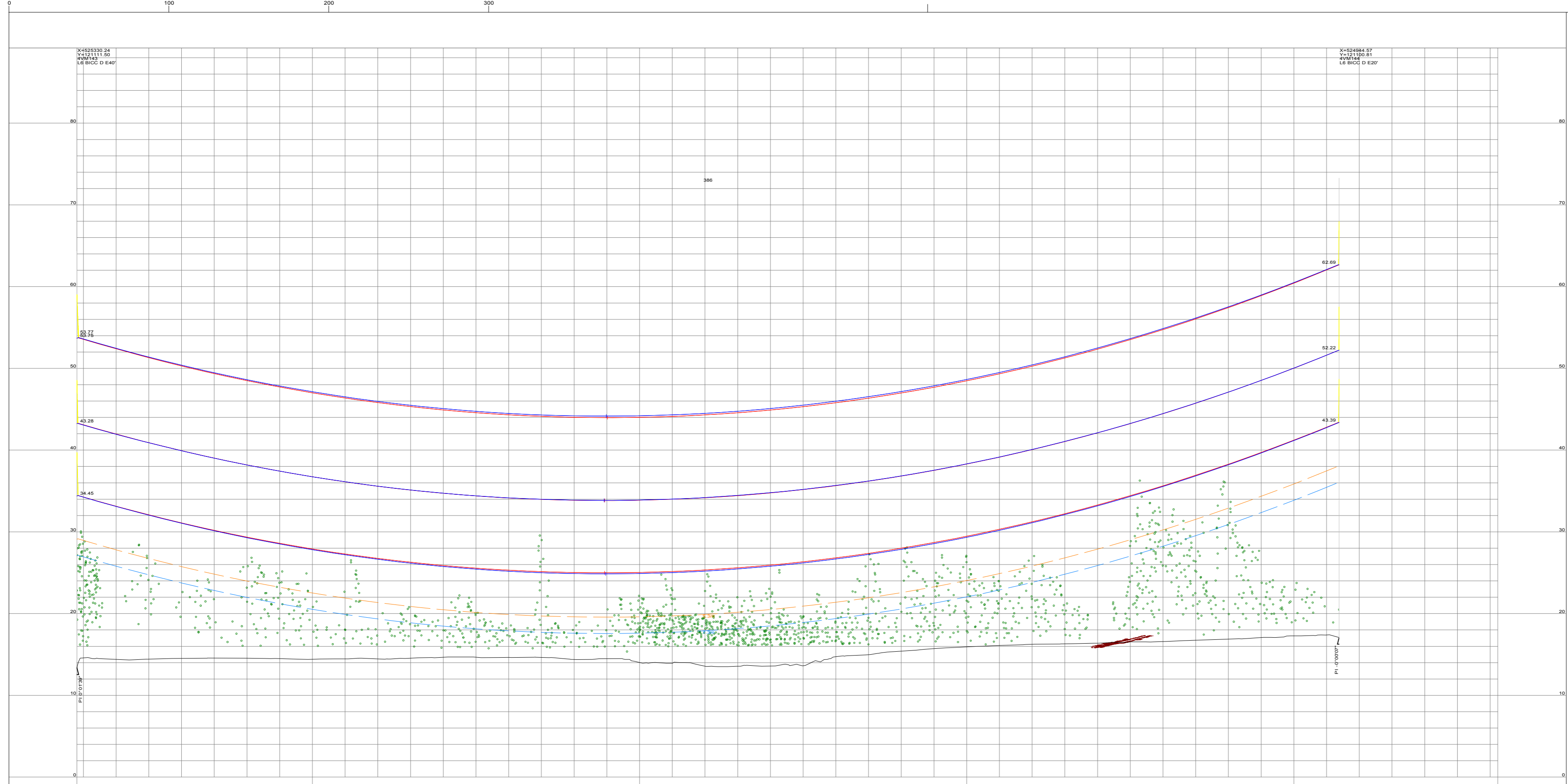


National Grid plc UK Transmission
 Warwick Technology Park, Galloway Hill, Warwick, CV34 8DA

Site: **4VM Ninefield - Bolney**
 Towers **4VM144 to 4VM145**
 Chainage **50614 to 51033**
 Left - A731 Right - A732

Originator Drawing Number: **4VM001-147_08516_08816_A**
 NG Drawing Number: **28_NG_0192_1** Sheet No. **17** No. of Sheets **19** ISSUE **A**

SCALE: - NG Project No. **28/03/216**
 Plotted 08/09/2017 10:52:00



National Grid Overhead Line Profiles

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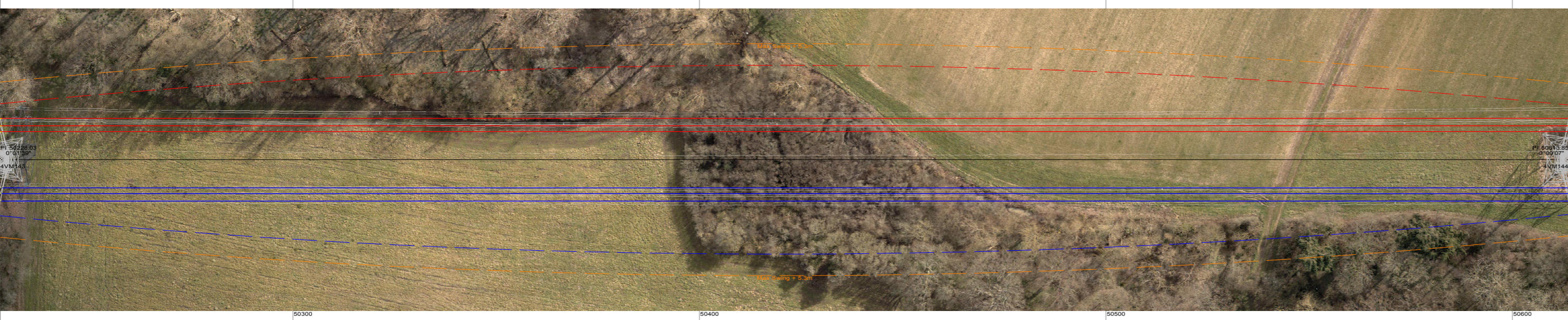
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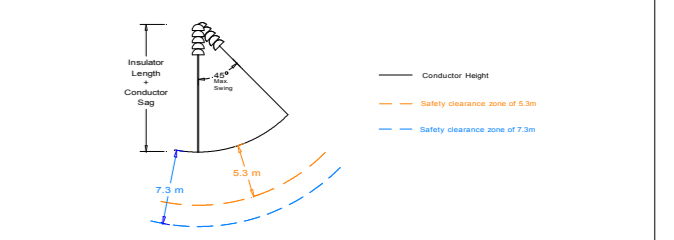
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National Grid plc **UK Transmission**
 Warwick Technology Park, Galloway Hill, Warwick, CV34 8DA

4VM Ninefield - Bolney
 Towers 4VM143 to 4VM144
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Site: **Bolney - Ninfield** A0
 Originator Drawing Number: 4VM001-147_08516_08816_A CAD
 NG Drawing Number: 28_NG_0192_1 Sheet No. 16 No. of Sheets 19 ISSUE
 SCALE: NG Project No. 28/03/216
 Plotted 08/09/2017 10:51:59

Technical Guidance Note 287

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





Purpose and scope	3
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Substations	4
Part 2 – Statutory requirements for working near high-voltage electricity	4
Electrical safety clearances	4
Part 3 – What National Grid will do for you and your development	5
Provision of information	5
Risks or hazards to be aware of.....	6
Specific development guidance	10
Asset protection agreements	12
Contact details	12



Disclaimer

National Grid Gas Transmission and National Grid Electricity Transmission or their agents, servants or contractors do not accept any liability for any losses arising under or in connection with this information. This limit on liability applies to all and any claims in contract, tort (including negligence), misrepresentation (excluding fraudulent misrepresentation), breach of statutory duty or otherwise. This limit on liability does not exclude or restrict liability where prohibited by the law, nor does it supersede the express terms of any related agreements.



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.

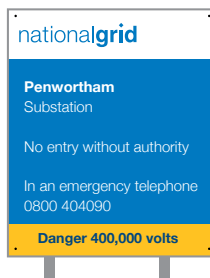
The scope of the report covers information on basic safety and the location of our assets – and also highlights key issues around particular types of development and risk areas.

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 the 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, scheduled or emergency works, contact the Plant Protection team online, by email, post or phone.

www.beforeyoudig.nationalgrid.com

Email: plantprotection@nationalgrid.com

Phone: 0800 688 588

Write to:

National Grid Plant Protection
Brick Kiln Street
Hinckley
Leicestershire
LE10 0NA

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 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. Diesel generators and compressed air systems are also found 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.

Part 3

What National Grid will do for you and your development

Provision of information

National Grid should be notified well in advance of any works or developments taking place near our electrical assets. We can then provide the following services:

Drawings

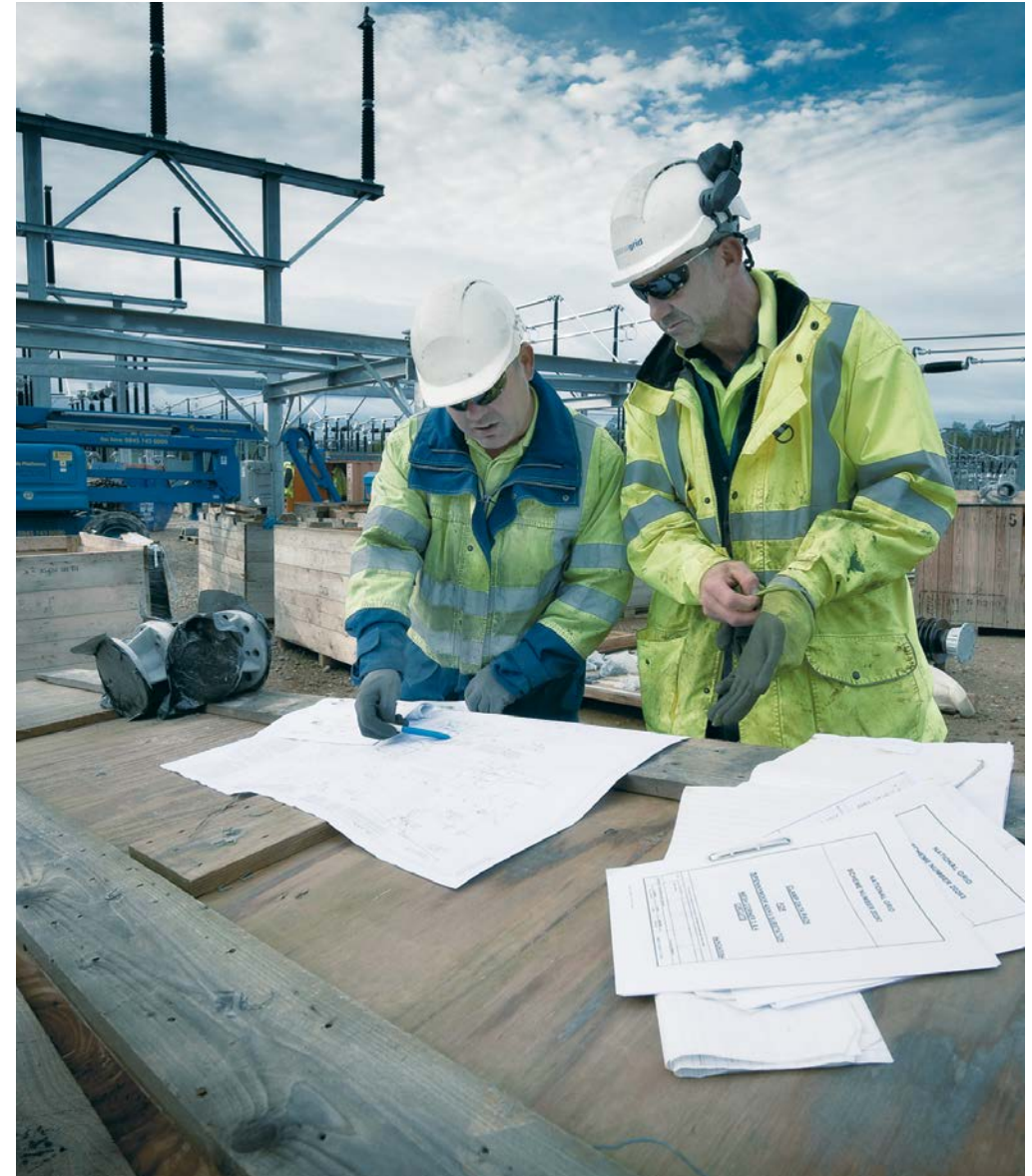
National Grid will provide relevant drawings of overhead lines or underground cables to make sure the presence and location of our services are known. Once a third party or developer has contacted us, we will supply the drawings for free.

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.

400kV

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





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 Plant Protection:

Email: plantprotection@nationalgrid.com
Phone: 0800 688 588

Electrical clearance from overhead lines

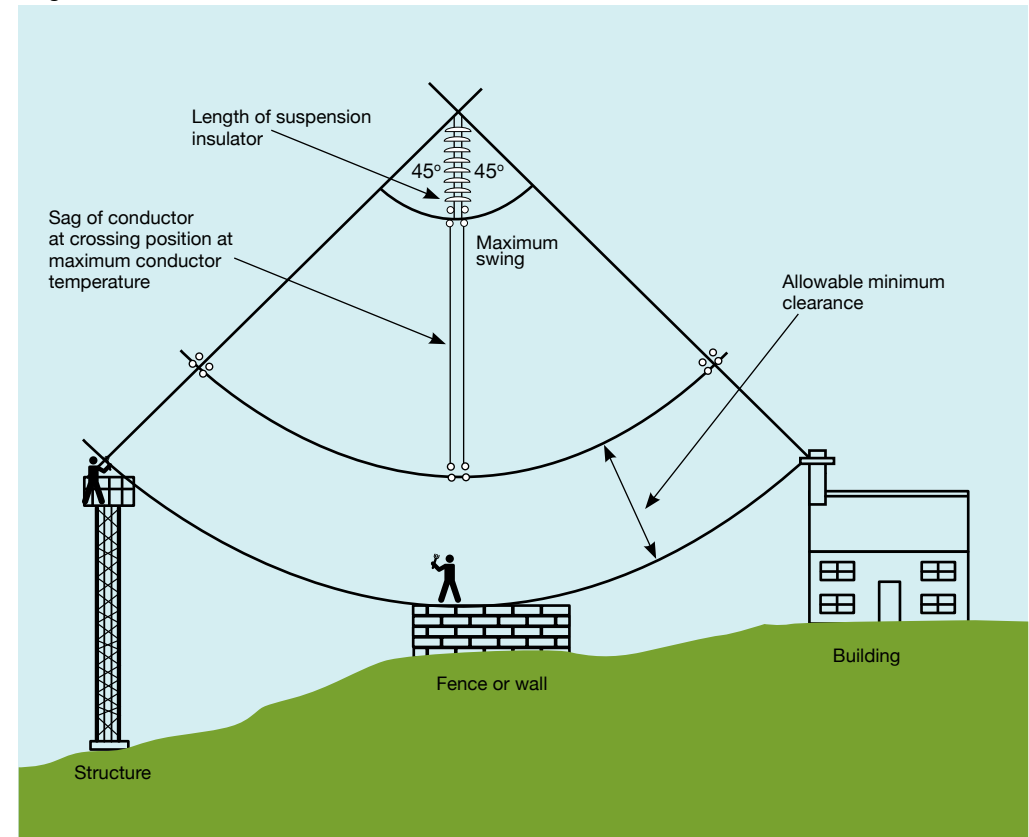
The clearance distances referred to in this section are specific to 400kV overhead lines. National Grid can advise on the distances required around different voltages i.e. 132kV and 275kV.

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

Diagram not to scale



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

overhead lines. 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.

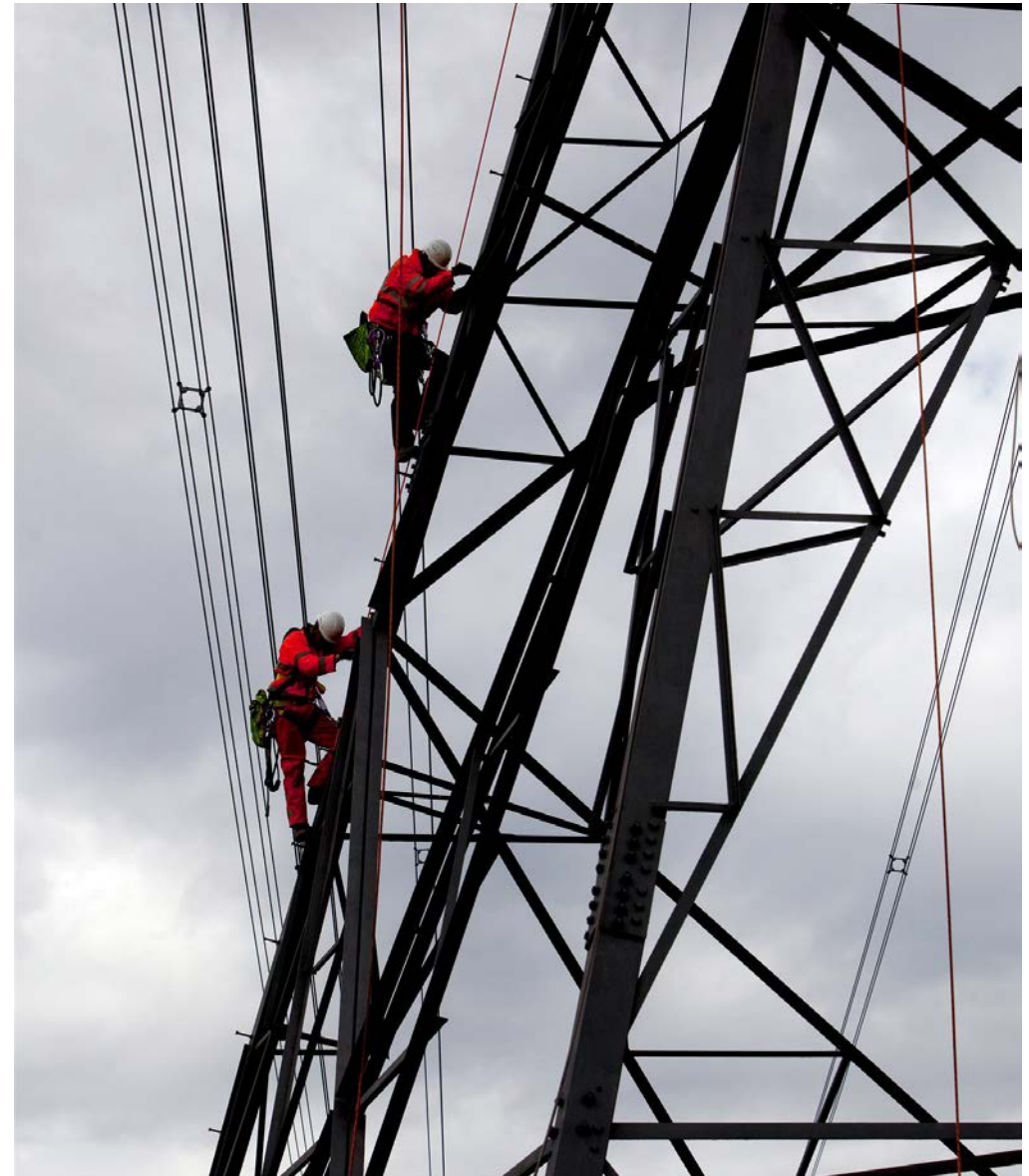
Maintenance access

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.

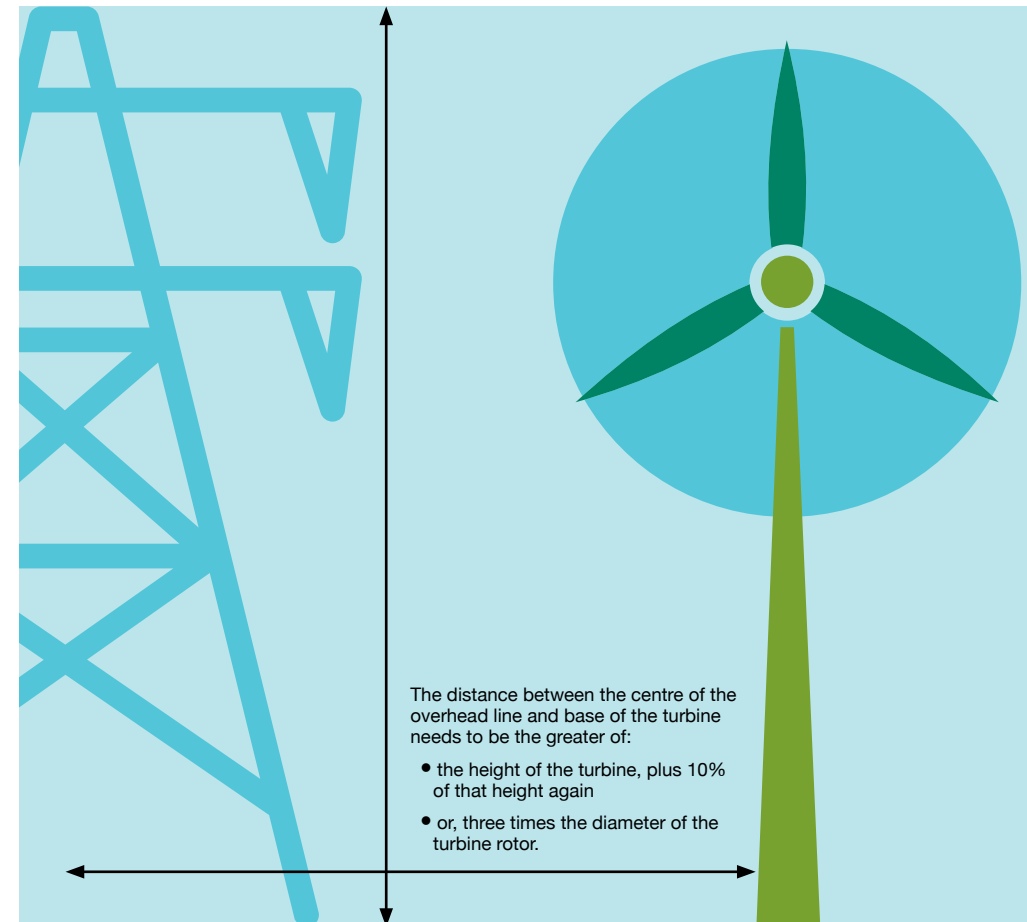
Commercial and housing developments

National Grid has developed a document called *A Sense of Place*, 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

Development of solar farms is a relatively new phenomenon. While there is limited research and recommendations available, there are several key factors to consider when designing them.

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.

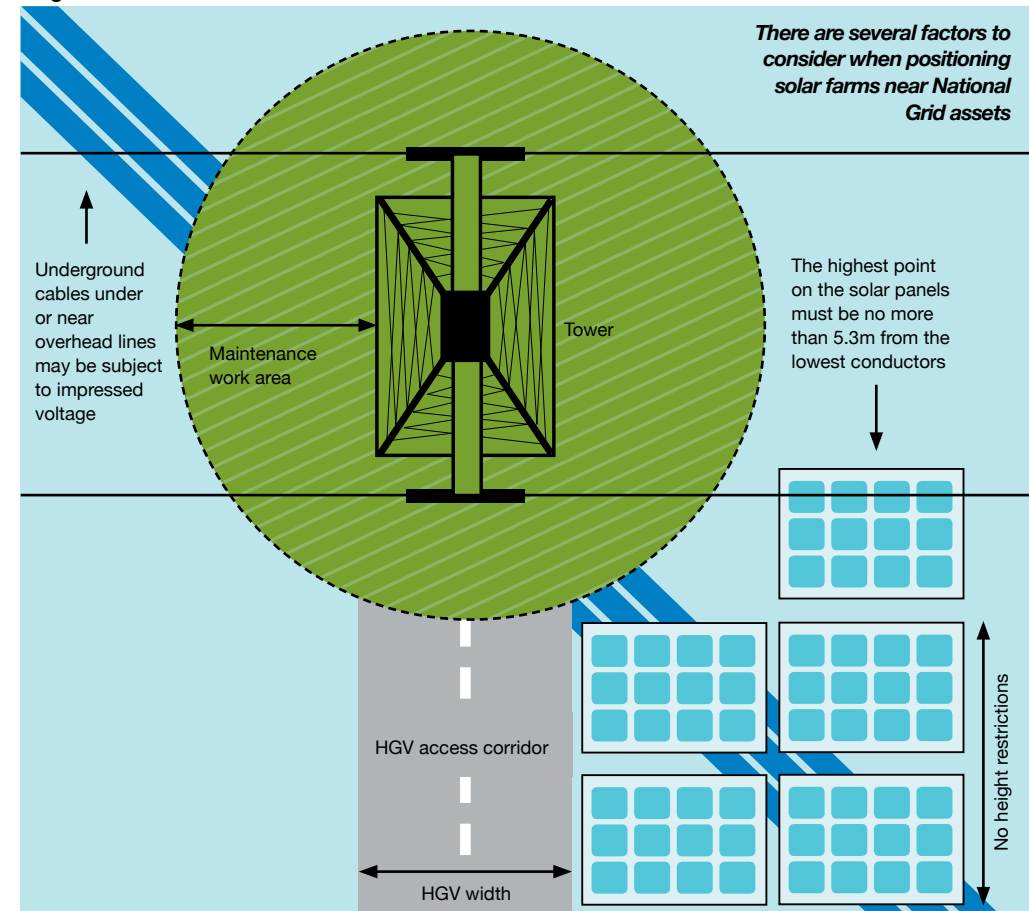
Solar panels that are directly underneath power lines risk being damaged on the rare occasion that a conductor or fitting falls to the ground. A more likely risk is ice falling from conductors or towers in winter and damaging solar panels.

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

Diagram not to scale



need full access for our vehicles, 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 01926 653 000.

Routine enquiries

Email:

plantprotection@nationalgrid.com
(you will be sent an automated response to confirm receipt)

Call Plant Protection for free on:
0800 688 588

Opening hours:
Monday to Friday 08:00-16:30

Write to:
**National Grid Plant Protection,
Brick Kiln Street,
Hinckley,
Leicestershire
LE10 0NA**

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