

Guidance for Third Parties Working Near SSEN Transmission Assets



Contents

1 Introduction	3
2 Contacting us	3
3 Statutory requirements	4
4 How we can help	5
5 Our Assets	6
6 Potential risks and hazards	8
7 Special Considerations	14
8 Contact Details	19

1. Introduction

We are SSEN Transmission and through our licenced entity, Scottish Hydro Electric Transmission plc, we own and maintain the high voltage electricity transmission network in the north of Scotland.

We have produced this document to provide guidance and information to third parties who intend to develop land near our electricity transmission assets. We aim to provide clear advice on working safely around our assets and give guidance on topics such as location of plant and equipment, electrical safety clearances and our requirements to ensure that we can safely maintain and protect our assets.

2. Contact SSEN Transmission

For enquiries relating to any works near our assets, you can contact the Transmission Asset Management team

Website: www.ssen-transmission.co.uk

Email: Transmission.Asset.Management@sse.com

Write to: Transmission Asset Management

Grampian House
200 Dunkeld Road
Perth
PH1 3GH



**POWER CUT?
CALL 105**

If you see an immediate danger involving your works or a member of the public, the national number to call is 105

3. Satutory requirements

Safety clearances

We are legally obliged to comply with the regulations for electrical safety in the UK, the Electricity Safety Quality and Continuity Regulations and associated amendments. In particular, these regulations specify minimum electrical safety clearances which are agreed at European and UK level. These clearances then form part of industry guidance issued by the Electricity Networks Association and provide the basis for Health and Safety Executive (HSE) Guidance Notes. The documents listed below are useful references.

Reference	Title
ENA TS 43-8	Overhead line clearances
ESQCR Regulations 2002 No. 2665	The electricity safety, quality and continuity regulations
ESQCR Regulations 2006 No. 1521	The electricity safety, quality and continuity regulations (Amendment)
ESQC Regulations 2009 No. 639	The electricity safety, quality and continuity regulations (Amendment)
HSE Guidance Note GS6	Avoiding danger from overhead power lines
HSE Guidance note G47	Avoiding danger from underground services
FISA Safety Guide 804	Electricity at work : Forestry

It is important to remember that even without touching an exposed conductor, a life-threatening electric shock can still occur from a distance.

Electricity can jump several metres at high voltages, therefore when working near our assets, it is essential that a safe distance is maintained between people, objects, and exposed conductors. Our electricity transmission network operates at extra high voltages (EHV's) and a breach of those safety clearances could lead to serious injury or even death.

The legal requirement for minimum electrical safety clearances can be found in ESQCR Regulations 2002 No. 2665 and ENA TS 43-8.

Breaches of legal safety clearances will be enforced and may result in a third party being ordered to remove any object within those clearance areas at the cost of that party, or whoever caused it to be there.

4. How we can help

Services

Please contact us at the earliest opportunity if you are planning to carry out any work near our assets. It is important we are notified ahead of any works and we can assist in a number of ways

Risk identification

We can assist you to assess the risks associated with working near our electricity assets. This includes identifying immediate risks such as high voltage electricity lines and also those risks that might not be so immediately obvious, such as maintenance access requirements, noise and micro shocks (small spark discharges) which may affect your proposals. We can provide best practice guidance but we will not authorise specific working procedures.

Site attendance

We can arrange for one of our engineers to attend site and assist with a variety of activities such as identification of underground plant, surveying overhead line heights and offset distances, reviewing activity plans and witness works in proximity to our assets.

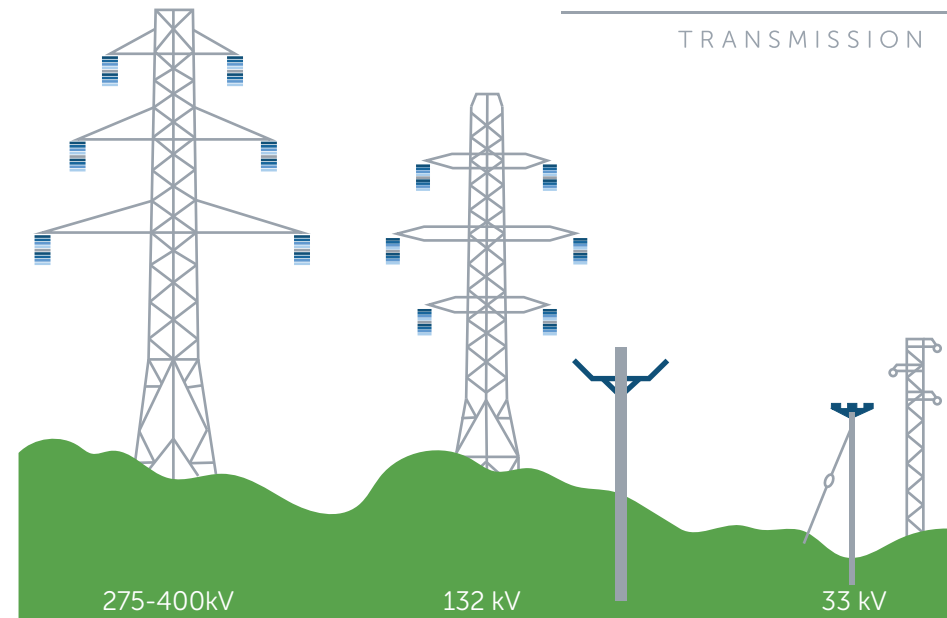


5. Our Transmission Assets

Overhead Lines

Overhead lines consist of live electricity conductors (cables) supported from large steel lattice towers (pylons) or wood poles, which carry high-voltage electricity to supply towns and cities. Most overhead lines on our transmission network operate between 132kV and 400 kV. Overhead lines are the means by which electricity is carried over long distances, usually between different substations which form part of the network.

Overhead line towers can vary in design depending on various factors such as voltage, conductor type and the location of the line. On the base of the tower there will be a notice identifying the tower number and circuit.



Underground Cables

Underground cables are generally found in urban and built up environments but can be found in rural areas too. It is always best to confirm the presence of any cables with us prior to planning a development. Underground cables have a conductive core which is surrounded by layers of insulation and armour. They can be installed in roads, underground tunnels or buried across open land in backfilled trenches.

Our underground cables can operate at voltages up to 400 kV.

Substations

Substations contain a wide range of equipment which performs a number of functions on the Transmission network, such as transforming electricity to higher or lower voltages or transitioning overhead lines into underground cables. They are usually located at the start or end point of overhead lines. They are secured areas and access to these is restricted to authorised persons only.

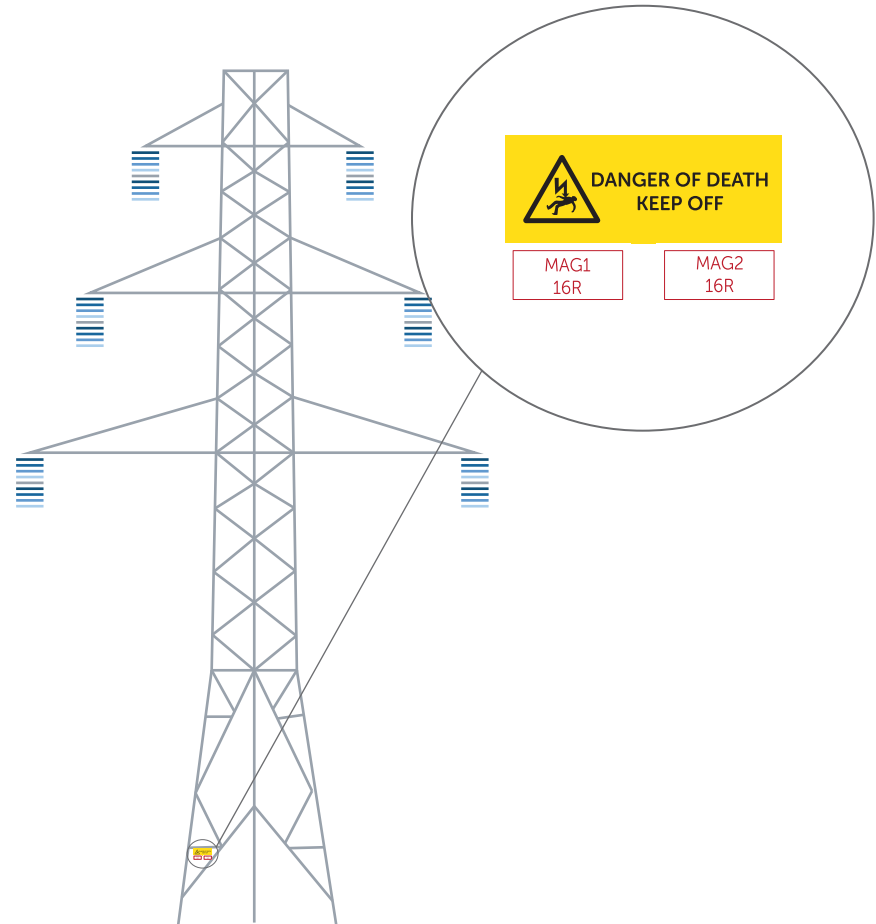
There will be signage at the entrance to the substations detailing the name and location of the substation and an emergency contact number.

SSEN Transmission Site identification

In case of EMERGENCY
please contact
SHE Transmission PLC
0800 300999

Substation Address:

GENERIC SUBSTATION
HIGH STREET
DUNDEE
DD8 8ZY
GRID REF NH-38842-47826



6. Potential risks and hazards

Land and Access

We enter into agreements with landowners and occupiers to enable us to install and maintain our assets on their land. These arrangements detail our rights and responsibilities to landowners and occupiers but also set out any restrictions that enable us to meet safety standards and protect our asset integrity. These may include constraints on development, planting or other works in the vicinity of our assets.

Our transmission network is undergoing significant redevelopment to help meet government Net Zero targets and to meet the demand for new connections. We have obligations under the Electricity Act 1989 to offer connections to new power generation sources, industries that need high voltage supply or electricity distribution companies. Overhead lines may need upgraded to accommodate larger voltages or substation footprints may have to be enlarged to accommodate new circuits or other facilities.

It is advised that any third party who have development proposals which may be in proximity to our transmission assets should consult us at an early stage to understand what requirements we might have for network maintenance or any restrictions which may apply to their development.

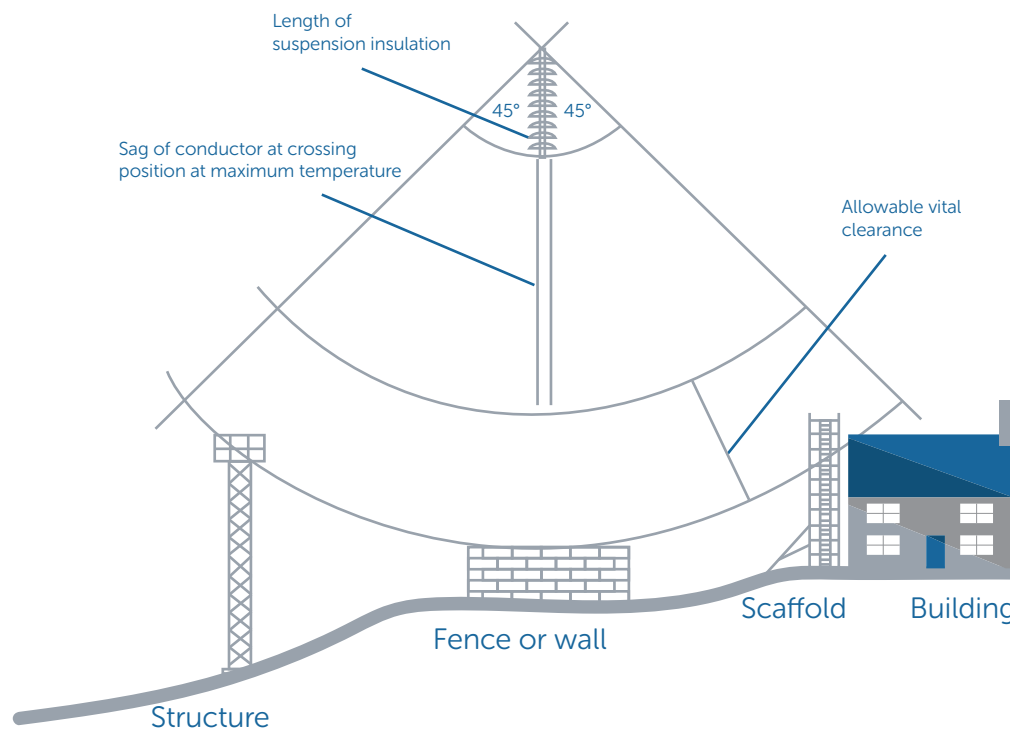


Overhead lines

We have statutory obligations to maintain a minimum ground clearance between conductors and other objects which are included in Regulation 17 of ESQCR 2002. Further guidance of standard clearances for the industry are set out in Energy Networks Association Technical Specification (ENA) TS 43-8.

The minimum distance between the conductors of an overhead line operating at 400kV, at maximum sag, and ground is 7.3m. The conductor sag can change due to various aspects including temperature. It is therefore essential that measurements to ground account for temperature variation.

The minimum clearance from the nearest line conductor to any object which is ordinarily accessible (including permanently mounted ladders and access platforms) or to any surface of a building is 5.3m. This includes temporary structures such as mobile and construction equipment. We will assess clearances on a case by case basis, provide guidance, and can attend the work site to assess risk and determine line heights.



Note: The clearance distances referred to here are specific to 400kV overhead lines, if advice is required on the distances around 132kV and 275kV assets then please contact us.

7.3m

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

If working near overhead lines, it is essential for you to contact Transmission.Asset.Management@sse.com so that we can assist you

Overhead lines

It is also essential that any excavations and structures built do not affect the foundations of the overhead line towers. The size of these foundations can vary depending on the type of tower. If you are planning any works within 30m of an overhead line tower base, then please contact us.

Safe systems of work are expected to be implemented by third parties whenever they are near overhead lines to protect our equipment and to protect all persons and animals in the area of the lines. The HSE guidance note, GS6 - Avoiding danger from overhead power lines, provides advice on avoiding danger from overhead lines.

Underground Cables

Transmission cables are located in a wide variety of environments and it is essential that developers know if any are in proximity to proposed works.

These assets can operate at voltages of up to 400 kV and present a severe hazard to personnel using excavation plant or digging tools in the event of a cable strike. Safe systems of work should be in place and guidance can be found in the HSE guidance note HSG47 - Avoiding danger from underground services.



Better safe than sorry!

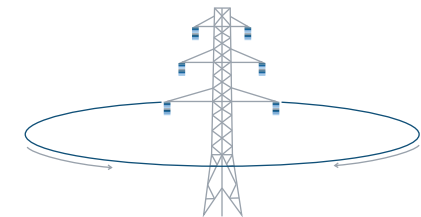
Electricity can jump to nearby objects. Even if you are a significant distance below an overhead line, it may not be safe. Always contact us for advice prior to commencing works.



You must avoid interaction with buried cables.

Contact linesearchbeforeUdig.com for location drawings of our underground lines.

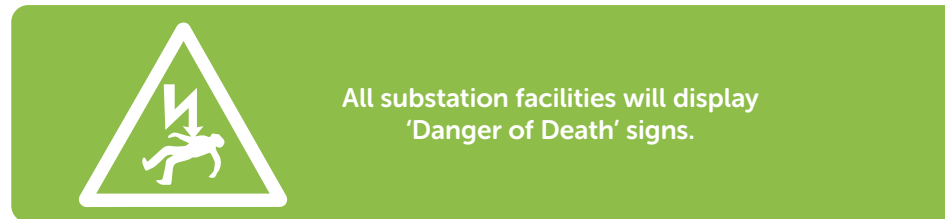
**30m
radius**



If you're planning to do work within a 30m radius of the tower base, you must contact us for more information

Substations

Due to their position at ground level and the high risk posed by equipment contained within, substations are protected with high security fencing to prevent entry by unauthorised individuals. This reduces the risk of accidental contact, which is a more common issue with overhead lines and underground cables.



Care is still required when working near to and planning developments in proximity to these facilities. Adequate road access is to be maintained for substation workers and for moving equipment during construction, maintenance or repair activities. Sometimes there is also a need to transport very large equipment such as transformers in or out of sites as abnormal indivisible loads.

No structures should be built, or materials stored within 2 metres of an existing substation fence, as this could provide a climbing aid for unauthorised persons to gain access to the facility.

Impressed Voltages and Micro Shocks

Impressed voltages are caused by electromagnetic coupling between high voltage equipment and surrounding conductive objects. Any conductive materials in the vicinity of a high voltage asset could gain a higher than earth voltage even when there is no direct contact. Non-earthed objects or persons may build up an electrical charge and upon touching a grounded object, may equalise the charge and experience a micro shock (small spark discharge).

Impressed voltages can cause equipment damage and personal injury, which should be taken into consideration during design and construction activities. For example, structures with metal cladding or metallic fences located under overhead lines can generate a voltage so should be suitably earthed to mitigate this effect.

Spark discharges present a serious hazard on sites where flammable materials are stored such as petrol filling stations. Electrical screening and earthing may be needed if in proximity to an overhead power line.

Earth Potential

During lightning storms or system failure, large amounts of electricity can enter the earth. This can result in an increase in the earth potential from the base of towers or substations. Whilst it is a rare occurrence, it can present a serious hazard to nearby people and equipment. It is therefore advised that works are not conducted near tower bases, particularly during lightning storms.

Noise

Some level of operational noise from our assets is inevitable, and that should be considered when planning any development. Depending on transformer type, a low frequency hum may be emitted from substations.

Overhead lines generate a phenomenon known as 'corona discharge', which can manifest as a crackling or buzzing sound. Noise from wind moving through steel lattice towers and cables can also elicit periodic whistling noises.

Adequate solutions to dampen sound should be incorporated into the design for any development in proximity to these assets.

Maintenance Access

Vehicle access needs to be maintained around all of our assets for maintenance purposes. These activities often occur at short notice and actions by other parties that restrict access are not permitted under the Electricity Act 1989. For overhead lines, access to tower bases must be maintained with the landowners.

Fire

No flammable materials should be stored under our overhead lines, over the top of underground cables or in proximity to substations. If there are live high voltage conductors within 30m of a fire, the fire and rescue services will not use water to extinguish the fire. If there is an outbreak of fire within 30m of a live conductor or any other infrastructure we will be required to turn off the circuit and make the situation safe for the fire service. This may disrupt supplies for several hours and the party responsible may be liable for the costs incurred which could be significant. If you have overhead or underground cables on our land you should also consider whether your insurance covers such events.

Where there are specific fire related hazards or flammable materials, it is recommended that our emergency contact details are included in any fire risk assessment and plan so incidents can be reported and dealt with quickly.

All high voltage assets produce an electric field that can generate micro shocks, which could be an ignition source. It is recommended that metal framed or clad buildings, chain link fences, metal gates, and deer fences next to overhead lines are adequately earthed in order to minimise this risk.

Earthworks

Any excavation works to depths of 0.5m and over should be reviewed for proximity to our infrastructure to reduce the potential for cable strike.

We must be informed of any works that may disturb the foundations of overhead line towers and substations or be in close proximity to underground cables. This includes excavation, piling and tunnelling work. Any activities that could potentially alter ground levels near transmission assets should be reviewed with us to ensure safety clearances are retained.

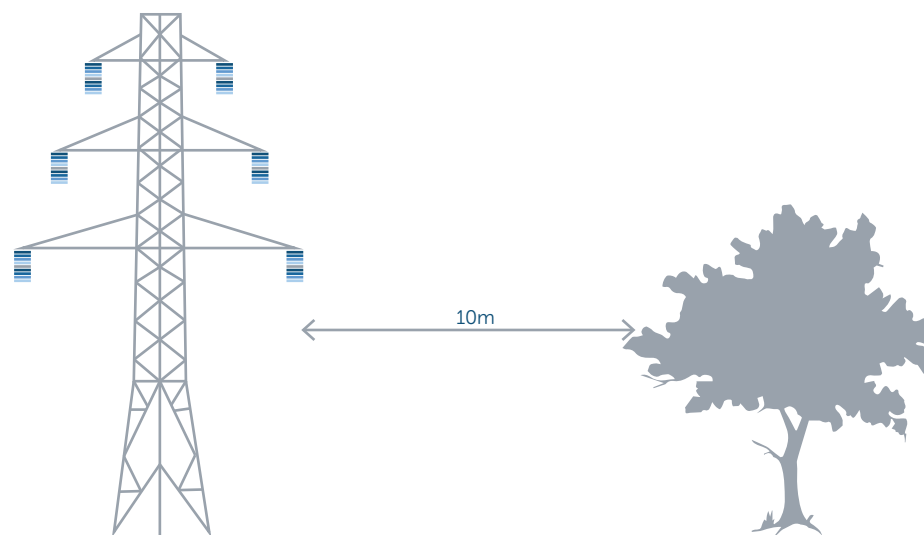
No spoil material is to be stored under overhead lines or within 2m of a substation fence. No tipping of material by dump truck or equivalent adjustable-bed plant is to take place below overhead lines.

A minimum distance of 200m should be maintained when quarrying near any of our assets, which may be reduced following a site-specific survey and risk assessment.

7. Special Considerations

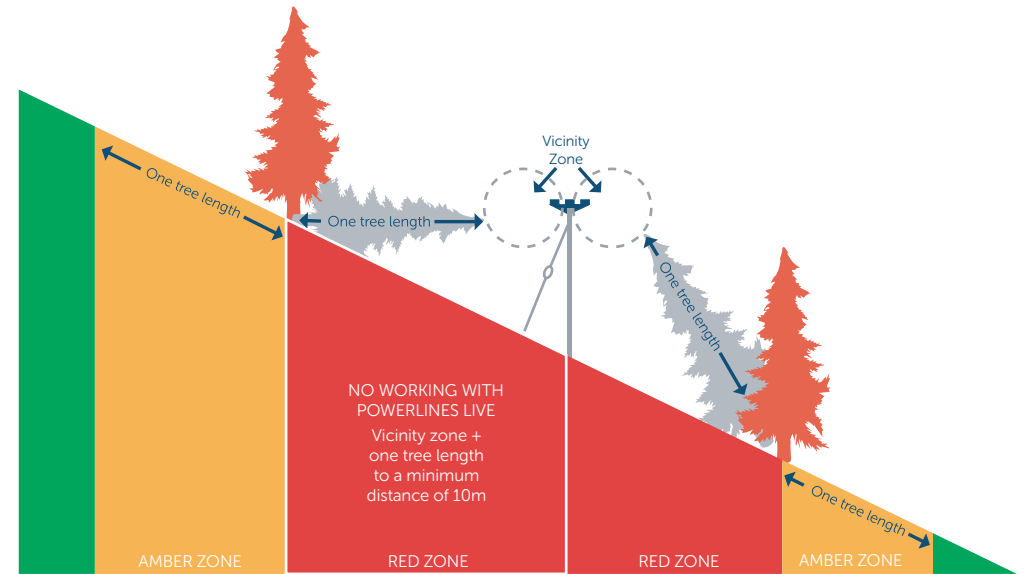
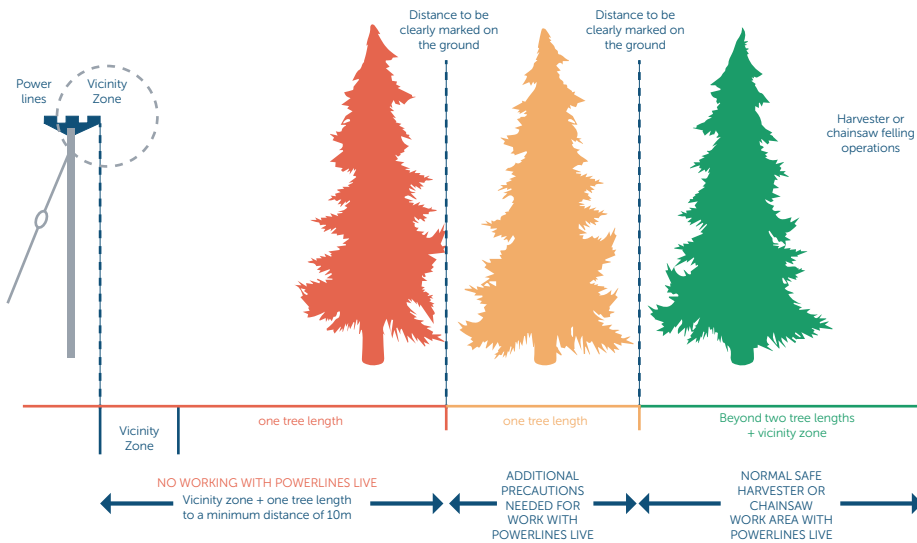
Arboricultural tree management

Arboricultural works proposed within 10m of overhead power lines, measured horizontally at ground level from surface under the nearest wire, need a risk-based approach. The potential to accidentally breach the 10m zone must also be considered. This can be caused by falling trees and debris or collapse of lifting equipment such as cranes or MEWPs. If you plan to carry out activities within this distance, we recommend you contact us for further guidance prior to commencing.



Forestry

The Forest Industry Safety Accord has set out recommended safe clearances for working near power lines. The distances consist of a red zone, defined as one tree length plus a 5m Vicinity Zone (minimum 10m in total), and an amber zone, set as one tree length. If any forestry operations are planned within these zones we recommend you contact us for further guidance.



Planting

To help us keep our overhead lines clear of trees and vegetation to ensure the safety and security of the electricity supply, we strongly recommend that you do not plant anything close to our overhead lines, buried cables or substations.

Trees, hedgerows and shrubs may impede access preventing maintenance and repair of electrical infrastructure. Trees of significant size may damage overhead lines by growing into or falling on to them. Planting near our assets also increases the potential for accidents involving arboricultural workers or members of the public who could utilise it as a climbing aid. Where planting near transmission infrastructure is necessary, we advise you to carefully consider species choice to minimise the need for future tree cutting. If planning to plant within 10m of Transmission assets we advise you get in touch for further guidance.

Wind Farms

Turbines need located at sufficient distance from overhead lines such that there is no potential for line damage due to a toppling turbine or wind turbulence generated by rotors. Turbulence, also called wake effects, can induce fatigue in conductors and fittings causing premature failure. Anyone planning to erect turbines should consult us during the design stage.

Solar Farms

There are several key factors to consider when designing solar farms near high voltage assets. To maintain minimum safety clearances with overhead lines, the highest point on the solar panels must be no more than 5.3m from the lowest conductors. Careful consideration must also be given to potential damage to the solar panels from ice falling from a conductor in the winter or in the rare occurrence of failure, from a falling conductor or fitting.

Rise in earth potential around tower bases can occur during lightning storms or system faults and adversely impact nearby solar panels. Suitable earthing is required to mitigate this risk.

Vehicle access to our assets must also be maintained when planning a solar farm compound. If space is not available during maintenance tasks of our assets, then solar panels may need to be temporarily removed.

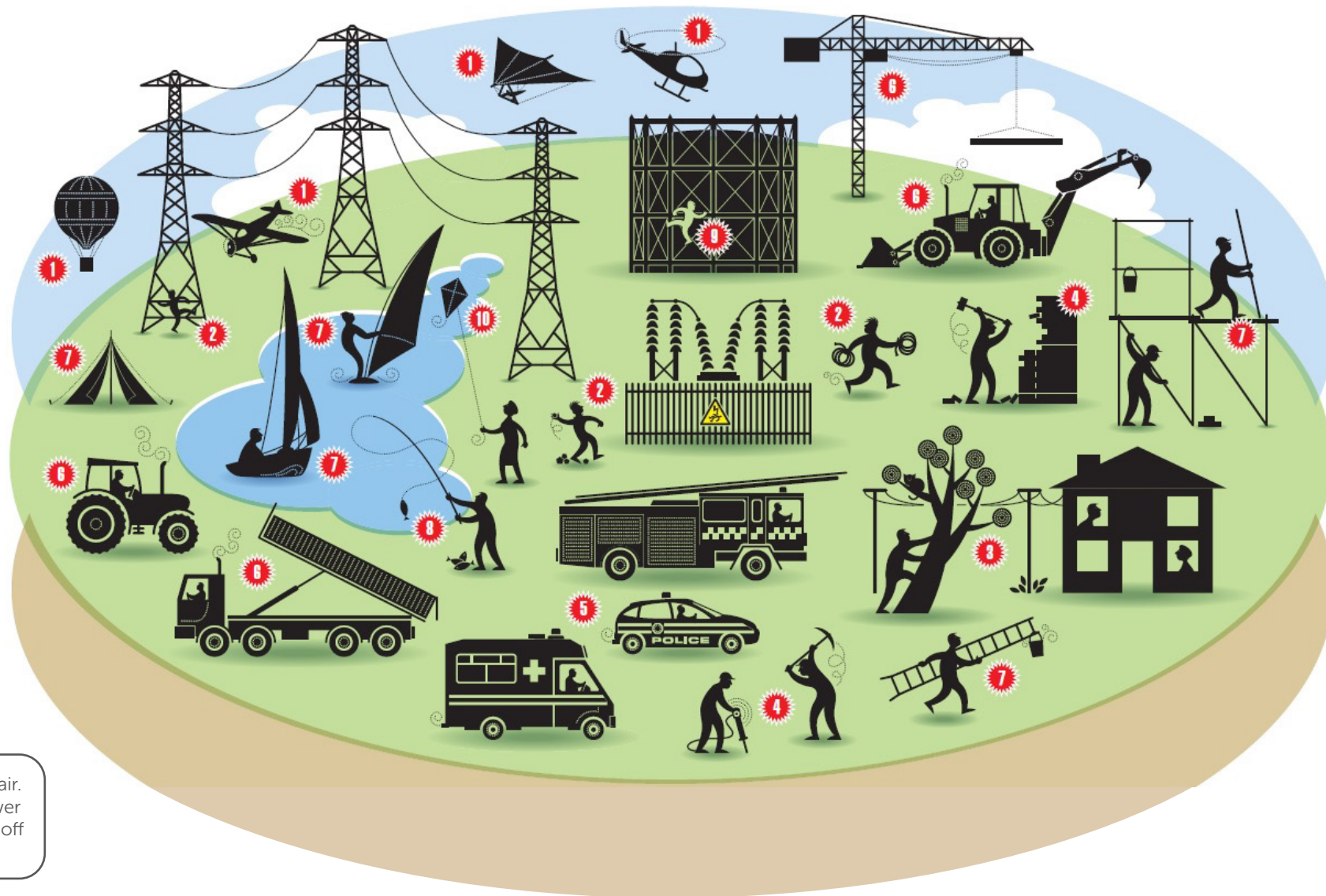
Recreation

When planning a development, you should be aware of the location of recreational areas and how these are positioned relative to overhead lines. To minimise risk, developers should avoid locating amenities under overhead lines without prior contact with us to assess the risks (for example, fishing areas, sailing lakes and play parks).

Activities enjoyed by members of the public such as fishing, camping, flying and DIY can impact safety clearances, presenting significant risks to persons who may not be able to identify the hazard.

Contractors and landowners are legally responsible for drawing attention to existing dangers presented by electrical infrastructure by erecting adequate signage.





1

Take care in the air. Be aware of power lines during take off and landing

2

Thieves and vandals are at risk of death or serious injury

3

Don't risk the danger of climbing near power lines

4

Can you dig it? Ask your local gas or electricity company first

5

Never start a rescue unless the power supply is guaranteed dead

6

When operating large machinery, look out for power lines

7

Tall objects can hit overhead lines. Make sure you keep well clear

8

Fishing? Watch out for overhead lines or you're angling for an accident

9

Trespassers climbing our structures risk death from falling

10

Look up and look out when flying a kite - overhead lines can kill

Contact Details

For enquiries relating to any works near our assets, contact the Transmission Asset Management team.

Email: Transmission.Asset.Management@sse.com

Write to: Transmission Asset Management
Grampian House
200 Dunkeld Road
Perth
PH1 3GH

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