



Be Aware of Powerlines

Transmission Powerlines and Your Safety

A Survival Guide

A community safety campaign endorsed by



Government of South Australia

Department for Transport,
Energy and Infrastructure

Introduction

ElectraNet is responsible for the safe, reliable and secure operation of South Australia's high voltage electricity transmission network.

Our network transmits electrical energy generated by power stations to bulk users of high voltage electricity, such as South Australia's electricity distributor ETSA Utilities, and the National Electricity Market.

Characteristics of ElectraNet's transmission network are large high voltage substations and high voltage transmission powerlines. These overhead powerlines (also referred to as conductors) are supported by a number of unique structure types, including steel lattice towers and several different pole designs (refer centre page of brochure).

ElectraNet's transmission network operates at mainly 132,000 and 275,000 Volts.

ElectraNet's transmission powerlines are located along corridors of privately owned and publicly owned land (referred to as transmission easements) and extend across some 200,000 square kilometres within the State.

Additional transmission easements for new overhead powerlines will be required as the demand for power increases in this State due to:

- Industry and business expansion.
- An increase in residential electrical demand for air-conditioning, etc.
- Connecting renewable energy power generators to the network.

These new powerlines will provide additional capacity to cater for State growth and provision of safe and reliable power supplies, into the future.

It is important that community members with transmission easements on their properties – as well as operators of heavy vehicles, cranes, farm machinery, light aircraft and recreational vessels – are fully conversant with appropriate safety precautions to be observed around high voltage powerlines.





Electrocution can occur without touching powerlines...

Dangers associated with working or operating near high voltage powerlines should not be under-estimated.

Even working close to powerlines, without actually touching them, can be fatal.

“Clearance” is the distance that must be maintained between a powerline and an object, to avoid the risk of a fatal electric shock.

Always be aware of the location, voltage and clearance requirements of powerlines which are close to where you and your employees/contractors are working or operating, especially at unfamiliar sites – or when working at night.

How close you can safely work or operate near powerlines depends on the powerline’s voltage and also weather conditions. The general rule is the higher the voltage, the greater the safety clearance required.

There are many types of powerlines of differing voltage and design. ElectraNet operates and manages high voltage powerlines in South Australia. ETSA Utilities operates and manages lower voltage distribution powerlines, which range from 66,000 Volts downwards, and deliver electricity to the general public. For details regarding clearance distances please refer to the centre of this brochure.

Your Survival Check List

To ensure your personal safety, please check for the location of overhead powerlines and potential electrical hazards **BEFORE**:

- Operating heavy vehicles and machinery (especially cranes, elevated work platforms, aerial applicators and harvesters);
- Transporting recreational vessels, high loads and equipment;
- Loading, fastening or unloading vehicles, especially stacking tall or long loads (such as irrigation pipes);
- Dumping materials using lift tray trucks;
- Travelling between farms; and
- Working near high voltage substations.

Please remember, **NEVER** work on top of a vehicle or its load when it is underneath or near a powerline, and never carry any metal object above waist height near powerlines.

Remember also that powerlines have the potential to sag lower in hot weather, which will reduce clearance under and beside the powerlines, and increase the risk of a clearance being breached.

Never guess at safe clearances, as appearances can be deceptive. **DO NOT** measure by touching, or by use of devices such as tape measures. If you are in any doubt about safe clearances after reading this brochure, please contact ElectraNet.



ElectraNet's Transmission Lines



P (08) 8404 7966
TOLL FREE 1800 243 853

	275,000 Volts double circuit steel tower	275,000 Volts single circuit steel tower	275,000 Volts single circuit double Stobie pole	132,000 Volts double circuit steel tower	132,000 Volts single circuit steel tower
height in metres	50	42	22	42	35
Voltage:	275,000 Volts	275,000 Volts	275,000 Volts	132,000 Volts	132,000 Volts
No. Circuits:	double circuit	single circuit	single circuit	double circuit	single circuit
Structure Type:	steel tower	steel tower	double Stobie pole	steel tower	steel tower
⁽¹⁾ Minimum safe clearance from a conductor for a person working and/or anything extended towards the powerline*:	6m	6m	6m	5m	5m
^{(1) (a)} Minimum safe clearance from conductor to top of vehicle (including anything extended towards the powerline) for general land use:	Vertical 3.2m Horizontal 4.6m	Vertical 3.2m Horizontal 4.6m	Vertical 3.2m Horizontal 4.6m	Vertical 2.4m Horizontal 1.5m	Vertical 2.4m Horizontal 1.5m
Standard easement width:	50m	50m	50m	40m	40m

⁽¹⁾ South Australian Electricity (General) Regulations 1997 * ie using power/hand operated tools
^(a) Refer More about Safe Clearances - General Land Use

ETSA Utilities' Distribution Lines

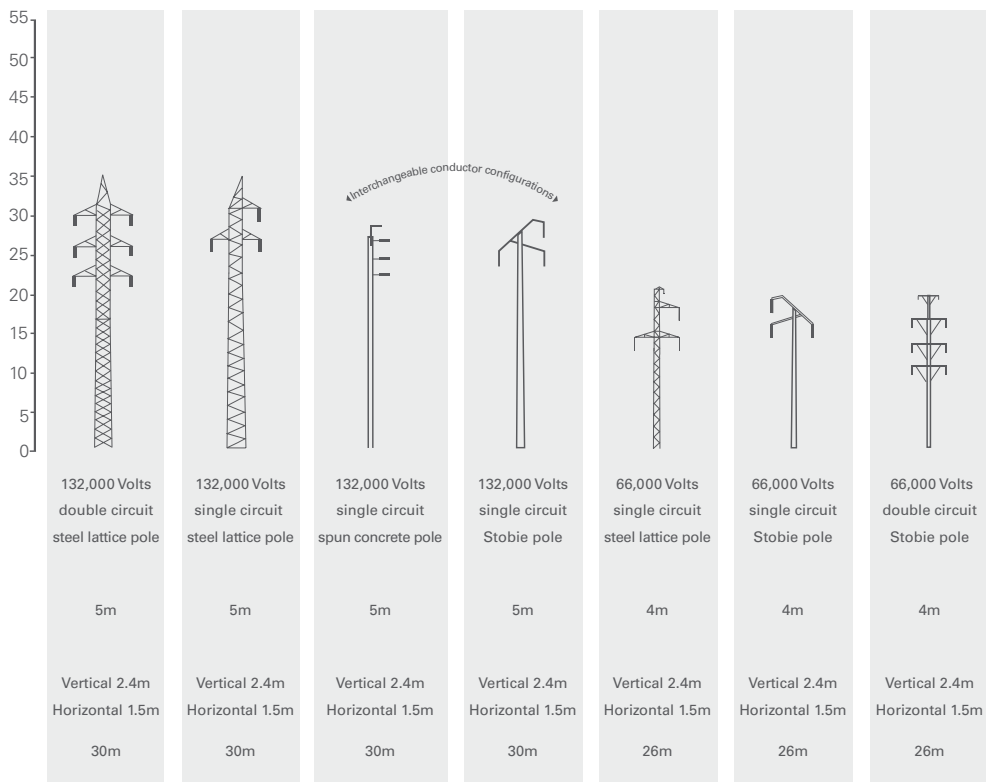


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Office of the Technical Regulator
P (08) 8226 5500

	66,000 Volts	33,000 Volts	19,000 Volts SWER	11,000 Volts	415 Volts
height in metres	20	16	13	11	9
Voltage:	66,000 Volts	33,000 Volts	19,000 Volts SWER	11,000 Volts	415 Volts
Minimum safe clearance from conductor for a person with nothing extended towards the powerline:	4m	3m	3m	2m	1m
Minimum safe clearance from conductor for a vehicle:	Vertical 2.4m Horizontal 1.5m	Vertical 2.4m Horizontal 1.5m	Vertical 2.4m Horizontal 1.5m	Vertical 2.4m Horizontal 1.5m	Vertical 0.33m Horizontal 0.33m





Identifying Powerline Voltages

It is critical to find out what voltage powerline(s) cross your property, place of work, or travel destination – and to identify potential hazards associated with your current work or recreational activities.

Safe clearance distances are calculated from the highest point of your person (including any object extensions) or vehicle, to the lowest powerline/conductor strand (as shown in the illustration on the next page).

Please contact ElectraNet if you are in any doubt at all about safe operating distances near transmission powerlines. You may also contact the Office of the Technical Regulator concerning clearances for ETSA Utilities’ distribution powerlines.

It is also important that you report powerlines of any voltage that appear to be too close to the ground – or if you are aware of changed circumstances (raised ground, buildings constructed, etc).



ElectraNet - At Your Service

Contacting **ANY** powerline with **ANY** object is extremely dangerous and potentially fatal. This includes contact with machinery or vessels, or even their extensions such as grain chutes, aerials, or flags on mastheads. It is also important to remember that you must never carry any metal object above waist height near powerlines. Serious personal injury and/or death, and property damage can occur.

Even working close to powerlines, without actually touching them, can be fatal. This is especially important to remember when working in adverse weather conditions such as storms, where lightning strikes may cause voltage surges.

For any work that has the potential to breach safe clearance distances to high voltage powerlines, a vital element of your safety procedure must be to inform ElectraNet's System Monitoring and Switching Centre in advance. ElectraNet will negotiate special arrangements to ensure your safety and that of your employees. ElectraNet's toll free line operates during business hours for this purpose. If you are unsure if your work or operations will breach safe clearance distances, please contact us.

Always assume that every powerline is energised or 'live'.

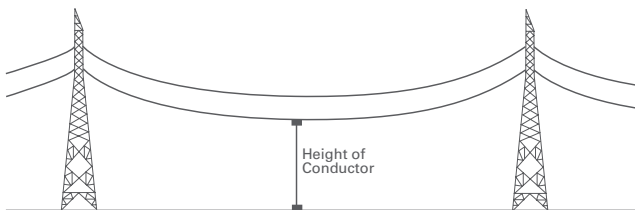
More about Safe Clearances

(a) General Land Use

Never work on top of a vehicle or its load, or any recreational vessels, either underneath or near a powerline – as you may inadvertently reduce safe clearance levels, resulting in electrocution.

Remember that a new piece of equipment may be higher and present risks that an older one did not.

Remember also that powerlines have the potential to sag lower in hot weather which will reduce clearance both under and beside the powerlines.



As a guide, the measurement between a 132,000 Volt powerline (conductor) operating at maximum capacity in extreme weather - and the ground - is 6.7m.⁽¹⁾

(b) Road Traffic Act

As a guide for arterial or major roads, the height of the conductor is 9m, under normal operating conditions.

Keep in mind too that modern machinery, shipping containers and recreational vessels are becoming increasingly larger. Safe working clearances are prescribed by law, depending on the type of activity being carried out. Road traffic rules stipulate a 4.6m safety height limit for vehicles, which includes items such as whip aerials, grain chutes and other vehicle extensions.

⁽¹⁾ South Australian Electricity (General) Regulations 1997





As required under the Road Traffic Act, if your vehicle or an employee's vehicle exceeds 4.6m when fully extended, or when it is absolutely necessary for people to work near powerlines, and/or on top of a vehicle you **MUST**:

- (i) obtain the necessary exemptions from the Road Transport Authority; and
- (ii) contact ElectraNet for advice **BEFORE** you start work, to ensure the potential for electrocution is removed.

We cannot stress enough the importance of adopting appropriate safety precautions when operating and working around powerlines.

As ElectraNet transmits power over long distances and to remote areas, high voltage powerlines are commonplace in rural areas and farming districts. Whilst this brochure details safe clearances for farm machinery, the landowner or occupier may also contract pilots of low flying aerial applicators. Landowners and occupiers who employ aerial application services have a duty of care to provide pilots with a comprehensive map of the treatment area and property, which includes details of any powerline hazards. All powerlines on your property and within the treatment area must be displayed on the map. Powerline voltage must also be noted. This essential information will assist pilots with their risk assessments for the job and in formulating a safe flight/work plan. The Aerial Application Pilots' Manual, published jointly by the Aerial Agricultural Association and the Civil Aviation Safety Authority describes safety procedures for pilots of light aircraft working around powerlines.

ElectraNet also has a small number of overhead high voltage transmission lines that cross South Australian rivers and harbours. Recreational and professional sailors should research the existence of overhead powerlines prior to transporting and sailing their recreational vessels, and dismantle masts where applicable. Skippers of motorised vessels with large aerials and other protrusions should also be mindful of overhead powerlines. The 4.6m safety height limit applies when transporting boats on roads and into marinas, and when manoeuvring on boat ramps. Sailors must be conversant with the highest astrological tide and the Australian height datum in ascertaining safe clearance distances.

Please remember that clearances **MUST NOT** be breached by any person or object due to the very high potential for electrocution.

Your Easement Responsibilities

Landowners and occupiers must be aware that raising ground levels underneath powerlines in order to gain a flat surface, will further reduce safe clearance distances. This activity is prohibited by law.

The construction of any permanent structure including but not limited to sheds, silos, swimming pools, haystacks or loading bays near powerlines is also **PROHIBITED**. Further information on easement responsibilities for landowners and occupiers – including vegetation management and building clearance restrictions – is available from ElectraNet in either hard copy or online from our website.



Emergency Instructions

If the vehicle you are operating contacts a powerline, **REMAIN IN THE VEHICLE** until the power is switched off **AND DO NOT MOVE AROUND EXCESSIVELY** (use a mobile phone if available).

It may however be necessary to leave your vehicle, **ONLY IF**:

- You are personally in danger of direct contact with the powerline;
- A fire starts; or
- It is unlikely that anyone else will know of your situation.

If it is absolutely necessary to leave your vehicle due to the above scenarios, **THE FOLLOWING PRECAUTIONS MUST BE OBSERVED**:

- Do not climb on top of the vehicle;
- When leaving your vehicle, **DO NOT** touch both the vehicle and ground at the same time;
- **JUMP** off the vehicle so that no part of your body (eg a hand) is still touching the vehicle when any part of your body (eg a foot) touches the ground;
- **LAND ON YOUR FEET WITHOUT TOUCHING THE GROUND WITH YOUR HANDS**;
- Calmly **WALK AWAY** from the vehicle with **SMALL STEPS**; and
- Once you leave the vehicle **DO NOT** return.

Keep others away from the vehicle. Bystanders should not approach or touch the vehicle or anyone on it, unless they are absolutely certain the power has been switched off.

Emergency Services (000) should be advised of the incident as soon as possible.



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