An introduction to working near Vector's overhead electricity network

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1. Overview

This document is for anyone planning, managing or carrying out work or planning buildings in the Auckland region. It presents guidance around what to check before beginning work, when to seek professional advice, and when to contact Vector about a Close Approach Consent for work near overhead electrical assets.

It focuses primarily on overhead electrical distribution equipment on Vector's network in Auckland and the safe distance requirements for working near it under the New Zealand Electrical Code of Practice for Electrical Safe Distances (**ECP34**).

ECP34 is the safety code that specifies the legal safe distances that people, buildings, structures, mobile plant and equipment must maintain while working near powerlines and associated equipment like poles. You are required to comply with it. It is enforced as law.

This is important because live electrical assets are an obvious safety risk. Therefore, the aim of this document is to contribute to public safety near those assets.

1.1 You always need to get your own professional advice

Vector has taken reasonable care to make sure this document is as accurate as possible. But it is an introduction to the subject of working near Vector's overhead electricity network and is guidance only. The information contained in this document is generalised and may not cover your specific site, plans or circumstances.

You, and not Vector, are responsible for meeting your obligations (including the requirements of ECP34) when working near Vector's electricity assets. You are responsible for the work (including its consequences) that you choose to do near Vector's existing electrical assets.

So before working near Vector's electricity assets, we strongly suggest you seek advice from a suitably qualified professional.

1.2 Document date

This document was published in November 2026. Its contents are up to date as at early October 2026. However, this document is not about the environment law requirements under the Resource Management (National Environmental Standards for Electricity Network Activities) Regulations 2026, which integrates requirements to comply with ECP34 as part of the resource consent process. Queries about the resource consenting processes should be directed to the relevant consenting body.

2. Electricity Distribution Assets

In this document, we will be focusing on Vector's overhead (i.e. above-ground) electricity distribution network assets. Our overhead assets include poles, powerlines, stay wires and other pole supports.

Vector also has extensive underground network assets too. Those assets are not the focus of this document. For information on how to identify and work safely with our underground network assets, please visit our website. In some situations, you may need to contact Vector before starting works.

If your work is near Transpower's equipment, you are encouraged to contact Transpower for advice before starting works. In some situations, you may also have underground assets belonging to other electricity operators (e.g. embedded network owners) on your property. You may also need to contact those operators for guidance on their assets.

In some locations, especially areas with dense vegetation, Vector's powerlines and other electrical assets such as transformers can be difficult to see. Vector's interactive map can help identify locations where safe distances may need to be checked. This is particularly important for matters relating to Section 3 of ECP34 (i.e. buildings/structures near powerlines). The map can be found here.

The rest of this document provides guidance around the requirements of ECP34, when you should contact Vector, and what steps to take.



Important: The requirements specified under ECP34 exist to protect people from serious risk of harm/death.

3. ECP34's Requirements and Working Near Distribution Assets

ECP34 sets limits on how close people, structures, mobile plant etc can be to powerlines and supporting structures (e.g. poles). The limits that it sets are mandatory and enforceable under the Electricity Act 1992 and the Electricity (Safety) Regulations 2010. Vector cannot exempt anyone from the requirements of ECP34.

If work is planned near distribution assets like overhead powerlines, then the operating voltage of the lines will in almost all cases be important in determining the required safe distances. Vector intends to shortly publish a website that will make available details of line voltages – we will update stakeholders and the community as soon as details are available.

Once the operating voltage is known, ECP34 provides guidance on whether Vector's consent is required for any work being carried out near its network. ECP34 defines two main categories of safe distance:

- **Default safe distances**: the default safe distances apply if you do not have Vector's consent. They indicate how far away from power lines you must stay when carrying out work. If the planned work will be within these distances, you must obtain a Close Approach Consent from Vector.
- **Minimum safe distances**: No work, plant or persons can be closer to Vector's assets than these distances. Vector cannot approve work within them.

  ECP34 provides minimum safe distances for every type of work. These can in some cases depend upon the span length and voltage of the conductor.

Before working near Vector's electricity assets, we recommend you seek advice from a suitably qualified professional and ensure the work meets all applicable legal and safety requirements, including ECP34.



You are responsible for the work (including its consequences) that you choose to carry out near Vector's existing electricity assets.

4. Close Approach Consent

If work is proposed within the default safe distances, then ECP34 requires that the person proposing this work first apply for and receive Vector's consent for that work in writing. That consent is called a Close Approach Consent (CAC).

A CAC allows the applicant to work within the default safe distances, but only if the minimum safe distances set by ECP34 are still met and the work can be carried out safely.

When reviewing a CAC application, Vector assesses whether the proposed work can be carried out safely around its electricity assets, so far as is reasonably practicable. Before granting consent, Vector must be satisfied that the applicant understands the risks, will comply with ECP34 and Vector's requirements, and will ensure everyone working near live electrical assets is competent, informed, and able to work safely.

Building or property owners and/or contractors are responsible for applying for a CAC before work begins if the work will be within ECP34's default safe distances.

5. Work permitted without a Close Approach Consent

Sections 2, 3, 4, 5 and 9 of ECP34 set out the default safe distances that apply to work near poles/pole supports etc, the construction of buildings/structures, the use of mobile plant, and people working near live powerlines. These are discussed with supporting diagrams in this section. The diagrams we have provided are a visual guide to introduce the requirements to you. But they are a guide only and you are responsible for ensuring that you comply with ECP34's requirements.

Work can go ahead without a CAC if all applicable default safe distances are met at the same time. If any part of your work cannot meet a safe distance requirement, then a CAC will be required.

5.1 Excavation near poles, towers and pole supports – Section 2.2 of ECP34

ECP34 Section 2.2 sets the safe distances for excavation near overhead line supports, including poles, stay wires, stay anchors, pylons and towers.

Important: Presence of overhead powerlines and poles does not mean there are no underground cables or ground-mounted equipment present. BeforeUDig plans should be obtained and safe digging practices used for any excavation works.

5.1.1 The default safe distances for power poles and stay wires/anchors are:

- More than 5 metres from the pole or stay wire/anchor.
- More than 2.2 metres from the pole or stay wire/anchor and excavation of less than 750mm in depth.
- Less than 2.2 metres from the pole or stay wire/anchor and excavation of less than 300mm in depth.

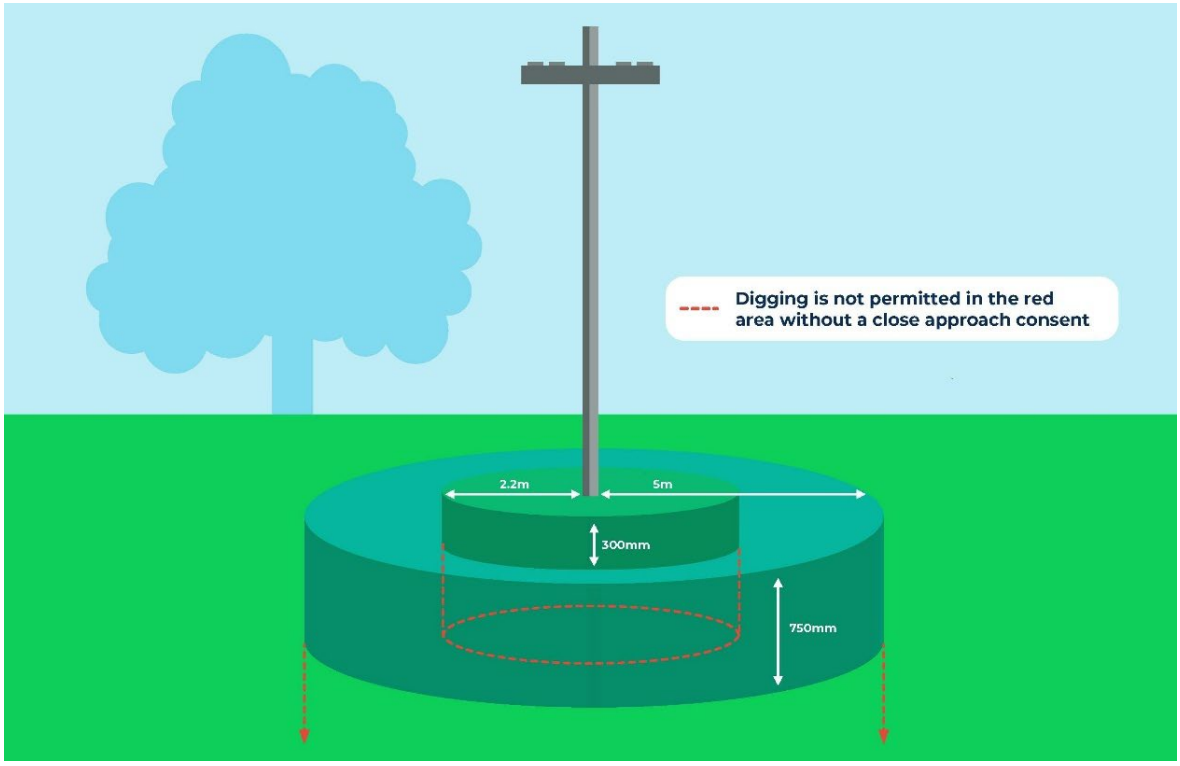


Diagram 1 – Showing the areas around a power pole where excavation is permitted vs where a CAC is required.

5.1.2 The safe distances for towers and pylons are:

- More than 12 metres from the tower or pylon.
- More than 6 metres from the tower or pylon and excavation of less than 3 metres in depth.
- Less than 6 metres from the tower or pylon and excavation of less than 300mm in depth.

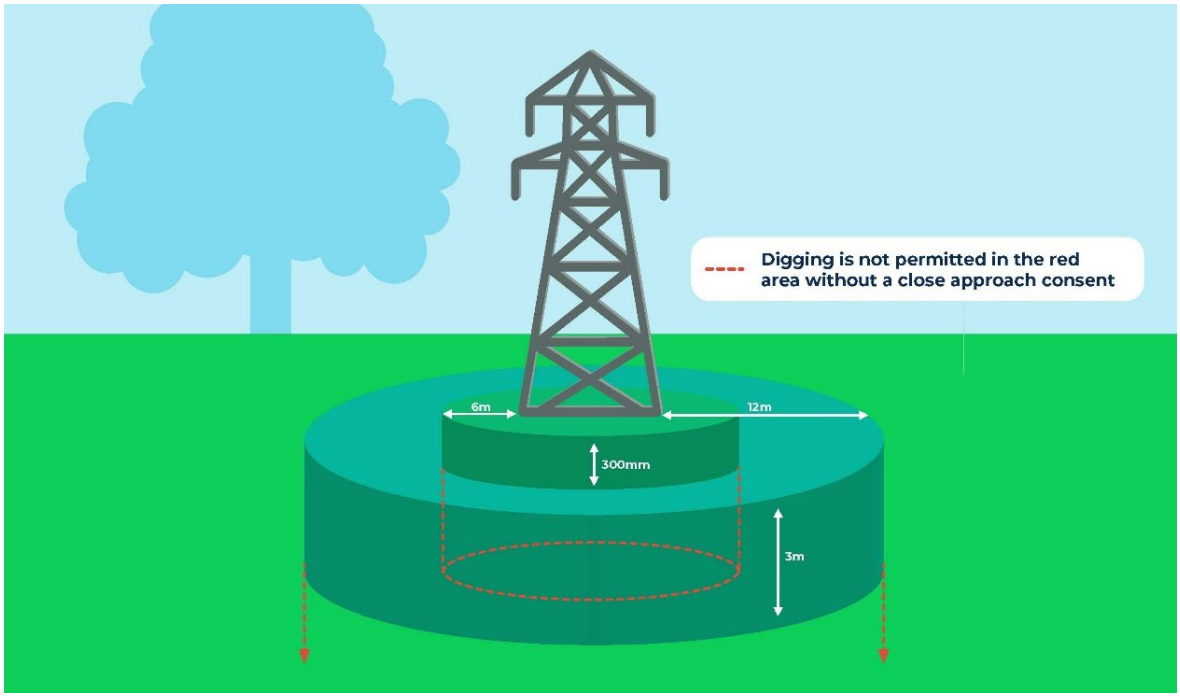


Diagram 2 – Showing the areas around a tower or pylon where excavation is permitted vs where a CAC is required.

5.2 Conductive fences near poles and towers – Section 2.3 of ECP34

A conductive fence is any fence that could conduct electricity. These fences are usually made of metal, but some fencing that appears to be non-conductive or insulated may still contain hidden metal parts. Conductive fences can carry dangerous electrical voltages if they are too close to electricity assets. This can create a serious risk of fire, electric shock or death, either near the line support or further along the fence.

Conductive fences must not be attached to any tower, concrete or other conductive pole.

5.2.1 For Vector's network, conductive fences must be kept at least:

- 2.2 metres from poles or towers supporting 11kV, 22kV or 33kV lines
- 5 metres from poles or towers supporting 110kV or higher lines.

5.3 New structures near poles, towers and pole supports – Section 2.4 of ECP34

ECP34 Section 2.4 sets default safe distances for new structures near overhead line supports. These distances should be considered alongside Section 2.2 and Section 3.

For Vector's network, all new structures must maintain at least

- 2 meters from 11kV and 33kV poles
- 6 meters from 11kV and 33kV poles
- 8 meters from 110kV poles
- 12 meters from 110kV towers

5.4 Buildings and Structures near powerlines – Section 3

ECP34 Section 3, Table 2 sets out the default safe distances for buildings and structures near powerlines. A 'structure' has a broad meaning and includes new buildings, extensions, awnings, verandas, canopies, decks, balconies, handrails, scaffolds, traffic lights, streetlights, signage, antennas and similar items.

If a proposed structure will be near powerlines then you must consider the default safe distances in Table 2. The following steps will support compliance with ECP34:

1. If there are powerlines near your proposed work site, contact Vector to confirm the voltage, span length and default safe distances (based on Table 2).
2. Determine whether the proposed structure will be further away from the powerlines than the default safe distances in Table 2.
    a. If the proposed structure will be further away than the default safe distances, construction may proceed (assuming all other applicable safe distance requirements of ECP34, including as they relate to people who may be working on that structure, are met too).
    b. If the proposed structure will be closer than the default safe distances, construction cannot proceed yet. ECP34 Section 3.2.1.3 requires that an engineering assessment be carried out to confirm if the proposed structure can comply with the minimum safe distances of Table 3 after considering the movement of the powerlines.

If you are not sure how far your structure will be from Vector's lines, or you think that you may be close to the default safe distances, then Vector strongly recommends that you engage a qualified professional to help you accurately work out the distance. It is your responsibility to comply with ECP34's requirements.

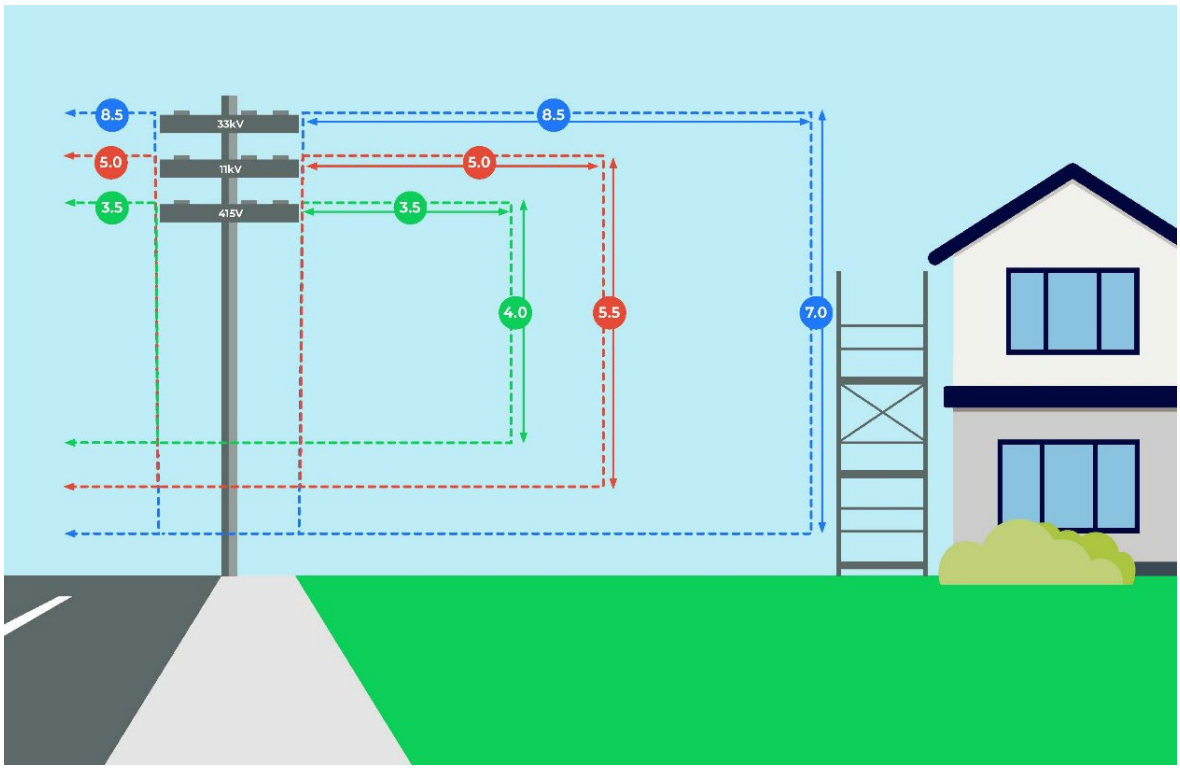


Diagram 3 – Showing some of the distances of Table 2 and how they apply.

Important: The distances in Diagram 3 are a guide only and must be checked against the actual site conditions and Table 2. Powerlines can move because of wind, temperature changes, ground movement and differences in ground level between poles. If your site has uneven ground, unusual powerline conditions, or you are unsure whether the safe distances can be met, please seek professional advice.

5.4.1 Taking measurements near Vector assets

When taking measurements, always treat powerlines as live. Never measure a power line by touching it.

It is possible to estimate horizontal distances from powerlines yourself. An example of how to complete a contactless, horizontal measurement estimate is showing in Image 1 below.



Image 1 – Showing an example of how to measure horizontal distances from powerlines.

However, Vector recommends that distances to powerlines are calculated by a professional using contactless measuring devices (e.g. laser measurement tools).

You are responsible for accurately establishing the distances between your structures and our existing lines.

5.5 Ground Clearances – ECP34 Section 4

ECP34 Section 4 sets the safe distances requirements between powerlines and the ground. Materials must not be placed under powerlines in such a way that ground clearances would become less than those specific in ECP34 Table 4.

If the proposed works may reduce ground clearances below the required safe distances, as shown in Diagram 4, contact Vector before proceeding.

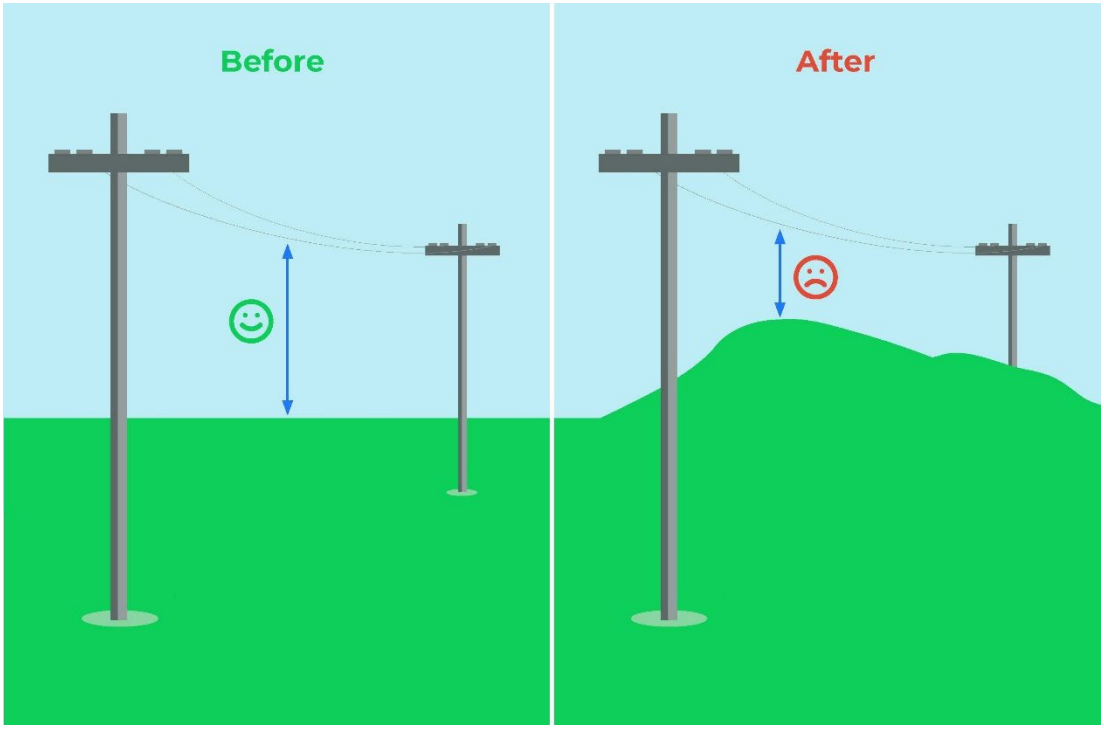


Diagram 4 – Showing that ground clearances beneath powerlines must not be reduced without approval from Vector.

5.6 Mobile Plant near powerlines – ECP34 Section 5

ECP34 Section 5 specifies that mobile plant must stay at least 4 metres away from powerlines in every direction. Mobile plant includes diggers, cranes, forklifts, scissor lifts, elevated work platforms, HIABs, drilling rigs and tree-trimming equipment.

This distance applies to the full reach of the plant, including any boom, arm, load or attachment. Please take extra care if this work takes place on uneven ground.

If mobile plant cannot stay at least 4 metres from powerlines, a CAC will be required. Mobile plant is not permitted to operate directly above the powerlines except in exceptional circumstances and with Vector approval.

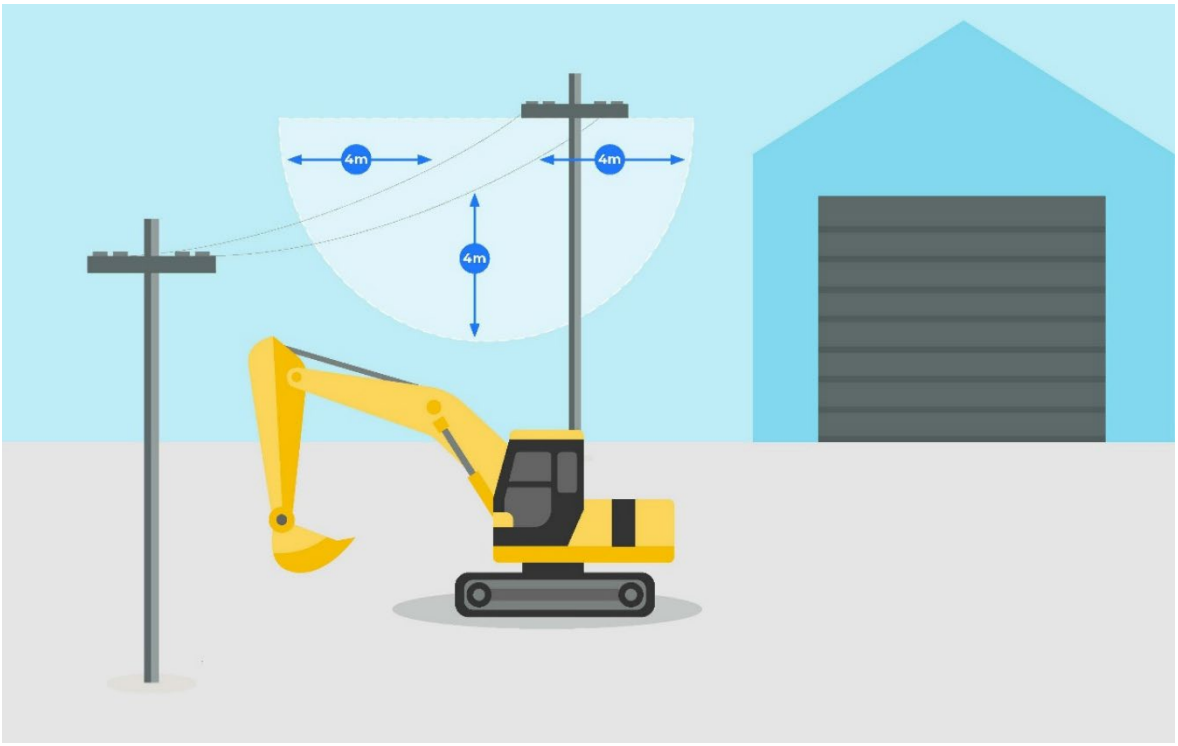


Diagram 5 – Showing that mobile plant must maintain a 4-metre radial distance from all powerlines.

5.7 People near powerlines – ECP34 Section 9

ECP34 Section 5 specifies that people must stay at least 4 metres away, in every direction, from exposed live parts. Exposed live parts include more than powerlines; these can also include transformer droppers, switchgear, lightning arrestors and other parts of the network that may not be obvious to people who are not electrically qualified.

This distance applies to the full reach of a person and includes anything a person is carrying, attached to, or connected with.

For safety of persons, Vector does not typically permit persons to work directly above any powerlines. If works must take place directly above powerlines, please contact us first.

Powerlines must be treated as live unless Vector confirms otherwise in writing.

If people cannot stay at least 4 metres from exposed live parts, a CAC will be required.

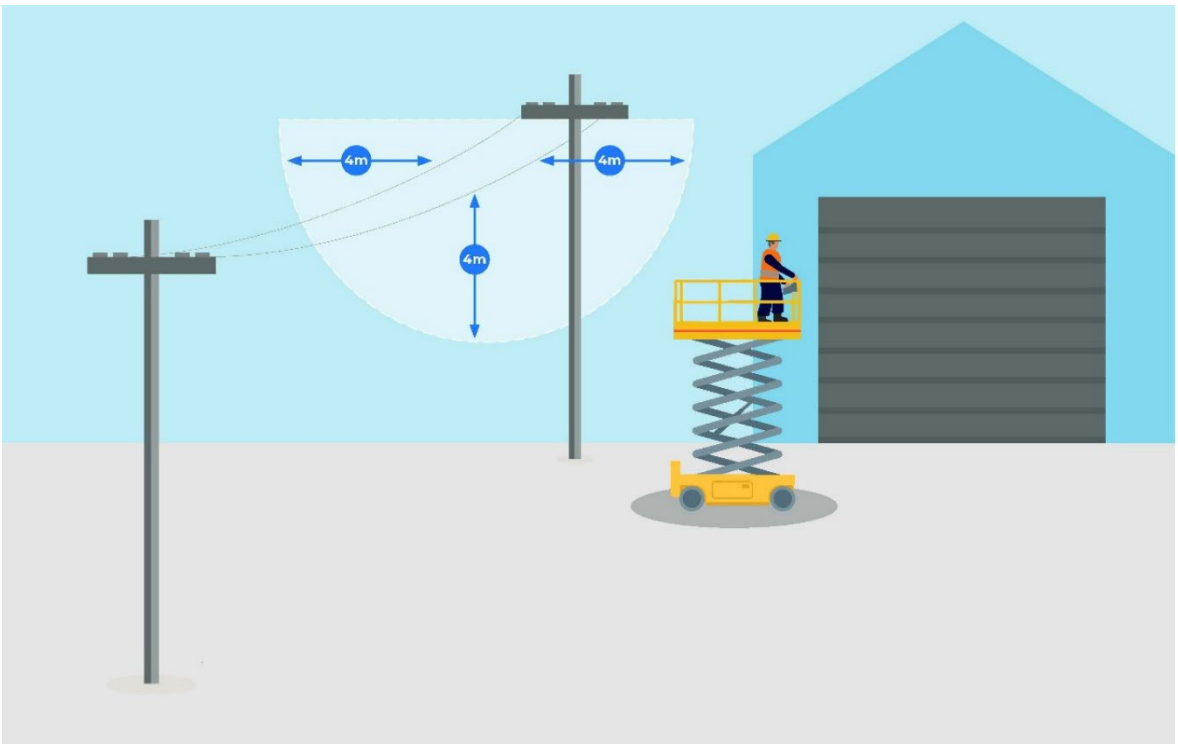


Diagram 6 – Showing that people must maintain a 4-metre radial distance to the side of and beneath all powerlines.

6. Works Requiring Close Approach Consents

If your work cannot meet the default safe distances in ECP34, then you will need a CAC from Vector before work can begin.

A CAC allows you to work within the default safe distances, but only if the minimum safe distances are still met and the work can be carried out safely.

Vector reviews CAC applications as a reasonable and prudent network operator. It will not unreasonably withhold its consent where it has received clear information on the proposed work and is satisfied that the work can be safely undertaken. Vector may have questions for you about the work that you propose or ask you for additional information. Applicants must allow enough time for Vector to assess the request.

6.1 When could a Close Approach Consent be required?

The flowchart on the following page gives an overview of when a CAC may be required. Consent for more than one type of work activity may be required (e.g. constructing a building within default safe distances and having persons working within the same), depending on the work and the assets involved.

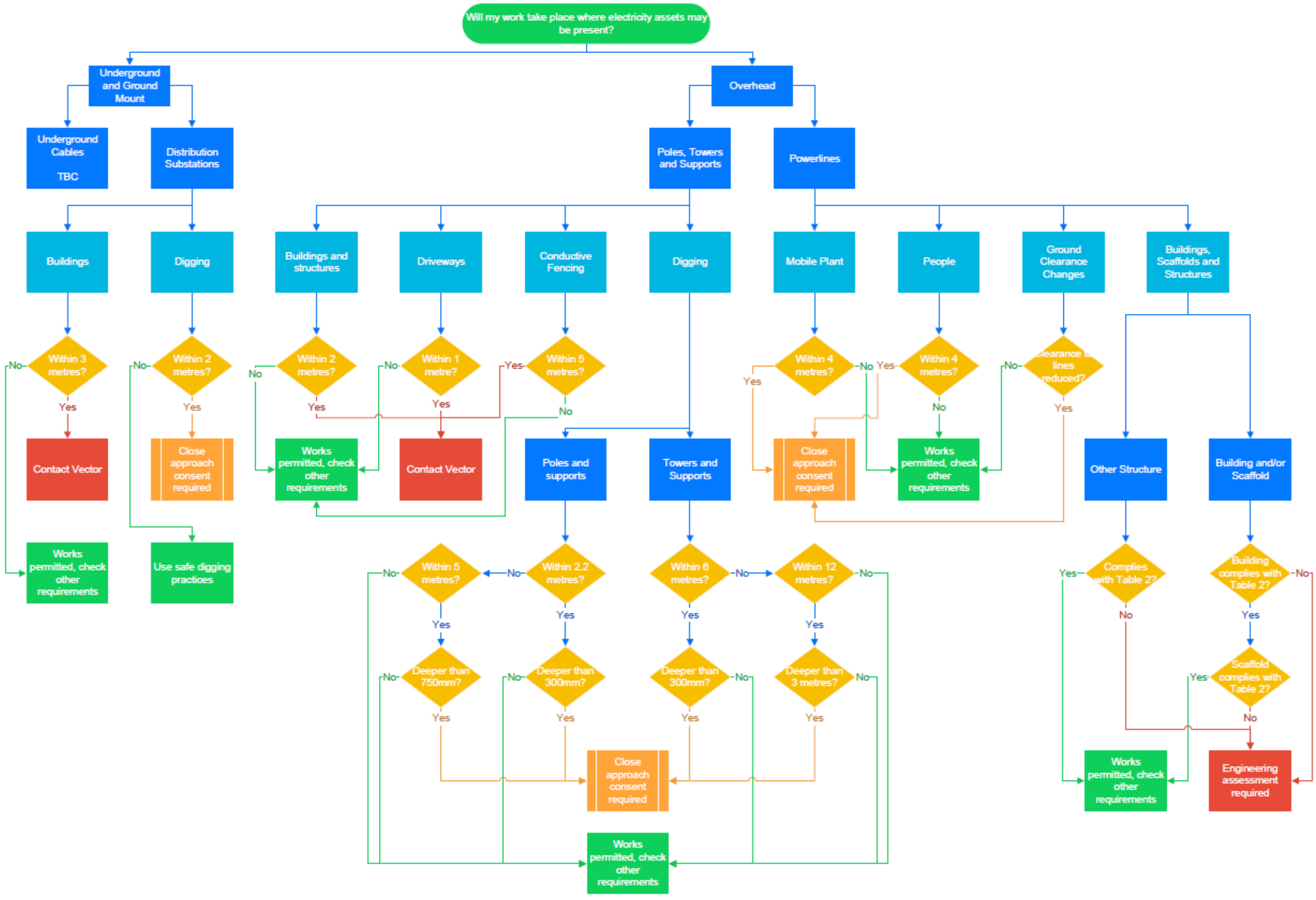
If work needs a CAC now, future maintenance may also need one. We recommend that you consider this when planning the work or location of a structure.

Further details on what needs to be considered for each type of CAC can be found in the relevant sections of this document.

6.2 Timeframes for Close Approach Consents

CAC assessment timeframes vary depending on the complexity of the work, the type of work, the safety risks involved and the information provided with the initial request. Some requests may be processed within two business days, while more complex requests can take several months. In all cases, worker and public safety is Vector's priority.

If your work is urgent, tell Vector what needs to happen and when, so we can consider whether there are safe options to support the work. Note, though, that Vector does not consider the construction of a new buildings / structures to be "urgent" work, as these activities can (and should) be planned in advance to comply with all safety requirements.


Will my work take place where electricity assets may be present?
Underground and Ground Mount
Overhead
Underground Cables
TBC
Distribution Substations
Poles, Towers and Supports
Powerlines
Buildings
Digging
Buildings and structures
Driveways
Conductive Fencing
Digging
Mobile Plant
People
Ground Clearance Changes
Buildings, Scaffolds and Structures
Within 3 metres?
Within 2 metres?
Within 2 metres?
Within 1 metre?
Within 5 metres?
Within 4 metres?
Within 4 metres?
Clearance to lines reduced?
Contact Vector
Close approach consent required
Works permitted, check other requirements
Contact Vector
Poles and supports
Towers and Supports
Close approach consent required
Works permitted, check other requirements
Other Structure
Building and/or Scaffold
Works permitted, check other requirements
Use safe digging practices
Within 5 metres?
Within 2.2 metres?
Within 6 metres?
Within 12 metres?
Complies with Table 2?
Building complies with Table 2?
Deeper than 750mm?
Deeper than 300mm?
Deeper than 300mm?
Deeper than 3 metres?
Scaffold complies with Table 2?
Close approach consent required
Works permitted, check other requirements
Works permitted, check other requirements
Engineering assessment required
Yes
No

7. Requirements for Close Approach Consents

These sections summarise the information Vector may need to assess CAC requests for different types of work.

7.1 Excavation near overhead electric line supports – ECP34 Section 2

To consider an application to excavate near overhead electric line supports, the following information must be provided to Vector:

- Proximity of total excavation area to pole
- Type of equipment proposed to be used for excavation
- Total depth of excavation area
- Total width and length of excavation area
- Length of time excavated area will be open
- Details of proposed temporary and permanent retaining structures
- What mitigation steps will be put in place if extreme weather affects the work site

Vector uses this information to assess whether the work can proceed safely, whether extra controls are needed, or whether permission cannot be granted.

7.2 Conductive fencing near overhead electric line supports – ECP34 Section 2

To consider an application to install a conductive fence near an overhead electric line support, the following information must be provided to Vector:

- Height of fence
- Length of fence and details of fence route and end point
- Proximity of fence to overhead electric line support
- Material of fence

Vector uses this information to assess whether the fence can be installed safely, whether changes or extra controls are needed, or whether permission cannot be granted.

7.3 Reducing Powerline Ground Clearances – ECP34 Section 4

To consider an application to reduce powerline ground clearances, the following information must be provided to Vector:

- Current ground level
- Proposed final or temporary ground level
- Full extent of ground level changes beneath the powerlines
- Type of equipment proposed to be used for works
- Consideration has been given to the effect on mobile plant working on the site

This information will be used to determine if works can proceed as planned or if additional information or network changes are required.

In some cases, Vector may need a powerline movement engineer to assess ground clearances under hot sag conditions. Providing this information helps Vector assess the application but does not guarantee consent.

7.4 Structures near powerlines – ECP34 Section 3

If the distances in ECP34 Table 2 cannot be maintained, an engineering assessment, also called a conductor movement report, is required.

Further details on this process and specific considerations for Section 3 of ECP34 are discussed in Section 9 of this document.

7.5 Mobile plant near powerlines – ECP34 Section 5

To consider an application to use mobile plant within 4 metres of powerlines, the following information must be provided to Vector:

- Health and safety documentation that identifies and controls risks for works near powerlines
- Work method statement
- Evidence of a conspicuous warning label, as required by Section 5.6.1.

ECP34 Section 5.6.1 requires that any mobile plant likely to be used within 4 metres of powerlines must have a conspicuous warning label that states: "WARNING, KEEP CLEAR OF POWERLINES".

Mobile plant operators must consider ground conditions. Uneven or soft ground can cause booms or elevated parts to move unexpectedly and contact live equipment. Examples of work that may bring mobile plant within 4 metres of powerlines include:

- Materials being unloaded from trucks, including tip trucks with raised decks
- Diggers being used for nearby earthworks
- Concrete vehicles
- Boom arms of various vehicles

7.6 People near powerlines – ECP34 Section 9

To consider an application for a person to work within 4 metres of powerlines, the following information must be provided to Vector:

- Health and safety documentation that identifies and controls risks for works near powerlines
- Work method statement

7.6.1 Competent and experienced vs non-competent workers

On Vector's network, an electrically competent and experienced person is someone with the required competencies and authority to work on the network.

Workers on private construction projects are generally not considered electrically competent, so the minimum safe distances in Table 9 apply.

Minimum safe distances are absolute minimums. Vector may still refuse consent if there are safety concerns.

7.6.2 Further safety observations

A consent for a structure or mobile plant to operate within reduced safe distances does not automatically give consent for a person to work or be within those same distances.

For example, a scaffold may be permitted to be constructed within 3.5 metres of 415-volt powerlines, but this does not automatically give consent for the workers who will be on the scaffold to work within 4 metres of the powerlines.

It must be made clear to the CAC issuer how close a person may come to the powerlines during the proposed work. This assessment needs to include anything likely to be held, moved or used during the proposed work. For example, if a person could be holding a length of pipe, the length of the pipe

must be included in the assessment. The CAC issuer may impose specific distance limits or controls for different aspects of the work.

It's important to realise that exposed live electrical parts may not be obvious to untrained people. While the line itself is obvious, exposed live electrical parts may include lightning arrestors, droppers to transformers, fuse bases mounted below the line, exposed transformer bushings or cable termination bushings.



Important: Regardless of the perceived covering on a powerline, all powerlines must be assumed to be live unless written confirmation has been provided by the powerline owner.

8. Required Information for ECP34 Section 3 'Conductor Movement Reports'

This section is for developers appointing professional engineers to prepare ECP34 Section 3 engineering assessments for placing buildings/structures near Vector's electricity assets.

8.1 General

8.1.1 Engineer's Responsibilities

Vector relies on the accuracy of engineering assessments. The submitting engineer is responsible for the completeness and accuracy of the information provided.

8.1.2 Assumptions, limitations and supporting data

Engineering assessments must clearly state assumptions, modelling limitations, measurement uncertainties, and the data sources used. All inputs listed in appendix 1 must be available for Vector to review on request.

8.1.3 Audit and Right to Request Information

Vector may audit submissions and request supporting data, calculations or modelling outputs. Assessments that do not meet Vector's requirements may be rejected or require re-working.

8.1.4 Validity of Assessment

Assessments are only valid for the site conditions, structures and network configuration assessed at the time. If these change, the assessment may no longer be valid.

For this reason, Vector will not accept reports more than 12 months old because assets or site conditions may have changed.

8.2 Modelling Techniques

LiDAR or Total Station surveys usually provide the clearest spatial information about powerlines and structures. Any other survey method must be clearly explained in the report.

For sites with marginal clearances, engineers should consider more detailed surveying and/or apply an appropriate safety margin.

8.3 Engineering Calculation Components

AS/NZS 7000 is a standard that specifies the general requirements for the design and construction of new overhead lines.

While not explicitly used for conductor movement reports, AS/NZS 7000 contains details and methods for completing various calculations required for conductor movement reports. Each method and calculation has specific input requirements that should be considered.

The sag of powerlines is a critical component of conductor movement reports. The recommended method for surveying and calculating the sag of powerlines is the Tangent Method from AS/NZS 7000.

8.4 Vector-required Modelling Conditions

In any modelling situation, certain assumptions must be made. Vector, as the electrical asset owner, has determined that the following should operate as conditional assumptions:

8.4.1 Hot Sag

- Maximum design temperature for Bare, PVC and CCT powerlines: 75°C
- Maximum design temperature for LV ABC powerlines: 80°C

8.4.2 Wind Impact

- Temperature coincident with maximum wind[1]: 15°C
- Everyday temperature[2]: 15°C
- Blowout temperature[3]: 25°C
- Maximum wind speed[4]: 120km/h

Notes:

1. As per AS.NZS 7000:2010 section 7.2.6
2. Temperature for sustained loading
3. Checking horizontal line displacement (powerline blowout)
4. Depending on local site data, the maximum wind speed modelling requirement may be increased

8.5 Expected Outputs

The following information should be included in conductor movement reports that are prepared for use in relation to work proposed near Vector's electrical assets:

1. The required outputs listed in Appendix 1.
2. Where applicable, the information listed in the specific modelling conditions, detailed in Section 11 within this document.
3. Ground clearances for all powerlines being modelled.
4. Where applicable, the proximity and depth of any excavation work near Vector assets.
5. Where applicable, the material and proximity of any fencing to Vector overhead electric line supports.
6. In cases where a structure fails to comply with ECP34 Table 3, we require sufficient information to determine the extent of the non-compliance, or suggestions for compliance solutions with supporting evidence.

9. Considerations for Section 3

ECP34 Section 3 explains how safe distances apply to structures near powerlines, but some common situations need extra consideration.

Table 3 has four distance conditions. They differ by direction and whether the structure is accessible to people.

9.1 Buildings

Per ECP34 Figures 3 and 4, the safe distance conditions of Table 3 are combined with each other to form a clearance zone around the structure.

While a building may comply with the minimum safe distances of Table 3, consideration must also be given to scaffolds.

9.2 Scaffolds

Scaffolds are considered as structures, regardless of how long they will remain in place, and therefore must comply with ECP34 Section 3.

For guidance on scaffold engineering assessment requirements, refer to Vector's Scaffolds Near Powerlines – Required Information document.

9.2.1 Hoarding and other protection on scaffolds

Where scaffolding is close to live electricity assets, Vector may require a physical barrier, such as screens or plywood, to help prevent accidental contact with the live electricity asset.

Because barriers can affect scaffold stability, these should be considered during scaffold design.

9.2.2 Minimum platform size and scaffold components

WorkSafe publishes the Good Practice Guidelines: Scaffolding in New Zealand (published date: November 2016), which gives advice on the safe design, use, and maintenance of scaffolding.

In line with WorkSafe's guidance, Vector requires scaffolds consented under a CAC to have at least 450mm of clear access on the scaffold platform.

There are 4 main components that make up the total width of a scaffold (green arrow).

1. The scaffold platform (red arrow). Can be no less than 450mm.
2. The scaffold standards (yellow arrows). Typically, 50mm each.
3. The offset from the building (blue arrow). Typically, can be no larger than 300mm without inside guard rails.
4. Any scaffold couplings or nodes (light blue arrows). Size varies depending on scaffold type.

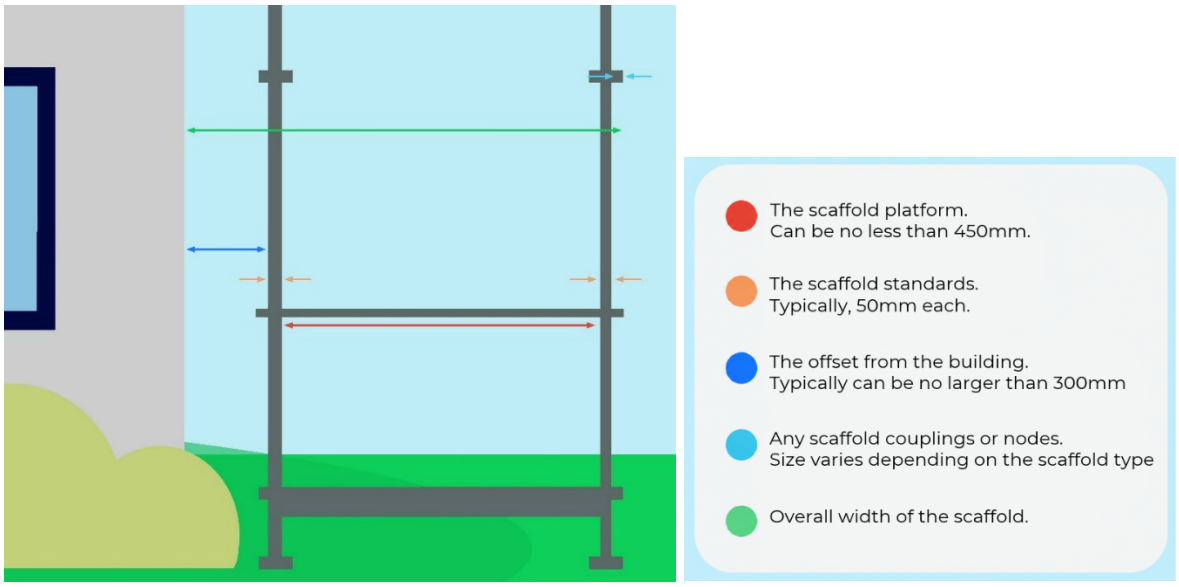


Diagram 6 – Showing an example of a proprietary scaffold that uses hooks that lock into nodes on the scaffold standards. These nodes become the outermost extent of the scaffold and should be captured as part of the powerline movement report.

9.2.3 Application of Table 3 distances to scaffold platforms and handrails

Scaffolds are normally accessible structures that are treated like a balcony. As per ECP34 Figures 3 and 4, the following distances apply:

- Row A to the scaffold platform
- Row B to the scaffold handrail
- Row C as a horizontal measurement to the side of the platform up to the height of either Row A or Row B depending on ECP34 clause 3.4.6

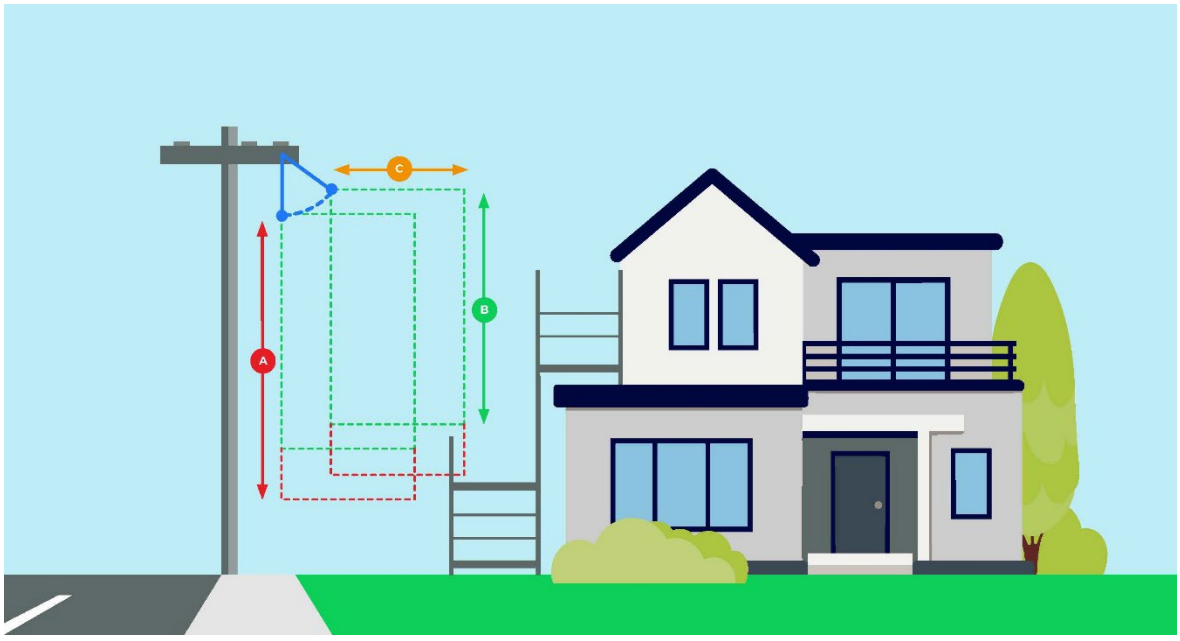


Diagram 3 – Showing the application of Table 3 distances to the different parts of a scaffold. As the powerline swings, the lower scaffold platform can achieve row A distances, the lower scaffold handrail can achieve row B distances, and the upper scaffold area can achieve row C distances.

9.2.4 Application of Table 3 distances to other parts of scaffolds

When modelling scaffolds, additional consideration should be given to parts such as bracing members.

Table 3 row D can be applied to scaffold supports so long as there will be no working platform on these parts and that the people putting the scaffold together can maintain the relevant ECP34 Section 9 clearances at all times.

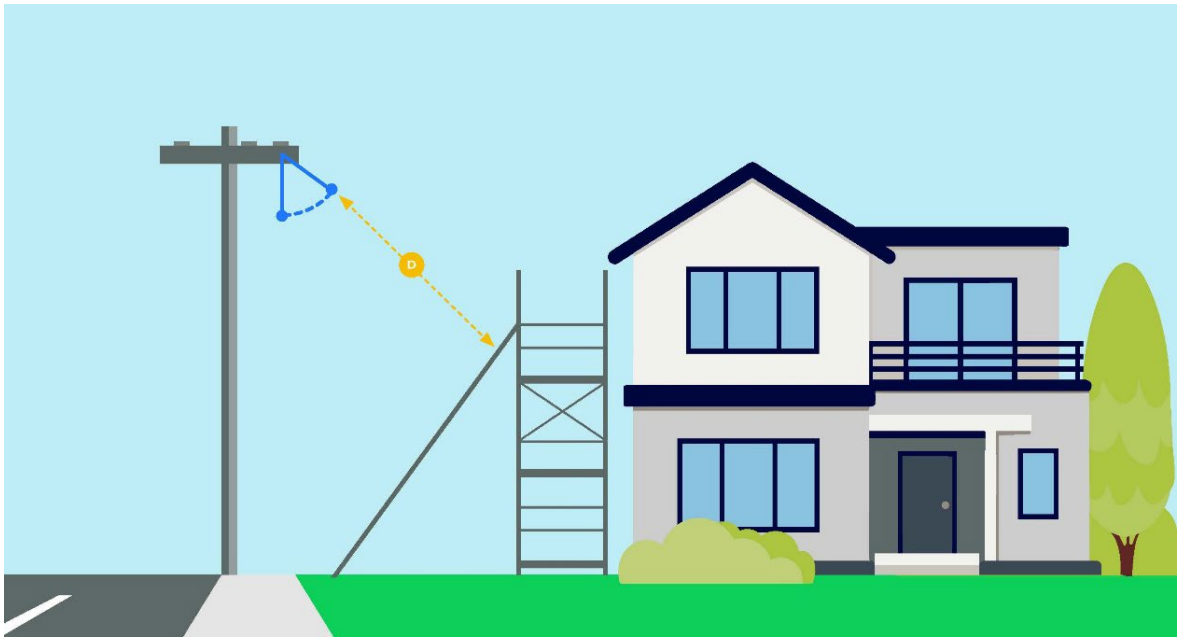


Diagram 4 – Showing the application of Table 3 row D distances to the scaffold support member ONLY.

9.2.5 Persons near powerlines – Section 9

ECP34 Section 9.1.3 specifies that the minimum safe distances of Table 9 must be maintained "at all times". This indicates that powerline movement, where applicable, must be considered when issuing a close approach consent.

Particularly where a scaffold will be near a 33kV or higher powerline, the distance of ECP34 Table 9 is larger than the minimum safe distance of Table 3. Therefore, it will be necessary to consider the distance between a scaffold and the powerlines to enable people to work safely and in compliance with ECP34 on the scaffold.

Powerline swing should be considered as part of Section 9 when people are working aloft. Most types of works will have restrictive weather conditions that specify when works must stop. There may also be other regulatory or industry guidance (in addition to ECP34) to consider regarding safe work at heights.

Modelling in these scenarios should include both:

- the worst-case scenario conditions required under ECP34 Section 3; and,
- the lower wind speed your works are restricted to.

9.2.6 Scaffolds at corners of buildings

When considering scaffolding around corners of buildings, it is important to remember that the distance between the corner of the building and the outermost corner of the scaffold will be larger than the total scaffold width.

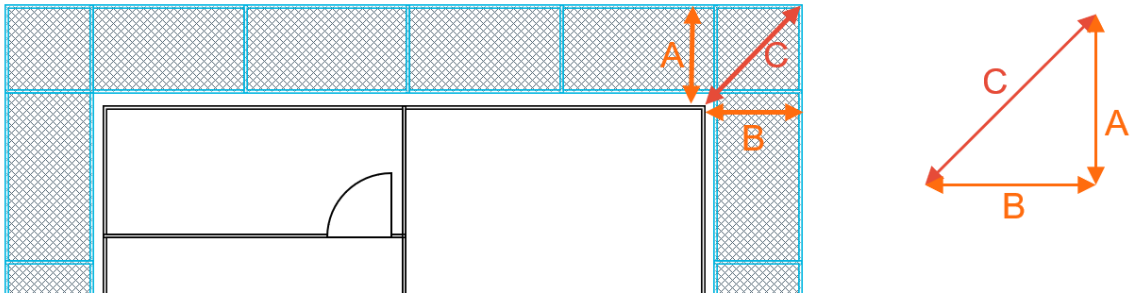


Diagram 5 – Showing the difference between the standard width of the scaffold and the width at the corner of the scaffold.

Using the Pythagorean theorem, we can determine the following:

Distance A and B (m)	Distance C (m)
1.60	2.26
1.00	1.41
0.75	1.06
0.65	0.92

If the corner of the scaffold will be a clearance issue, we can consider the scaffold stopping at the corner of the building. This is why it is then important to have all 3 distances mentioned in the building corner section above.

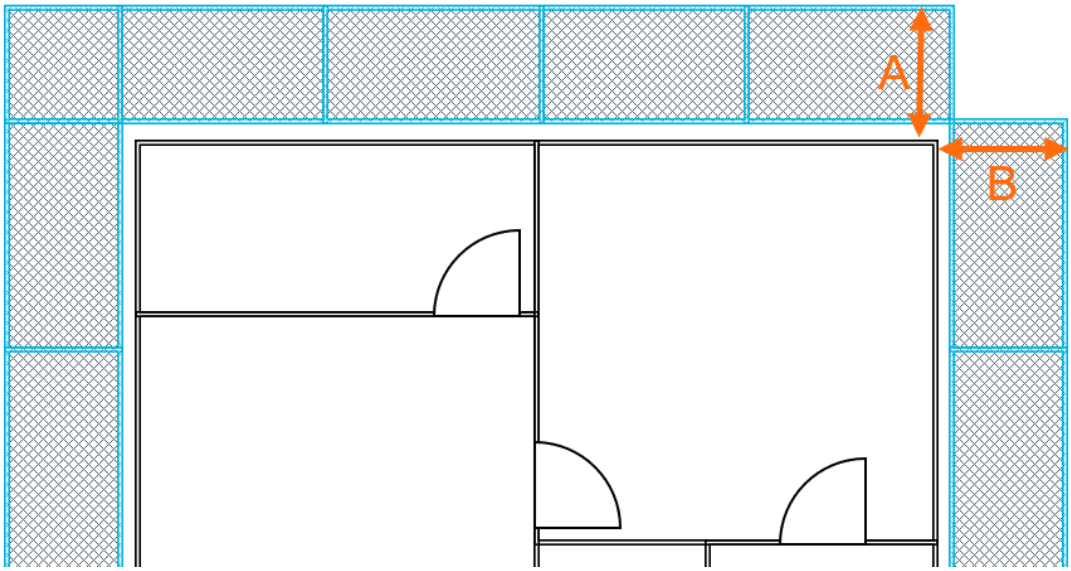


Diagram 6 – Showing a scaffold stopping at the corner of a building to achieve better clearances.

9.3 Row D Application

Row D applies to any structure not normally accessible to persons and applies in any direction. Structures that can be considered for Row D include traffic lights, billboards, signage, etc.

In some cases, installation of the new structure or future maintenance may bring mobile plant or persons within 4 metres of the powerlines. For this reason, Row D must be considered in conjunction with ECP34 Sections 5 and 9.

9.4 Temporary or relocatable buildings and structures

Temporary and relocatable structures must comply with ECP34 at all times. If these will be within default safe distances (i.e. Table 2) to powerlines, an engineering assessment is required.

Future maintenance should also be considered. If there will not be enough room for scaffolding later, consent may require additional controls.

To avoid future costs and delays, it is recommended that future scaffolding or other requirements be considered before building or placing a temporary structure.

9.4.1 High Load Permits

High load permits are required for moving any vehicle and its load that is over 4.3 metres high. Before moving these kinds of loads through the Vector area, you must apply for a high load permit via our website.



Diagram 7 – Showing consideration of clearances between the powerlines and a building being relocated by truck.

9.5 Service Lines

A service line is the powerline that connects a property to the Vector network. Service lines are often privately owned, but Vector may own some or all of a service line in some cases.

ECP34 applies equally to service lines as it does to Vector's distribution electrical assets.

If a CAC is needed near a service line not owned by Vector, consent must come from the owner of that line. Vector cannot consent on behalf of a private owner.

Where a service line is privately owned, then there are also WorkSafe-recommended controls to ensure the safety of workers – the WorkSafe Guidelines for Working near low voltage overhead electric lines. Those Guidelines can be a point of reference for work on privately-owned service lines.

9.5.1 Cover-up gear

Vector doesn't permit cover-up gear (e.g. sleeving) to be used as a means of complying with ECP34 in relation to service lines owned by us. Sleeving a line adds significant weight to the line, which increases the loading on Vector's poles.

For the same reason, Vector also does not recommend the use of cover-up gear on privately owned service lines. The additional weight of the cover-up gear could cause the attachment points of the line and/or the customer's end to fail. If the covering of privately owned service lines causes the Vector pole or pole hardware to fail, then the person responsible for the sleeving will be responsible for the costs of the repair of Vector's electrical assets.



You are responsible for the work (including its consequences) that you choose to carry out near your privately owned service lines (as well as the work you choose to carry out near Vector's existing electricity assets).

10. Other Considerations

10.1 Where a low line exists

If you believe a Vector-owned powerline may be too low, please contact Vector.

If an engineering assessment identifies a clearance issue to a new structure near a low line, ask your engineer to provide the exact clearances to Vector.

Vector will review and action any required network changes as soon as reasonably practicable. However, fixing a low line may not always mean the proposed construction work can go ahead.

10.2 Lifting over powerlines

In line with ECP34 Section 5.3.1, permission from Vector is required to move any load over a powerline.

Vector will only allow loads to be lifted over powerlines in exceptional cases. If allowed, the line will need to be de-energised, which may require night work or other low-demand times.

The person or organisation requesting de-energisation is responsible for related costs.

Requests for de-energisation must be made to Vector at least six weeks in advance.

These requests can be made by calling 0508 VECTOR.

11. Specific Modelling Requirements (Engineering Assessment)

11.1 Swing Path & Blowout Curve

The closest point between a powerline and structure may not occur at mid span or maximum swing. The entire swing pathway and blowout curve of the powerline must be considered.

11.1.1 Swing path

Swing path is the path taken by the powerline from its normal position with no wind to its swing position with worst case scenario winds.

Sites that achieve horizontal compliance at maximum swing can be assumed to comply at all stages of the swing pathway. Conversely, sites relying on vertical compliance may not comply at all stages of the swing pathway. In these cases, measurements along the swing pathway are expected to be included in the engineering assessment.

Where manual measurements are completed, i.e. where computer modelling that can easily consider various wind speed impacts is not used, intervals of 100Pa are expected to be used to check compliance along the swing path.

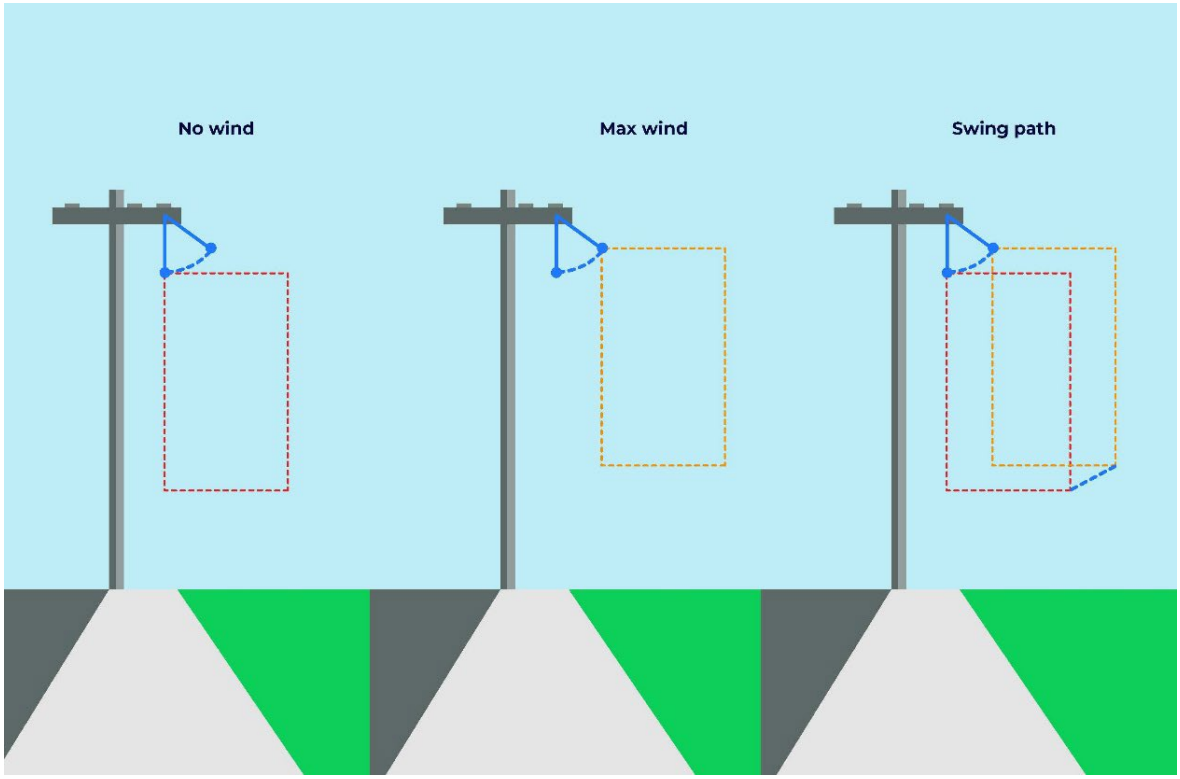


Diagram 8 – Showing the swing path of the powerline and the resulting Table 3 minimum safe distances.

11.1.2 Blowout curve

Blowout curve is the curve of the powerline when it swings under worst case scenario winds. The maximum blowout point may not always occur in the middle of the span.

The position of the structure in relation to the blowout curve determines the closest point between the structure and the powerline.

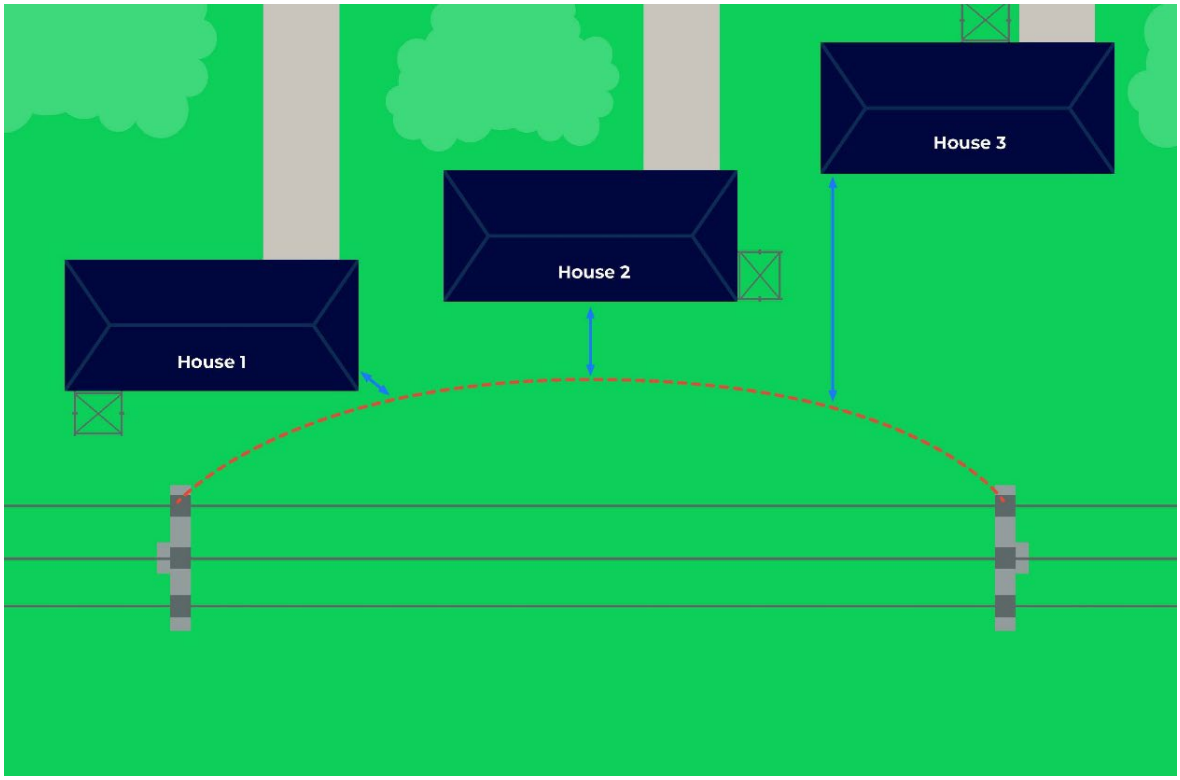


Diagram 9 – Showing the blowout curve and that different parts of this curve may be the closest point depending on the location of the structure.

11.2 Hot Sag

Similarly to the powerline's swing path, to comply with ECP34 Section 3, the structure must meet the minimum safe distances across the entire path the powerline takes as it sags with variations in temperature. These variations in powerline sag can occur with changes in ambient temperature, from a cool morning to the heat of a summer's day, or with temperature changes in the powerline during load variations.

Winds blowing on powerlines have a cooling effect. Therefore, the tension of the powerline at hot sag condition should not be used for swing calculations.

If a vertical non-compliance is identified at a lower temperature, the temperature at which the non-compliance first occurs should be recorded in the engineering assessment.



Diagram 10 – Showing the distance between the powerline and structure at (A) ambient conditions, and (B) hot sag conditions.

11.3 Leaning poles

Poles will almost inevitably lean over time due to a variety of factors. A leaning pole is not necessarily a safety issue or a network concern. The pole type, degree of lean, and the equipment the pole is supporting determines whether the pole lean needs to be corrected and the timeframe for those corrective works.

Where a pole is leaning towards the structure under consideration, the existing pole lean must be accounted for in the conductor movement report.

Where a pole is leaning away from the structure under consideration, the pole must be assumed to be plumb in the conductor movement report. Vector may correct the pole lean at any time. So, the distances from the pole in its 'normal' state must be considered.

11.3.1 Correction of leaning poles.

If a pole leans but its condition nonetheless continues to align with good industry practice and Vector's standard asset management criteria, then Vector may not always (or, depending on the circumstances, may not always be able to) further straighten the pole.

Therefore, it is not recommended to rely on pole straightening as a resolution to an ECP34 clearance issue.

11.3.2 Where applicable, additional information to include in conductor movement reports:

- Degree and direction of pole lean and how it was measured.
- High-quality images of the pole from the date of inspection.



Diagram 11 – Showing a pole without lean (plumb pole).



Diagram 12 – Showing a pole leaning away from a structure, the no lean position must be considered.



Diagram 13 – Showing a pole leaning towards a structure, the current lean must be considered.

11.4 Termination poles

NZECP34 does not explicitly discuss termination poles. However, it defines a conductor as a "… form of metal designed for carrying electric current". This means that any electrical hardware on a pole is a conductor, including fuses, transformer tails, cable terminations, among other things. It could also be argued that transformer tanks could be considered conductors, as they are designed to carry fault current to earth during transformer faults. Thus, persons and structures must maintain safe distances from all metal designed for carrying electric current.

Termination poles typically support other electrical hardware, often on the reverse side of the pole. As the Table 2 and Table 3 clearance distances of conductors to buildings and other structures do not specify a minimum span length, they apply to all conductors, including the electrical hardware on termination poles. These distances must be accurately reported on as part of an engineering study to apply. Where applicable, the following information may additionally need to be included in conductor movement reports:

- Distance between proposed structure and closest live parts.
- Distance between proposed structure and power pole.

There are two scenarios to consider if the termination pole does not comply with Table 2:

11.4.1 Scenario 1 - Where the crossarm on a termination pole runs parallel and the conductors perpendicular to and away from the building/structure; or at an obtuse angle and the conductors to and away from the building/structure:

In this case, since there are no conductors continuing on towards the building/structure, sag and wind deviation of the conductors are not relevant, so wind modelling would not be required when doing an application for a CAC.

11.4.2 Scenario 2 - Where the crossarms on a termination pole run at an acute angle to the building/structure, with the conductors running away from the building/structure:

In this case, where the conductors are not perpendicular to the building/structure but rather run partly along the structure at an acute angle to the building, sag and wind deviation will affect the proximity of the conductors to the building/structure, so modelling would be required.

The CAC application must show the crossarm in relation to the building/structure and the angle (obtuse and acute) of deflection of the powerlines from the crossarm or pole for both scenarios. Wind calculations are not needed for Scenario 1.

11.4.3 Similarly, the minimum approach distances for mobile plant and persons, outlined in Section 5 and Section 9 respectively, apply to all live conductors, including the electrical hardware on termination poles.

From a practical point of view, the termination or any other hardware at the top or reverse side of the pole presents a danger to structures and personnel. It would not make sense to allow structures or personnel to encroach upon conductors on the non-line side of a termination pole any closer than is allowed on the line side of a pole. Otherwise, a structure could be built, or personnel could approach, so close to the conductors that it would clearly be a danger and unsafe, which would go against the purpose of NZECP34; to protect persons, property, vehicles, and mobile plant from harm or damage from electrical hazards.

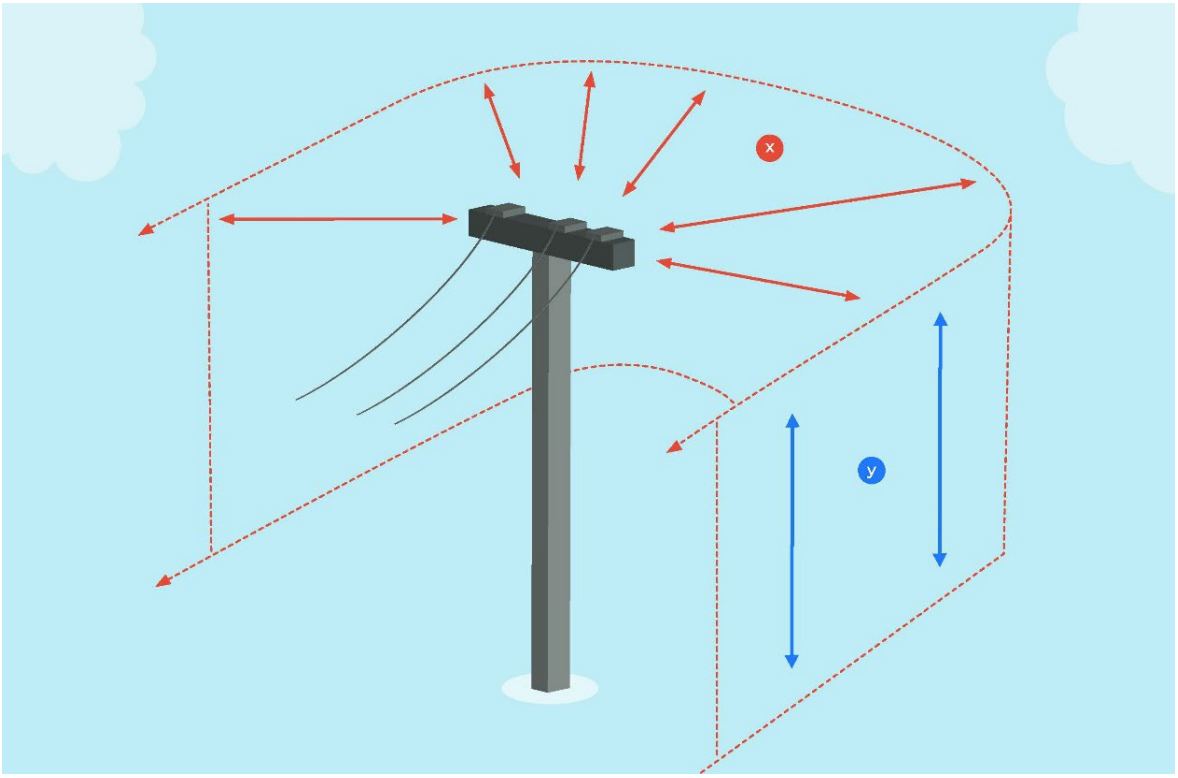


Diagram 14 – Showing how the Table 2 distances are applied to a termination pole.

11.5 Roof vs building wall

Conductor movement reports must show the closest point between the powerline and the structure. For buildings alone (i.e. not considering scaffolds required for construction or maintenance), this closest point is typically the roof as opposed to the building wall.

Despite this, knowing the clearance to the building wall, in addition to the roof distance, can support decision-making for scaffold sizes* and potential network or building changes. For this reason, clearances to the building wall should be included in conductor movement reports.

*Scaffold sizes can be measured based on the building wall rather than the roofline.

11.5.1 Where applicable, additional information to include in conductor movement reports:

- Distance between building wall and powerline when it swings.



Diagram 15 – Showing the difference in distances from the powerline between a building roof and a building wall.

11.6 Convergence

Powerlines are rarely perfectly parallel to structures. In some cases, the distance between the powerlines and structure can differ significantly at either end of the span. Where this is the case, distances at either end of the span may need to be provided.

As with the example below, the building is intended to be 4 separate units. By providing the distances at either end of the span, it can help indicate to both Vector and the property owner if all or only specific units are impacted and therefore the level of change that is required.

11.6.1 Where applicable, additional information to include in conductor movement reports:

- Distance between structure and powerline at each extreme end of a convergence.

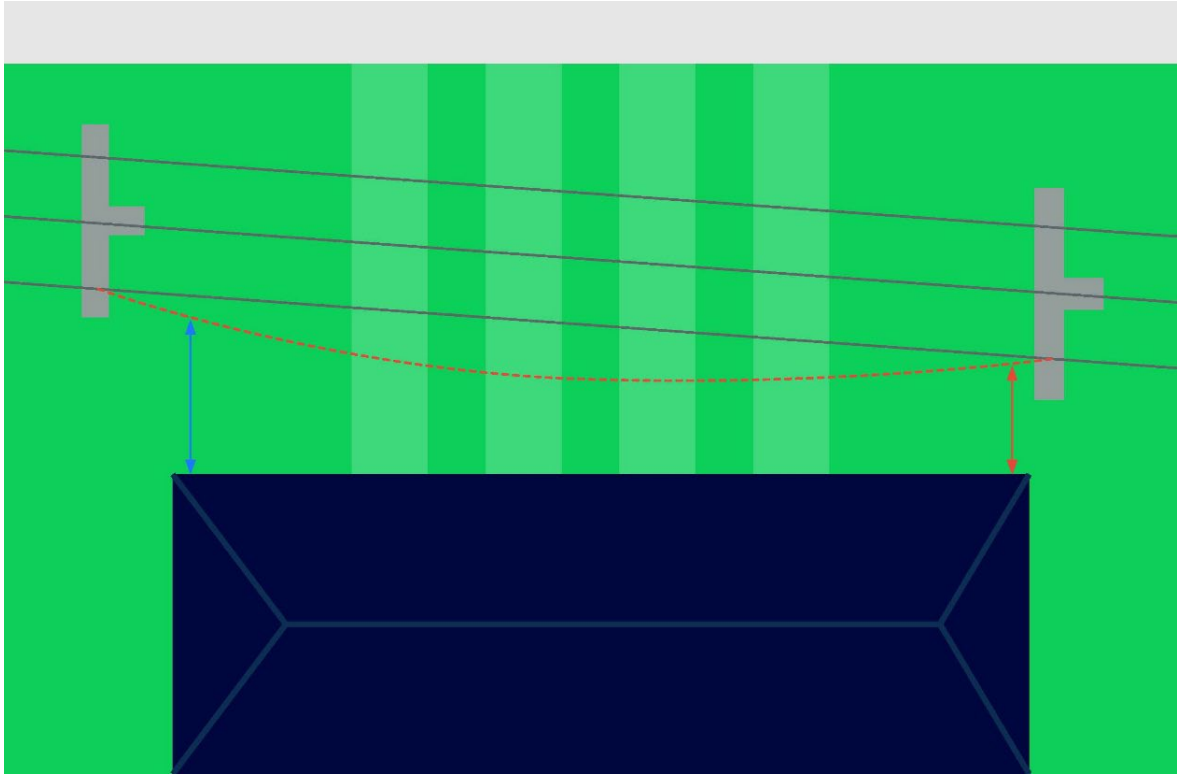


Diagram 16 – Showing the difference in distances at either end of a powerline that converges with a structure.

11.7 Building corners as the closest point

A corner of a building being the closest point to powerlines can introduce complications with scaffolds. To give both Vector and the building owner clarity, additional clearance information should be included.

11.7.1 Where applicable, additional information to include in conductor movement reports:

- The closest point – measurement B.
- The distances between the corner of the building and the powerline at 90 degrees from the building wall – measurements A and C

These distances should be taken to the building wall.

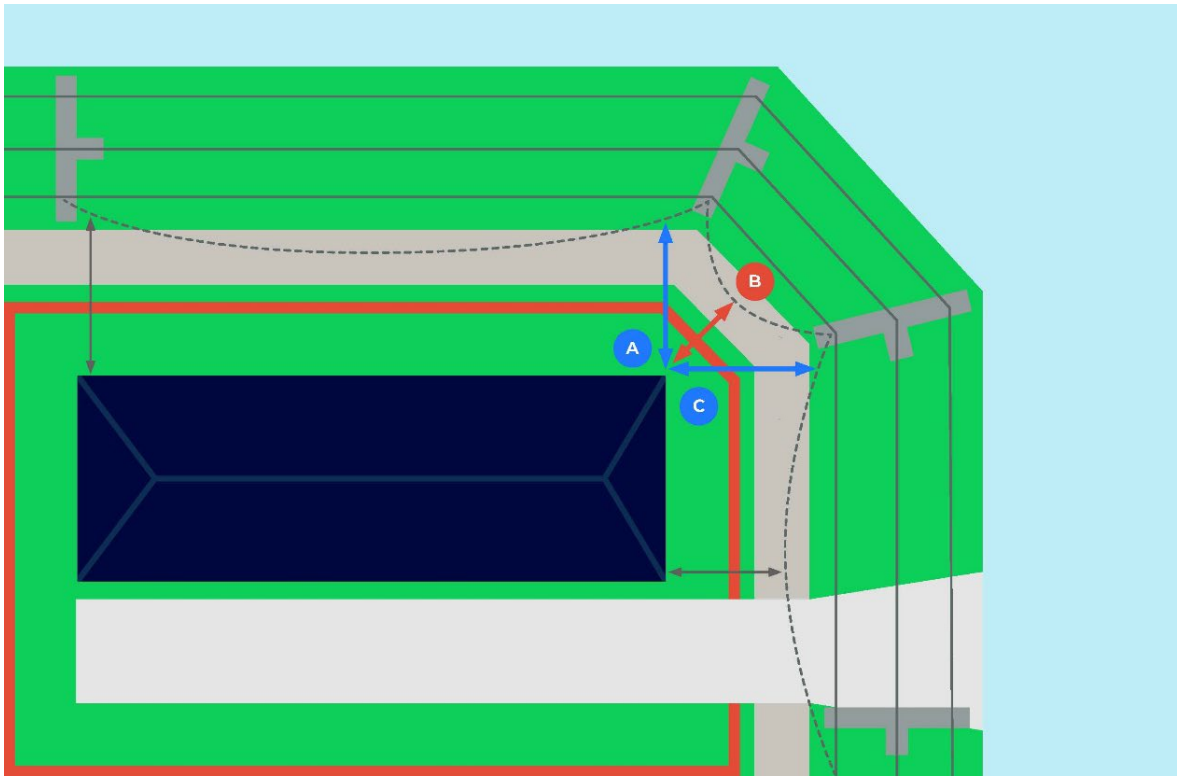


Diagram 17 – Showing the required distances to be included as part of the conductor movement report when the corner of a building is the closest point.

12. Network changes as solutions to Table 3 Non-Compliance

If a proposed structure does not meet ECP34 Table 3 clearances, Vector may consider network changes to improve clearances provided that the person requesting the change pays the related costs as required by our published capital contributions policy.

12.1 Potential Network Changes

Possible network changes include, aerial bundled conductor, taller poles, mid-span poles or undergrounding, depending on the site and network constraints.

Undergrounding remains the preferred method of removing clearance issues as it physically removes the risk of contact with live overhead powerlines.

12.1.1 Aerial Bundle Conductor (**ABC**)

Replacing open wire construction with aerial bundled conductor (ABC) is possible in some situations for 415V powerline only.

The maximum size of low-voltage ABC is 150mm2 aluminium and therefore cannot be used where the existing or likely future network will require capacity greater than can be supplied by a 150mm2 aluminium cable.

Owing to the additional and concentrated loading of ABC, ABC is not suitable for cantilevering as it places too great a bending movement on the pole.

This option will require additional modelling.

12.1.2 Taller Poles

Taller poles are only usually suitable where vertical clearances are the primary issue.

Vector is bound by Auckland Unitary Plan's resource consent requirements. Some parts of Auckland have height restrictions that restrict the installation of taller poles or limit the height of pole that can be used.

This option will require additional modelling.

12.1.3 Midspan pole

Mid-span poles have the benefit of significantly reducing the swing of powerlines.

Vector is bound by Auckland Unitary Plan's resource consent requirements. Unless there is an existing clearance issue, a mid-span pole will require resource consent. This option will require additional modelling.

12.1.4 Undergrounding

If suitable routes are available (depending on what already exists in the ground), affected spans can be placed underground. As well as ensuring ECP34 compliance, undergrounding has additional advantages, such as improving the aesthetic value of the building, which may increase its value.

Undergrounding can be an expensive solution and may not always be economically viable. The consents of neighbouring properties currently supplied by overhead lines to modify their properties to accept underground connections will be required.

This option does not require additional modelling.

12.1.5 Cantilevering

Cantilevering is not a preferred solution for Vector owing to the increased loading it places on poles and the reduced flexibility it gives Vector for network upgrading and accommodating future requirements. As such this is limited to solutions for existing buildings only.

To avoid conflict with road users, Vector will not cantilever where the powerlines or crossarms end up over roads, right of ways or other areas where large vehicle access may be required.

12.2 Process for Network Changes

Before a network change can go ahead, Vector requires the following:

1. Engineering modelling showing network change will achieve required clearances to structure.
2. Consent (if required) from Auckland Council or any impacted property owners. This needs to be obtained by the requestor typically.
3. Vector project number for proposed network changes.
4. Once network changes are completed, Vector requires the following:
5. Updated engineering modelling proving network changes have been successfully implemented and required clearances can be maintained.

In some cases, a network change may result in marginal hypothetical clearances. Vector does not recommend pursuing such network changes as a hypothetically modelled network is not always achievable on site. We will provide you with more details in these cases.

If the post-works engineering assessment shows that the network changes have failed to achieve the correct clearances, an alternative solution will need to be identified at the customer's cost.

13. Historical or old building issues

Buildings built before ECP34:2001 came into force in August 2001 are still considered compliant if these meet the rules in place at the time and the work was done there have been no major changes to the building or nearby powerlines since. This does not apply to new additions, scaffolding or other structures needed for maintenance today.

Where practical, Vector will endeavour to work with building owners to provide solutions to enable maintenance works to proceed whilst maintaining ECP34 compliance. Costs will usually be incurred by the person requesting the work. Owners of historical or old buildings are encouraged to consider a permanent solution directed at ensuring compliance with the newer standards set under ECP34, such as undergrounding, to help avoid future cost or disruption.

Appendix 1 – Engineering Assessment Submission Checklist

Field-ready checklist for engineering assessments submitted to Vector under ECP34 Section 3. Please note that Vector may request modelling files, calculations, and supporting data.

Site Address		**Report ID / Revision**	
Verified Person / Party		**Date of Inspection**	

Category	Checklist
General Report	☐ Unique report identifier included ☐ Revision history included ☐ Issue date included ☐ Validity period stated ☐ Page / figure / table numbering present
Site Details	☐ Site address included ☐ Site inspection/survey date included ☐ Weather conditions at inspection recorded ☐ Pole ID numbers included (or noted that Vector was contacted) ☐ Site map/context showing poles and structure ☐ Input documents attached (building plans, scaffold plans, designs, etc.)
Inputs & Measurements	☐ Pole location (relative to structure/boundary) documented ☐ Pole plumbness/lean measured and recorded ☐ Pole height and crossarm height recorded ☐ Crossarm width/offset/angle recorded ☐ Conductor attachment points recorded ☐ Conductor type and voltage recorded ☐ No-movement clearance distances recorded ☐ Conductor sag characteristics documented (including location of max sag) ☐ Elevations of poles and structure documented
Modelling Conditions	☐ Wind model includes 0–120 km/h (0–725 Pa) or higher if local data requires ☐ Hot sag model includes 75°C ☐ Conductor swing path assessed across the full swing envelope
Required Outputs	☐ Clearances at 0 km/h (no wind) provided ☐ Clearances at max modelled wind provided ☐ Worst-case (minimum) clearance across wind range identified ☐ Hot sag clearance results provided (if required) ☐ Distances between new structures and HV poles assessed (where relevant)
Scenario Checks (where applicable)	☐ Leaning poles ☐ Termination poles ☐ Roof vs building wall ☐ Convergence ☐ Building corners as the closest point ☐ Scaffold considerations
Declaration	☐ Assessment assumptions and limitations stated ☐ All inputs available on request